



Amplifier Built-in

NEW

ULTRA-COMPACT LASER SENSOR

EX-L200 SERIES



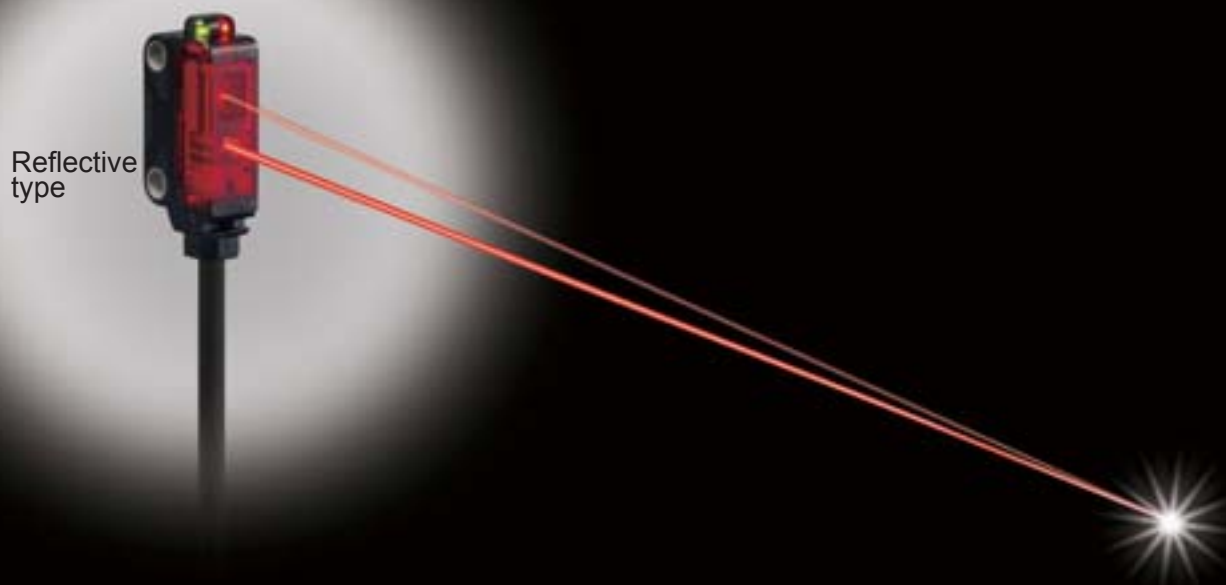
Conforming to
EMC Directive

FDA



Thru-beam
type

**Built-in amplifier in this size?
Introducing world smallest***
Amplifier Built-in **Laser Sensor**



Reflective
type

* Based on research conducted by SUNX as of April 2010

Introducing world smallest* amplifier built-in laser sensor

* Based on research conducted by SUNX as of April 2010

High precision detection is fulfilled in a world smallest size with directivity and visibility achievable only by laser. The laser adopted is Class 1 (JIS / IEC / FDA) laser that is safe to use, so that there is no need to separate the areas of sensor usage.

Reflective
type

NEW

Addition of reflective type!

Minute object detection type (Reflective type) EX-L221

A long range detection of 300 mm **11.811 in** is achieved by this ultra-compact sensor. A spot size of \varnothing 1 mm **\varnothing 0.039 in** can be easily used on various applications.

0.01 mm
0.0004 in

gold wire can also be detected!

Sensing range: 45 to 300 mm **1.772 to 11.811 in**

Spot size: \varnothing 1 mm **\varnothing 0.039 in**

(at a sensing distance of 300 mm **11.811 in**)*

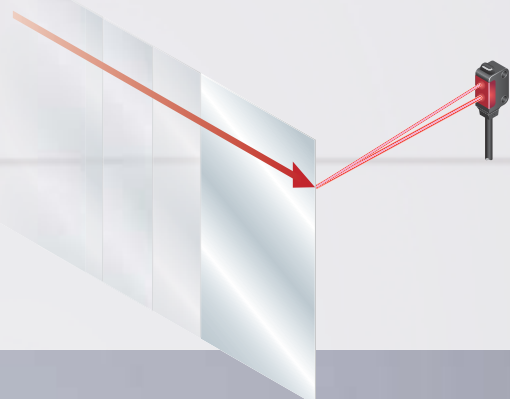
* Visual reference value

High precision

Suitable for positioning and minute object detection

EX-L221

A repeatability of 0.02 mm **0.0008 in** or less at a range of from 100 mm to 200 mm **3.937 to 7.874 in** makes this type best suitable for positioning applications. Moreover, it boasts a top-class detection precision in the compact laser sensor category with its min. sensing object being \varnothing 0.01 mm **\varnothing 0.0004 in**. The same aspheric surface glass lens used in the thru-beam type is adopted to minimize aberration and deliver a high quality beam spot.

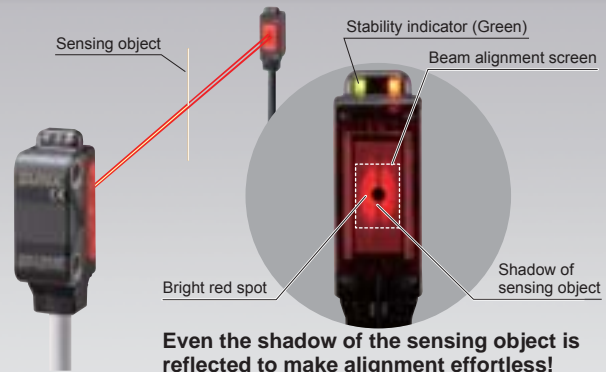


Easy alignment

Beam alignment is easy

EX-L211 EX-L212

Beam alignment is carried out by looking at the red spot reflected on the beam alignment screen to match with the actual object. The optimum position can be understood at a glance by looking at the beam alignment screen and stability indicator (green).



Thru-beam type



Long sensing range type (Thru-beam type) EX-L212

A long range detection of 3 m 9.843 ft is achieved. High precision detection with minimum beam spread is possible even in a long range.

Laser beam has little beam spread!

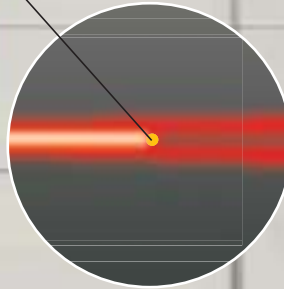
3 m 9.843 ft
long range detection

Sensing range: 3 m 9.843 ft
Spot size: 8 × 5.5 mm 0.315 × 0.217 in approx.
(at a sensing distance of 1 m 3.281 ft)*

* Visual reference value

Minute object detection type (Thru-beam type) EX-L211

The beam is purposely widened to have a lower beam density and little beam spread so that when detecting minute objects, even a slight change in the light received intensity will not be missed.



0.3 mm 0.012 in
minute object is detectable
at any location in between
the emitter and receiver!

Sensing range: 1 m 3.281 ft
Spot size: 6 × 4 mm 0.236 × 0.157 in approx.
(at a sensing distance of 1 m 3.281 ft)*

* Visual reference value

Min. sensing object ø0.3 mm ø0.012 in (typical)

EX-L211

The ø0.5 mm ø0.020 in light receiving slit cuts out any unnecessary beam. As only the beam which enters into the slit becomes valid, an accurate and precise detection is possible. This is effective for minute object detection or small difference in level detection.

Also, the aspheric surface adopts a glass module lens to deliver a high quality spot beam.

Secret behind
high precision:
ø0.5 mm
(ø0.020 in) slit

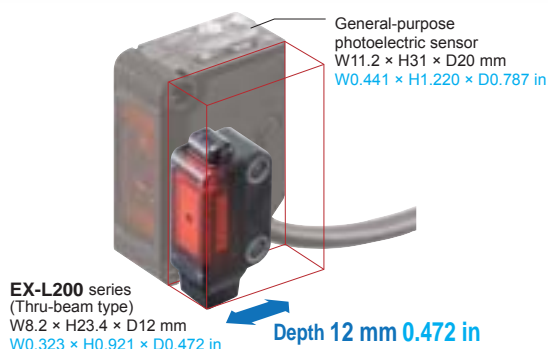


Ultra-compact

World smallest* size of reflective type, thru-beam type

* Based on research conducted by SUNX as of April 2010

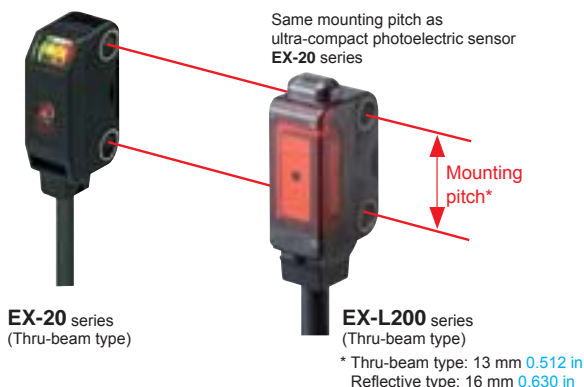
The customized IC and the new structural design pursue a compact size. With its volume being approx. 67% decreased (thru-beam type) and approx. 58% decreased (reflective type) from general photoelectric sensors, an amplifier built-in laser sensor is now offered in a compact body that is in the range of conventional ultra-compact photoelectric sensors.



Easy setting

Same mounting pitch as ultra-compact photoelectric sensor

EX-L200 series has the same mounting pitch as ultra-compact photoelectric sensor EX-20 series so that the time taken in designing is saved.



Environmental resistance

Strong against water and dust with protection structure IP67

The sensor can be used even in environment where water or dust present because of its protection structure IP67.



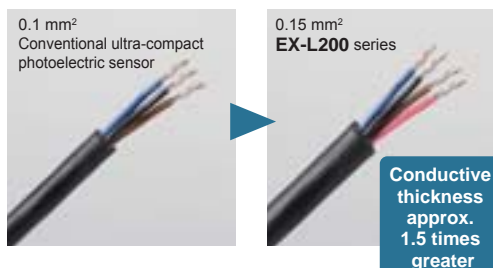
High usability

M3 screw used for secure tightening

The mounting holes have metal sleeves inserted to prevent damage to the sensor due to over tightening of the screws. It is possible to tighten securely with M3 screws. (Tightening torque: 0.5 N·m)

Conductor thickness 1.5 times increased to make wiring easier

The lead wire conductor's thickness is increased to 0.15 mm² from 0.1 mm² of the conventional ultra-compact photoelectric sensor. This makes it easier to perform crimping work on the cables for better workability. In addition, the tensile strength of the crimping area has become stronger.



Sensitivity adjuster EX-L211 EX-L221

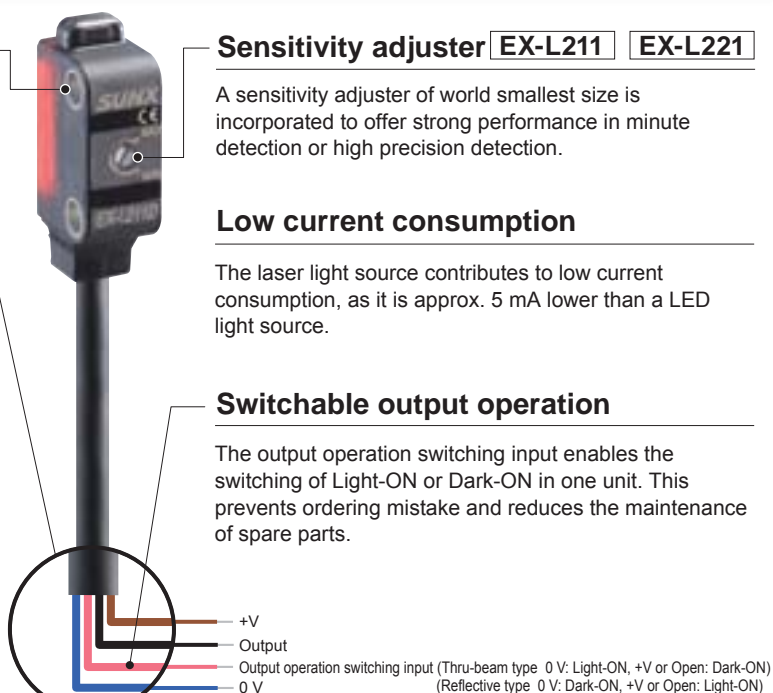
A sensitivity adjuster of world smallest size is incorporated to offer strong performance in minute detection or high precision detection.

Low current consumption

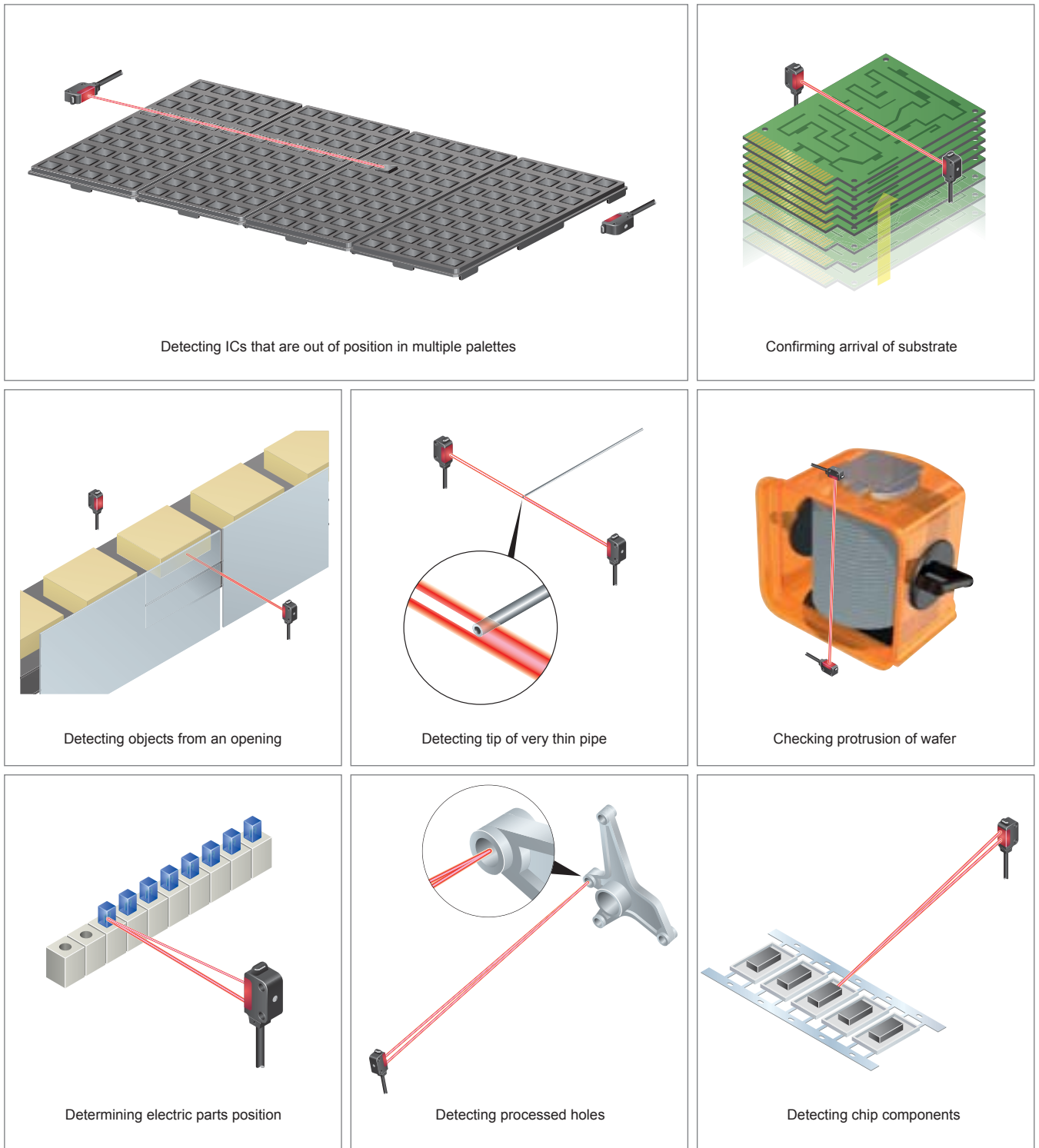
The laser light source contributes to low current consumption, as it is approx. 5 mA lower than a LED light source.

Switchable output operation

The output operation switching input enables the switching of Light-ON or Dark-ON in one unit. This prevents ordering mistake and reduces the maintenance of spare parts.



Laser is applicable for various usages.



ORDER GUIDE

Type	Appearance	Sensing range	Model No.		Emission spot size	Sensitivity adjuster
			NPN output	PNP output		
Thru-beam	Minute object detection type	1 m 3.281 ft	EX-L211	EX-L211-P	Approx. 6 × 4 mm 0.236 × 0.157 in (at a sensing distance of 1 m 3.281 ft)	Incorporated
	Long sensing range type	3 m 9.843 ft	EX-L212	EX-L212-P	Approx. 8 × 5.5 mm 0.315 × 0.217 in (at a sensing distance of 1 m 3.281 ft)	—
Spot reflective	Minute object detection type	45 to 300 mm 1.772 to 11.811 in	EX-L221	EX-L221-P	ø1 mm ø0.039 in or less (at a sensing distance of 300 mm 11.811 in)	Incorporated

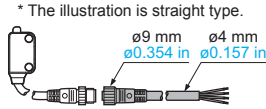
ORDER GUIDE

Pigtailed type and 5 m 16.404 ft cable length type

Pigtailed type and 5 m 16.404 ft cable length type (standard: 2 m 6.562 ft) are also available.
 When ordering these types, suffix “-J” for the pigtailed type, “-C5” for the 5 m 16.404 ft cable length type to the model No.
 Please order the mating cable separately.
 (e.g.) Pigtailed type of EX-L211-P is “EX-L211-P-J”
 5 m 16.404 ft cable length type of EX-L211-P is “EX-L211-P-C5”

Mating cable

•CN-24A-C2 •CN-24AL-C2
 •CN-24A-C5 •CN-24AL-C5



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

Type	Model No.	Cable length
Straight	CN-24A-C2	2 m 6.562 ft
	CN-24A-C5	5 m 16.404 ft
Elbow	CN-24AL-C2	2 m 6.562 ft
	CN-24AL-C5	5 m 16.404 ft

Accessory

•MS-EXL2-2 (Mounting plate for thru-beam type): 1 pc.
 •MS-EXL2-3 (Mounting plate for spot reflective type): 1 pc.

SPECIFICATIONS

Item	Type		Thru-beam		Spot reflective
	Model No.	NPN output	Minute object detection	Long sensing range	Minute object detection
		PNP output	EX-L211	EX-L212	EX-L221
		EX-L211-P	EX-L212-P	EX-L221-P	
Sensing range		1 m 3.281 ft	3 m 9.843 ft	45 to 300 mm 1.772 to 11.811 in (for non-gloss white paper 100 × 100mm 3.937 × 3.937 in)	
Emission spot size (Typical)		6 × 4 mm 0.236 × 0.157 in (vertical × horizontal) (at a sensing distance of 1 m 3.281 ft)	8 × 5.5 mm 0.315 × 0.217 in (vertical × horizontal) (at a sensing distance of 1 m 3.281 ft)	ø1 mm ø0.039 in or less (at a sensing distance of 300 mm 11.811 in)	
Sensing object		Opaque object of ø2 mm ø0.079 in or more	Opaque object of ø3 mm ø0.118 in or more	Opaque, translucent or transparent object	
Minimum sensing object (Typical)		Opaque object of ø0.3 mm ø0.012 in	—	Gold wire of ø0.01 mm ø0.0004 in	
Repeatability		Perpendicular to sensing axis: 0.05 mm 0.0020 in or less			
Repeatability (Typical) (perpendicular to sensing axis)		0.01 mm 0.0004 in or less (all area)	0.01 mm 0.0004 in or less (2700 to 3000 mm 106.299 to 118.110 in or less) 0.015 mm 0.0006 in or less (within 2700 mm 106.299 in)	0.02 mm 0.0008 in or less (at 100 to 200 mm 3.937 to 7.874 in sensing distance)	
Supply voltage		12 to 24 V DC ±10 % Ripple P-P 10 % or less			
Current consumption		Emitter: 10 mA or less, Receiver: 10 mA or less		15 mA or less	
Output		<NPN output type> NPN open-collector transistor •Maximum sink current: 50 mA •Applied voltage: 26.4 V DC or less (between output and 0 V) •Residual voltage: 2 V or less (at 50 mA sink current) 1 V or less (at 16 mA sink current)	<PNP output type> PNP open-collector transistor •Maximum source current: 50 mA •Applied voltage: 26.4 V DC or less (between output and +V) •Residual voltage: 2 V or less (at 50 mA source current) 1 V or less (at 16 mA source current)		
	Output operation	Light-ON / Dark-ON selectable by the output operation switching input			
Short-circuit protection		Incorporated			
Response time		0.5 ms or less			
Interference prevention function		—		Incorporated (Two sensors can be mounted close together.)	
Sensitivity adjuster		Continuously variable adjuster (incorporated on the receiver)	—	Continuously variable adjuster	
Protection		IP67 (IEC)			
Ambient temperature		-10 to +55 °C +14 to +131 °F (No dew condensation or no icing condition), Storage: -30 to +70 °C -22 to +158 °F			
Ambient humidity		35 to 85 % RH, Storage: 35 to 85 % RH			
Emitting element		Red semiconductor laser class 1 (IEC / JIS), Class I (FDA) (Maximum output: 390 µW (EX-L221□: 2 mW), Peak emission wavelength: 655 nm 0.026 mil)			
Material		Enclosure: Polybutylene terephthalate, Front cover: Acrylic, Lens: Glass			
Cable		0.15 mm ² 4-core (emitter of a thru-beam type: 2-core) cable, 2 m 6.562 ft long			
Weight		Net weight: Emitter; 40 g approx., Receiver; 40 g approx., Gross weight: 90 g approx.		Net weight: 45 g approx., Gross weight: 60 g approx.	
Accessory		MS-EXL2-2 (Metal plate): 2 pcs.		MS-EXL2-3 (Metal plate): 1 pc.	

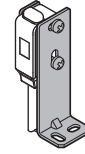
Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73.4 °F.
 2) In the case sensing distance is 3 m 9.843 ft, the emission spot size is 17 × 11 mm 0.669 × 0.433 in (vertical × horizontal)(visual reference value).
 3) This 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). For details, refer to the Laser Notice No. 50.

OPTIONS

Designation	Model No.	Description
Sensor mounting bracket	MS-EXL2-1	Foot angled mounting bracket Two brackets are needed.

Sensor mounting bracket

• **MS-EXL2-1**

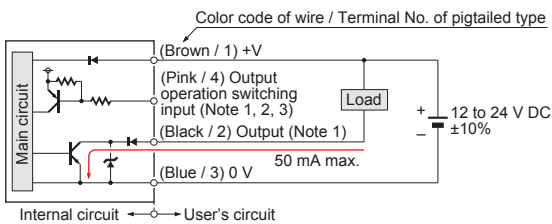


Material: Stainless steel (SUS304)
Two M3 (length 14 mm 0.551 in) screws with washers [stainless steel (SUS304)] are attached.

I/O CIRCUIT DIAGRAMS

NPN output type

I/O circuit diagrams



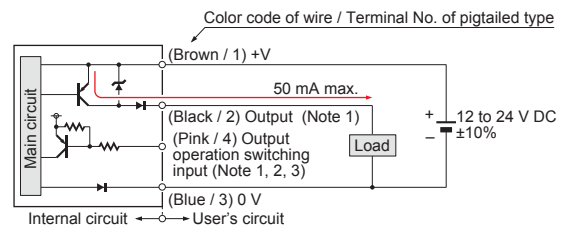
- Notes: 1) The emitter of a thru-beam type does not incorporate output (black / 2) and output operation switching input (pink / 4).
2) Be able to select either Light-ON or Dark-ON by wiring the output operation switching input (pink / 4) as shown in the following table.
3) When connecting the mating cable to the pigtailed type, color code of wire is "white".

Type	Light-ON	Dark-ON
Thru-beam	Connect to 0 V	Connect to +V or, Open
Spot reflective	Connect to +V or, Open	Connect to 0 V

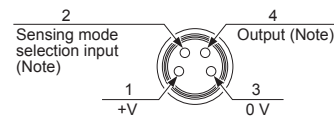
* Insulate the output operation switching input wire (pink / 4) when leaving it open.

PNP output type

I/O circuit diagrams



Connector pin position (pigtailed type)



Note: The emitter of a thru-beam type does not incorporate output and output operation switching input.

PRECAUTIONS FOR PROPER USE

- This catalog is a guide to select a suitable product. Be sure to read the instruction manual attached to the product prior to its use.



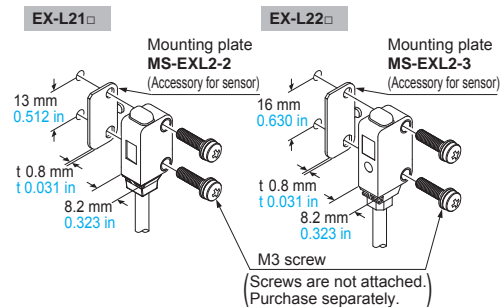
- Never use this product as a sensing device for personnel protection.
- In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.



- This product is Class 1 laser in compliance with IEC / JIS and FDA regulations 21 CFR 1040.10 and 1040.11. Do not look at the laser beam through optical system such as a lens.

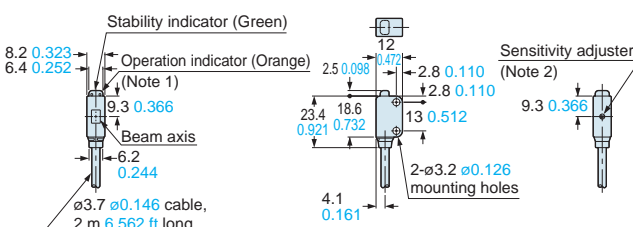
Mounting

- When mounting this sensor, use a mounting plate (**MS-EXL2-2**, **MS-EXL2-3**). Also, install the mounting plate in between the sensor and the mounting surface.
 - The tightening torque should be 0.5 N·m or less.
- Note: The mounting direction of the mounting plate is fixed. Install in a way so that the bending shape is facing the sensor side.



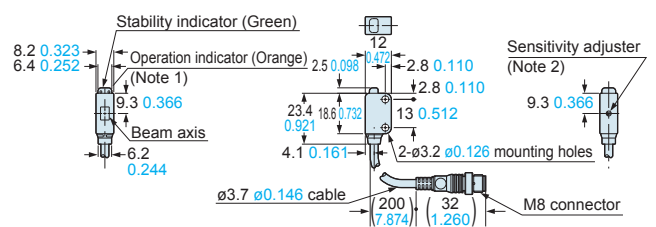
DIMENSIONS (Unit: mm in)

EX-L211(-P) EX-L212(-P) Sensor



- Notes: 1) It is the laser radiation indicator (green) on the emitter.
2) It is incorporated in **EX-L211(-P)** only.

EX-L211(-P)-J EX-L212(-P)-J Sensor

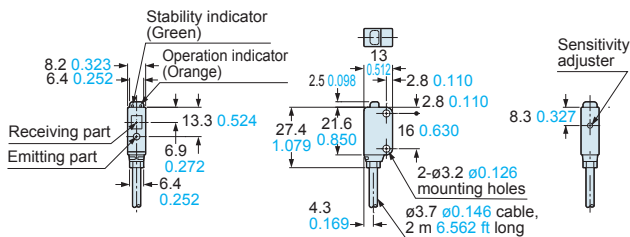


- Notes: 1) It is the laser radiation indicator (green) on the emitter.
2) It is incorporated in **EX-L211(-P)-J** only.

DIMENSIONS (Unit: mm in)

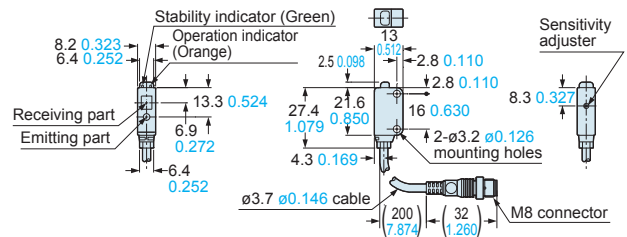
EX-L221(-P)

Sensor



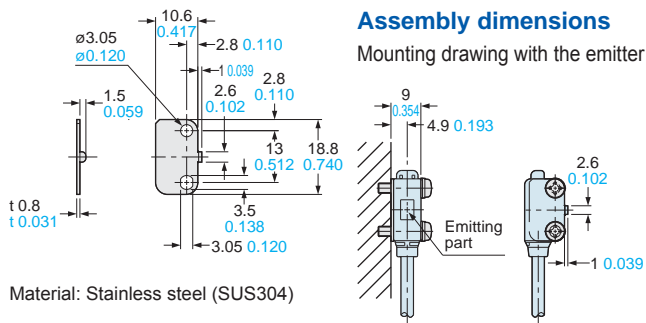
EX-L221(-P)-J

Sensor



MS-EXL2-2

Mounting plate (Accessory for thru-beam type)



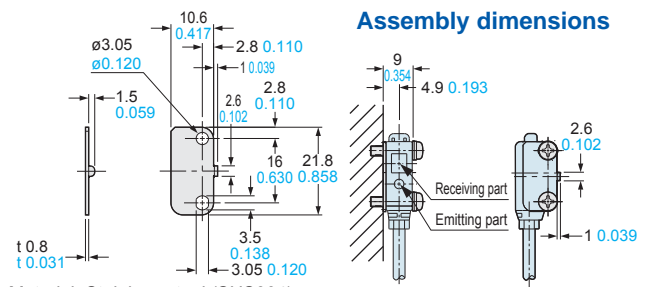
Material: Stainless steel (SUS304)

Note: Screws are not attached.
Purchase separately.

* Without using the mounting plate,
beam misalignment may occur.

MS-EXL2-3

Mounting plate (Accessory for spot reflective type)



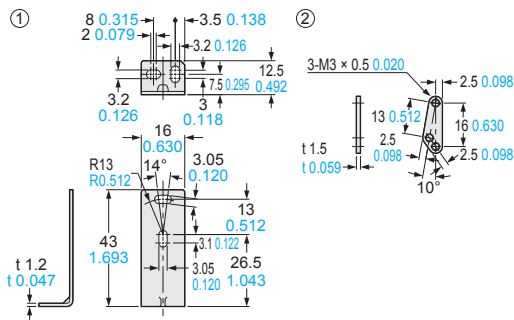
Material: Stainless steel (SUS304)

Note: Screws are not attached.
Purchase separately.

* Without using the mounting plate,
beam misalignment may occur.

MS-EXL2-1

Sensor mounting bracket (Optional)

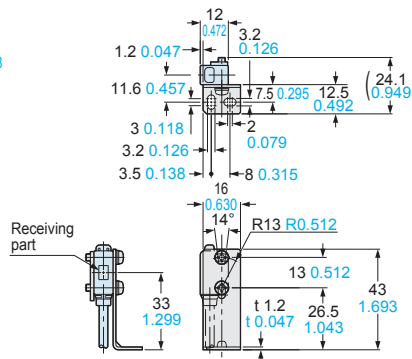


Material: Stainless steel (SUS304)

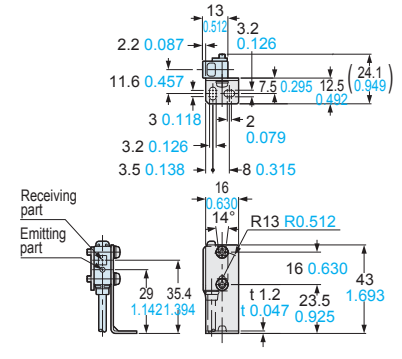
Two M3 (length 14 mm 0.551 in) screws with washers [stainless steel (SUS304)] are attached.

Assembly dimensions

Mounting drawing with the receiver of EX-L21□



Mounting drawing with EX-L22□



All information is subject to change without prior notice.



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