



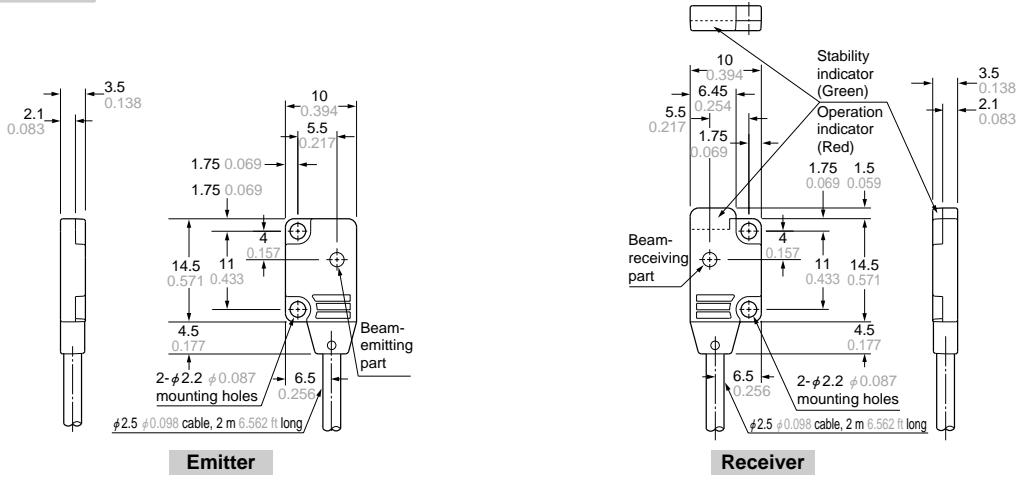
## Ultra-slim Photoelectric Sensor

The EX-10 series is one of the smallest sensors on the market today. The ultra small size allows for mounting in the smallest areas. The size is achieved by locating all of the electronics and controls in an in-line amplifier. A bright 2-color indicator on the sensor head allows for quick determination of the sensor state. The EX-10 series is also equipped with a 0.5ms response time for high-speed detection and an IP-67 rated housing for wash-down environments. The mounting options available include a front sensing type as well as a side sensing type. Each type has two, metal reinforced M3 mounting holes for stable sensor placement. All types are available as either Light ON or Dark ON and PNP or NPN.

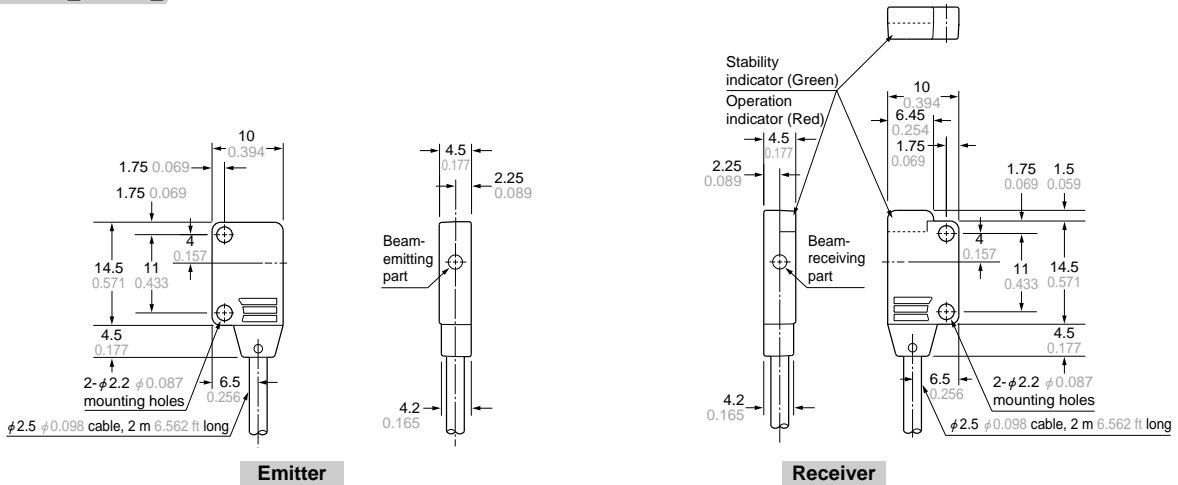
Model Name	Model Pic	Type	Output Operation	Output Configuration	Emitting Element	Max. Range (mm)	Max. Range (in)
Sort ▲ ▼		Sort ▲ ▼	Sort ▲ ▼	Sort ▲ ▼	Sort ▲ ▼	Sort ▲ ▼	Sort ▲ ▼
EX-11A		Thrubeam Front Sensing	Light-ON	NPN	Red LED	150	5.9
EX-11A-PN		Thrubeam Front Sensing	Light-ON	PNP	Red LED	150	5.9
EX-11B		Thrubeam Front Sensing	Dark-ON	NPN	Red LED	150	5.9
EX-11B-PN		Thrubeam Front Sensing	Dark-ON	PNP	Red LED	150	5.9
EX-11EA		Thrubeam Side Sensing	Light-ON	NPN	Red LED	150	5.9
EX-11EA-PN		Thrubeam Side Sensing	Light-ON	PNP	Red LED	150	5.9
EX-11EB		Thrubeam Side Sensing	Dark-ON	NPN	Red LED	150	5.9
EX-11EB-PN		Thrubeam Side Sensing	Dark-ON	PNP	Red LED	150	5.9
EX-13A		Thrubeam Front Sensing	Light-ON	NPN	Red LED	500	19.7
EX-13A-PN		Thrubeam Front Sensing	Light-ON	PNP	Red LED	500	19.7
EX-13B		Thrubeam Front Sensing	Dark-ON	NPN	Red LED	500	19.7
EX-13B-PN		Thrubeam Front Sensing	Dark-ON	PNP	Red LED	500	19.7

## DIMENSIONS (Unit: mm in)

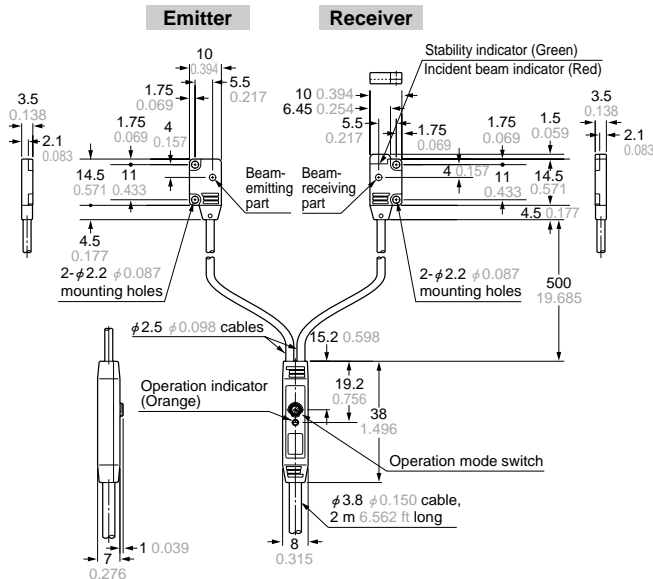
EX-11A □ EX-11B □ EX-13A □  
EX-13B □ EX-19A □ EX-19B □ Sensor



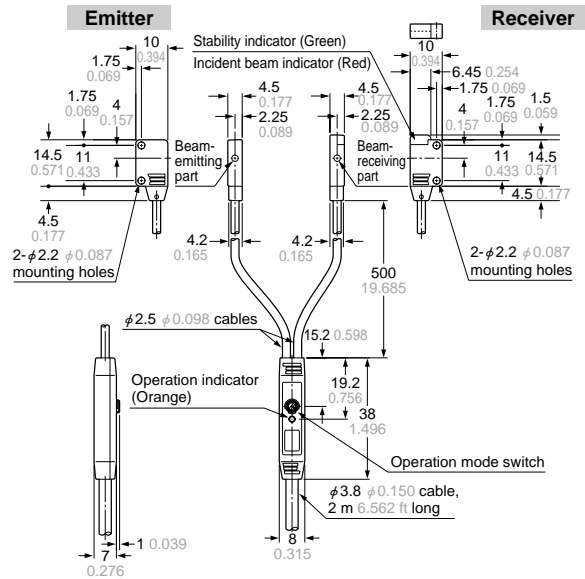
EX-11EA □ EX-11EB □  
EX-13EA □ EX-13EB □ Sensor



EX-15  
EX-17 Sensor



EX-15E  
EX-17E Sensor



# SPECIFICATIONS

Item	Type		Thru-beam					Convergent reflective (Diffused beam type)	Thru-beam • with operation mode switch on bifurcation				
			Front sensing	Side sensing	Front sensing	Side sensing	Front sensing	Front sensing	Front sensing	Side sensing	Front sensing	Side sensing	
	Model No. (Note 1)	Light-ON	EX-11A(-PN)	EX-11EA(-PN)	EX-13A(-PN)	EX-13EA(-PN)	EX-19A(-PN)	EX-14A(-PN)	EX-15 (Note 2)	EX-15E (Note 2)	EX-17 (Note 2)	EX-17E (Note 2)	
	Dark-ON	EX-11B(-PN)	EX-11EB(-PN)	EX-13B(-PN)	EX-13EB(-PN)	EX-19B(-PN)	EX-14B(-PN)						
Sensing range			150 mm 5.906 in		500 mm 19.685 in		1 m 3.281 ft	2 to 25 mm 0.079 to 0.984 in (Note 3) (Conv. point: 10 mm 0.394 in)		150 mm 5.906 in		500 mm 19.685 in	
Min. sensing object			∅1 mm ∅0.039 in opaque object (Setting distance between emitter and receiver: 150 mm 5.906 in)		∅2 mm ∅0.079 in opaque object (Setting distance between emitter and receiver: 500 mm 19.685 in)		∅2 mm ∅0.079 in opaque object / Setting distance between emitter and receiver: 1 m 3.281 ft	∅0.1 mm ∅0.004 in copper wire (Setting distance: 10 mm 0.394 in)		∅1 mm ∅0.039 in opaque object (Setting distance between emitter and receiver: 150 mm 5.906 in)		∅2 mm ∅0.079 in opaque object (Setting distance between emitter and receiver: 500 mm 19.685 in)	
Hysteresis			—————					15 % or less of operation distance	—————				
Repeatability (perpendicular to sensing axis)			0.05 mm 0.002 in or less					0.1 mm 0.004 in or less	0.05 mm 0.002 in or less				
Supply voltage			12 to 24 V DC ± 10 %									Ripple P-P 10 % or less	
Current consumption			Emitter: 10 mA or less, Receiver: 15 mA or less				20 mA or less		30 mA or less				
Output			<p>&lt;NPN output type&gt; NPN open-collector transistor</p> <ul style="list-style-type: none"> <li>• Maximum sink current: 50 mA</li> <li>• Applied voltage: 30 V DC or less (between output and 0 V)</li> <li>• Residual voltage: 1 V or less (at 50 mA sink current) 0.4 V or less (at 16 mA sink current)</li> </ul> <p>&lt;PNP output type&gt; PNP open-collector transistor</p> <ul style="list-style-type: none"> <li>• Maximum source current: 50 mA</li> <li>• Applied voltage: 30 V DC or less (between output and + V)</li> <li>• Residual voltage: 1 V or less (at 50 mA source current) 0.4 V or less (at 16 mA source current)</li> </ul>					<p>NPN open-collector transistor</p> <ul style="list-style-type: none"> <li>• Maximum sink current: 100 mA</li> <li>• Applied voltage: 30 V DC or less (between output and 0 V)</li> <li>• Residual voltage: 1.5 V or less (at 100 mA sink current) 0.4 V or less (at 16 mA sink current)</li> </ul>					
	Utilization category			DC-12 or DC-13					—————				
	Short-circuit protection			Incorporated									
Response time			0.5 ms or less										
Operation indicator			Red LED (lights up when the output is ON)					Orange LED (lights up when the output is ON), located on the bifurcation					
Incident beam indicator			—————					Red LED (lights up under light received condition), located on the receiver					
Stability indicator			Green LED (lights up under stable light received condition or stable dark condition)					Green LED (lights up under stable light received condition or stable dark condition), located on the receiver					
Environmental resistance	Pollution degree		3 (Industrial environment)										
	Protection		IP67 (IEC)										
	Ambient temperature		- 25 to + 55 °C - 13 to + 131 °F (No dew condensation or icing allowed), Storage: - 30 to + 70 °C - 22 to + 158 °F										
	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 0.118 in amplitude 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			Red LED (modulated)										
Material			Enclosure: Polyethylene terephthalate Lens: Polyallylate					Enclosure: Polyethylene terephthalate Lens: Polyallylate, Bifurcation: Polyallylate					
Cable (Note 4)			0.1 mm <sup>2</sup> 3-core (thru-beam type emitter: 2-core) cabtyre cable, 2 m 6.562 ft long					0.2 mm <sup>2</sup> 3-core cabtyre cable, 2 m 6.562 ft long (beyond bifurcation; from emitter / receiver to bifurcation: 0.5 m 1.640 ft long)					
Cable extension			Extension up to total 50 m 164.042 ft is possible with 0.3 mm <sup>2</sup> , or more, cable (thru-beam type: emitter and receiver).					Extension up to total 100 m 328.084 ft is possible with 0.3 mm <sup>2</sup> , or more, cable.					
Weight			Emitter: 20 g approx., Receiver: 20 g approx.				20 g approx.		55 g approx.				
Accessories			Mounting screws: 1 set					Mounting screws: 1 set		Mounting screws: 1 set, Adjusting screwdriver: 1 pc.			

Notes: 1) Model Nos. having the suffix '-PN' are PNP output type.

2) Either Light-ON or Dark-ON can be selected by the operation mode switch (located on the bifurcation).

3) The sensing range of convergent reflective type sensor is specified for white non-glossy paper (50 × 50 mm 1.969 × 1.969 in) as the object.

4) The flexible cable type (model Nos. having suffix '-R') has a 0.1 mm<sup>2</sup> 3-core (thru-beam type emitter : 2-core) flexible cabtyre cable, 2 m 6.562 ft long.