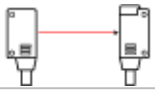
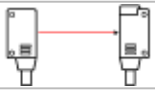
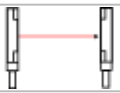
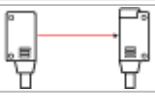
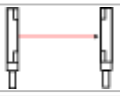
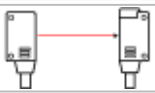
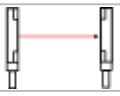
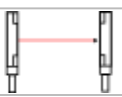
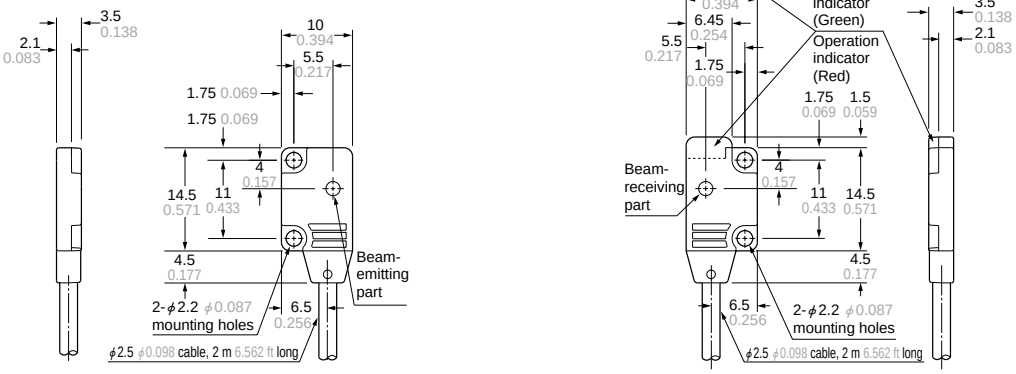
Ultra-slim Photoelectric Sensor

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.

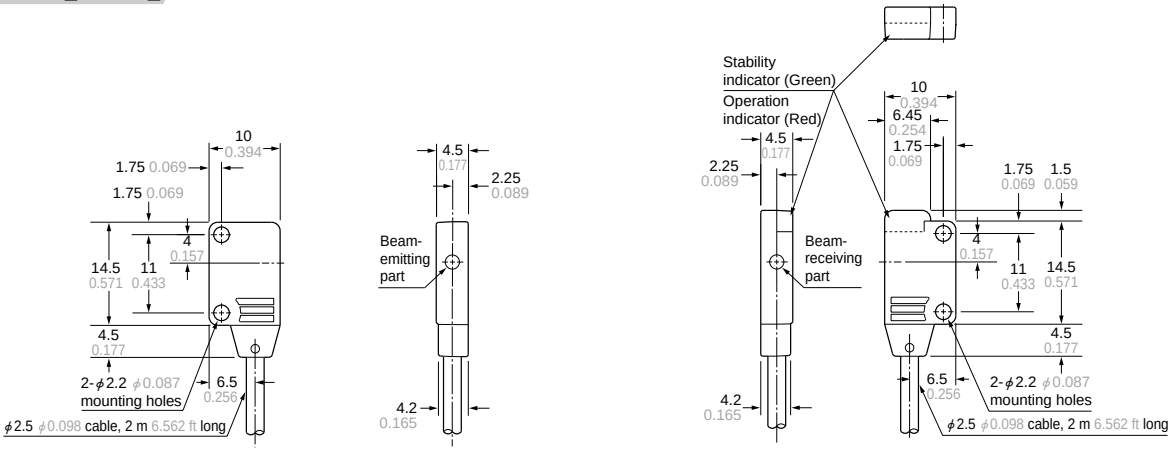
Model Name	Model Pic	Type	Output Operation	Output Configuration	Emitting Element	Max. Range (mm)	Max. Range (in)
EX-13EA		Thrubeam Side Sensing	Light-ON	NPN	Red LED	500	19.7
EX-13EB		Thrubeam Side Sensing	Dark-ON	NPN	Red LED	500	19.7
EX-14A		Convergent Reflective	Light-ON	NPN	Red LED	25	0.98
EX-14A-PN		Convergent Reflective	Light-ON	PNP	Red LED	25	0.98
EX-14B		Convergent Reflective	Dark-ON	NPN	Red LED	25	0.98
EX-15		Thrubeam Front Sensing	Light-ON/Dark-ON	NPN	Red LED	150	5.9
EX-15E		Thrubeam Side Sensing	Light-ON/Dark-ON	NPN	Red LED	150	5.9
EX-17		Thrubeam Front Sensing	Light-ON/Dark-ON	NPN	Red LED	500	19.7
EX-17E		Thrubeam Side Sensing	Light-ON/Dark-ON	NPN	Red LED	500	19.7
EX-19A		Thrubeam Front Sensing	Light-ON	NPN	Red LED	1000	39.4
EX-19B		Thrubeam Front Sensing	Dark-ON	NPN	Red LED	1000	39.4

DIMENSIONS (Unit: mm in)

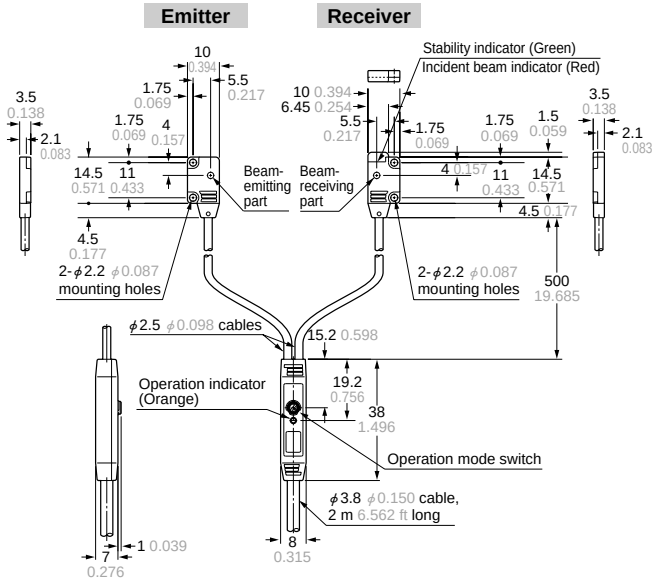
EX-11A□ EX-11B□ EX-13A□ EX-13B□ EX-19A□ EX-19B□ Sensor



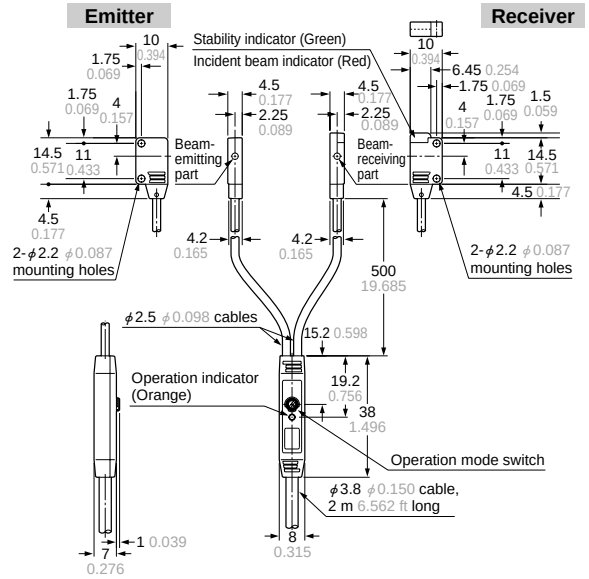
EX-11EA□ EX-11EB□ EX-13EA□ EX-13EB□ Sensor



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		ϕ1 mm ϕ0.039 in opaque object (Setting distance between emitter and receiver: 150 mm 5.906 in)		ϕ2 mm ϕ0.079 in opaque object (Setting distance between emitter and receiver: 500 mm 19.685 in)		ϕ2 mm ϕ0.079 in opaque object (Setting distance between emitter and receiver: 1 m 3.281 ft)	ϕ0.1 mm ϕ0.004 in copper wire (Setting distance: 10 mm 0.394 in)	ϕ1 mm ϕ0.039 in opaque object (Setting distance between emitter and receiver: 150 mm 5.906 in)		ϕ2 mm ϕ0.079 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		<NPN output type> NPN open-collector transistor • Maximum sink current: 50 mA • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 1 V or less (at 50 mA sink current) 0.4 V or less (at 16 mA sink current) <PNP output type> PNP open-collector transistor • Maximum source current: 50 mA • Applied voltage: 30 V DC or less (between output and + V) • Residual voltage: 1 V or less (at 50 mA source current) 0.4 V or less (at 16 mA source current)						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)			
	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/s² acceleration (50 G approx.) in X, Y and Z directions for three times each									
Emitting element		Red LED (modulated)									
Material		Enclosure: Polyethylene terephthalate Lens: Polyalylate						Enclosure: Polyethylene terephthalate Lens: Polyalylate, Bifurcation: Polyalylate			
Cable (Note 4)		0.1 mm² 3-core (thru-beam type emitter: 2-core) cabtyre cable, 2 m 6.562 ft long						0.2 mm² 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 mm², or more, cable (thru-beam type: emitter and receiver).						Extension up to total 100 m 328.084 ft is possible with 0.3 mm², 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 mm² 3-core (thru-beam type emitter : 2-core) flexible cabtyre cable, 2 m 6.562 ft long.