






Omron's Next Generation of Miniature Photoelectric Sensors

- Utilizes Omron's "Hyper LED" technology to achieve the industry's smallest visible red beam
- Self-contained sensor ideal for compact applications
- "Pin-point" beam for detecting extremely small objects
- Offered in both flat and rectangular body styles
- Retroreflective model employs Omron's Free-Angle Optics technology (FAO) to detect objects as small as 2 mm dia
- Convergent-beam model spot diameter is 0.15 mm
- Through-beam model is capable of sensing distances of 1 meter with a 2 mm target diameter
- CE conformance



Ordering Information

■ PHOTOELECTRIC SENSORS

Sensor type		Sensing method						
		Through-beam		Retroreflective	Diffuse reflective	Convergent-beam		
Appearance		Side-view 	Flat 	Side-view 	Flat 	Side-view 		
Sensing distance		1 m	500 mm	10 to 200 mm	5 to 30 mm	5 to 15 mm	5 to 30 mm	
Part number	Light-ON	NPN	E3T-ST11	E3T-FT11	E3T-SR11	E3T-FD11N	E3T-SL11	E3T-SL21
		PNP	E3T-ST13	E3T-FT13	E3T-SR13	E3T-FD13N	E3T-SL13	E3T-SL23
	Dark-ON	NPN	E3T-ST12	E3T-FT12	E3T-SR12	E3T-FD12N	E3T-SL12	E3T-SL22
		PNP	E3T-ST14	E3T-FT14	E3T-SR14	E3T-FD14N	E3T-SL14	E3T-SL24

Note: All through-beam models are packaged and sold as pairs (one transmitter and one receiver).

■ ACCESSORIES (ORDER SEPARATELY)

Slits (Apertures)

Slits for sensor models	Slit width	Sensing distance	Minimum sensing object (typical)	Comments	Part number
E3T-ST1□	0.5 dia.	50 mm	0.5 mm wide	One each for Emitter and Receiver	E39-S63
	1 dia.	100 mm	1 mm wide		

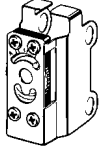
Slits for sensor models	Slit width	Sensing distance	Minimum sensing object (typical)	Comments	Part number
E3T-FT1□	0.5 dia.	50 mm	0.5 mm wide	One each for Emitter and Receiver	E39-S64
	1 dia.	100 mm	1 mm wide		

Reflectors

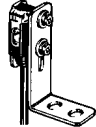
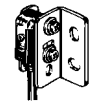
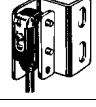

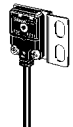
Item	Sensing distance	Minimum sensing object (typical)	Part number
Compact retroreflective model	10 to 200 mm	2 mm wide	E39-R4 (See Note.)
	10 to 100 mm		E39-R37

Note: E39-R4 reflector included with the E3T-SR1□ (can also be ordered separately).

Adjustable Aperture

For sensor models	Appearance	Part number
E3T-ST1□		E39-E10

Mounting Brackets

For sensor models	Appearance	Comments	Part number
E3T-S□		Two mounting brackets are required for through-beam models.	E39-L116
			E39-L117
			E39-L118
E3T-F□		E39-L119	
		E39-L120	

Specifications

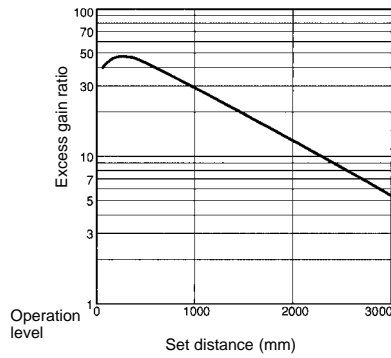
■ RATINGS/CHARACTERISTICS

Sensing method		Through-beam				Retroreflective		Convergent beam				Diffuse reflective	
Shape		Side-view		Flat		Side-view						Flat	
Output type		NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP
Part number	Light-ON	-ST11	-ST13	-FT11	-FT13	-SR11	-SR13	-SL11	-SL13	-SL21	-SL23	-FD11N	-FD13N
	Dark-ON	-ST12	-ST14	-FT12	-FT14	-SR12	-SR14	-SL12	-SL14	-SL22	-SL24	-FD12N	-FD14N
Sensing distance		1 m (adjustable aperture is available)		500 mm		10 to 200 mm (with the E39-R4)		5 to 15 mm (50 x 50 mm Kodak white card)		5 to 30 mm (50 x 50 mm Kodak white card)		5 to 30 mm (50 x 50 mm Kodak white card)	
Standard sensing target		2 mm dia. min.				10 mm dia. min.		---					
Min. sensing target (typical)		2 mm dia. min.				2 mm dia. (sensing distance at 100 mm)		0.15 mm dia. (sensing distance at 10 mm)					
Differential travel		---						2 mm max.		6 mm max.		6 mm max.	
Optical angle	Emitter	3° to 10°		3° to 13°		2° to 5°		---					
	Receiver	3° to 70°		3° to 70°		---							
Light source (wave length)		Red LED ("Pin-point" LED) ($\lambda=670$ nm)											
Power supply voltage		12 to 24 VDC $\pm 10\%$, ripple (p-p) 10% max.											24 VDC $\pm 10\%$
Current consumption		12 mA max. emitter/receiver				20 mA max.							
Output		Open collector, load current: 50 mA max. at 24 VDC, residual voltage: 1 V max., operation mode: Light-ON or Dark-ON (separate models)											
Circuit protection (See Precautions Section.)		Protection from reversed and output short-circuit				Protection from reversed polarity, output short-circuit, and mutual interference							
Response time		1 ms max. each for on and off											
Ambient light immunity	Incandescent lamp	5,000 lx max.											
	Sunlight	10,000 lx max.											
Ambient temperature	Operating	-25°C to 55°C (-13°F to 131°F)											
	Storage	-40°C to 70°C (-40°F to 158°F) with no icing or condensation											
Ambient humidity	Operating	35% to 85% RH											
	Storage	35% to 95% RH (with no condensation)											
Insulation resistance		20 M Ω min. (at 500 VDC)											
Dielectric strength		1,000 VAC, 50/60 Hz for 1 min											
Vibration resistance		10 to 2,000 Hz, 1.5-mm double amplitude or 300 m/s ² (approx. 30G) for 0.5 hrs each in X, Y, and Z axis											
Shock resistance		1,000 m/s ² (approx. 100G) 3 times each in X, Y, and Z axis											
Enclosure rating		IEC60529: IP67											
Connection method		Pre-leaded (standard length: 2 m)											
Weight (with packaging)		Approx. 40 g				Approx. 20 g							
Materials	Case	PBT											
	Lens and cover	Polycarbonate											
Accessories included		Two each of M2 mounting screws, spring washers, and flat washers, and reflector (E39-R4: retroreflective model only)											

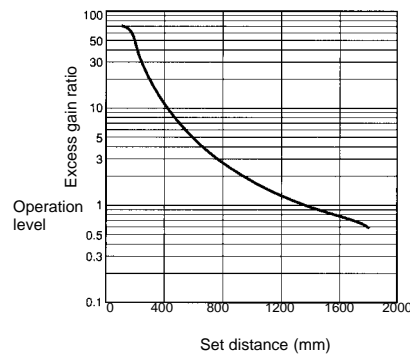
Engineering Data

■ EXCESS GAIN VS. SET DISTANCE (TYPICAL)

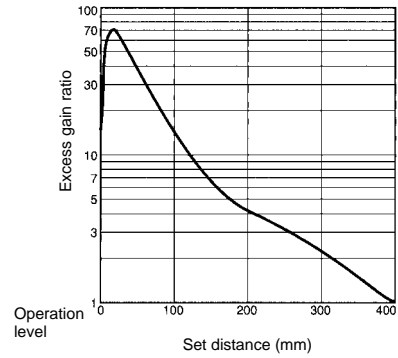
E3T-ST1 □ (Through-beam)



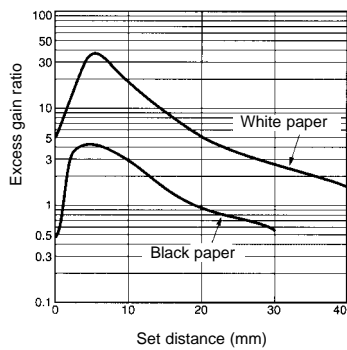
E3T-FT1 □ (Through-beam)



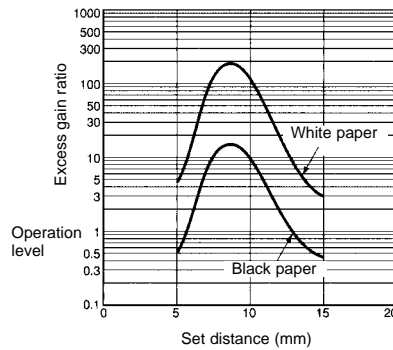
E3T-SR1 □ with E39-R4 (Retroreflective)



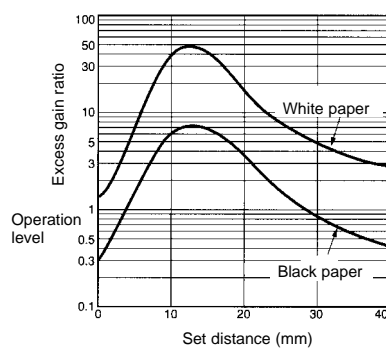
E3T-FD1 □ (Diffuse Reflective)



E3T-SL1 □ (Convergent Beam)

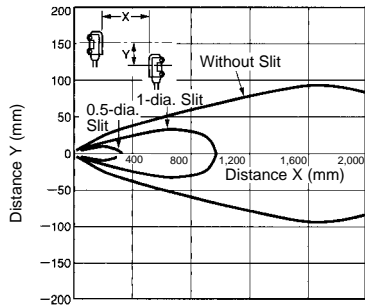


E3T-SL2 □ (Convergent Beam)

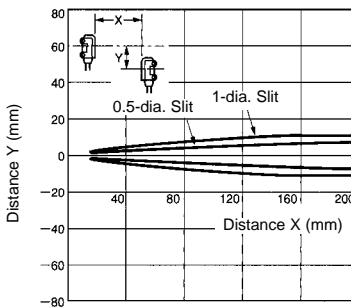


■ PARALLEL OPERATING RANGE (TYPICAL)

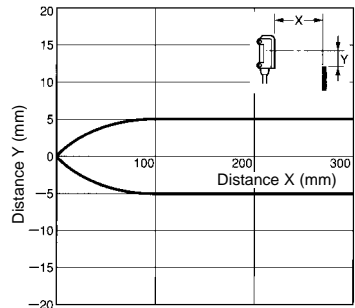
E3T-ST1□ with Slit (Aperture)
(Through-beam)



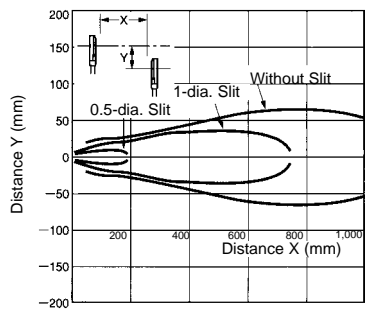
E3T-ST1□ with Slit (Enlarged graph)
(Through-beam)



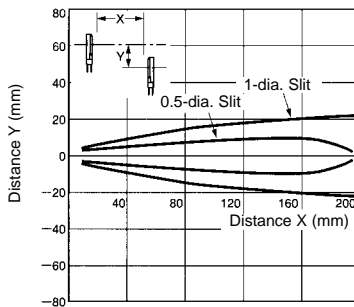
E3T-SR1□ with E39-R4
(Retroreflective)



E3T-FT1□ with Slit (Through-beam)

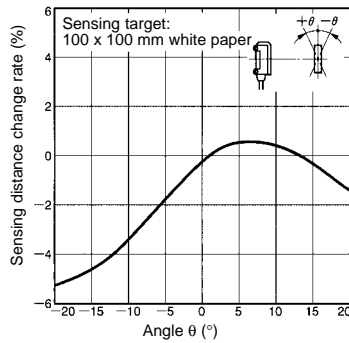


E3T-FT1□ with Slit (Enlarged graph)
(Through-beam)

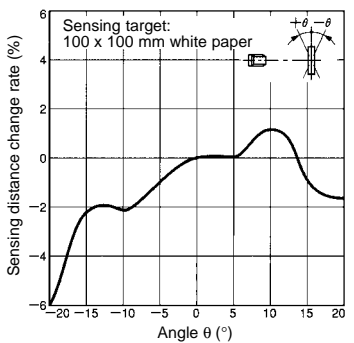


■ ANGLE CHARACTERISTICS (TYPICAL)

E3T-SL1□
(Up and Down)

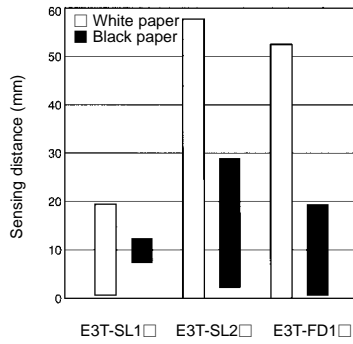


E3T-SL1□
(Left and Right)



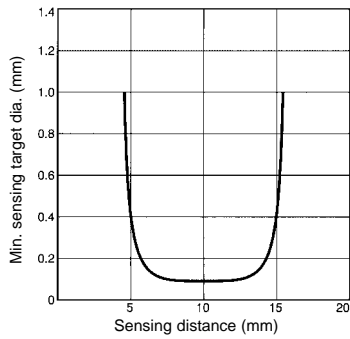
■ CLOSE-DISTANCE SENSING CAPABILITY (TYPICAL)

E3T-SL1□, E3T-SL2□, E3T-FD1□

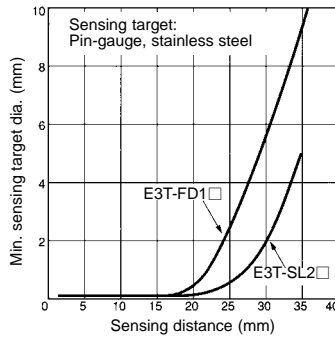


■ SENSING TARGET SIZE VS. SENSING DISTANCE (TYPICAL)

E3T-SL1□

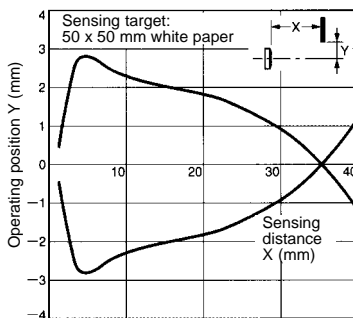


E3T-FD1□, E3T-SL2□

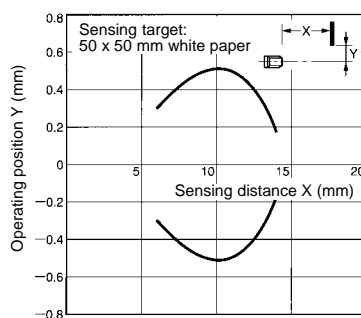


■ OPERATION RANGE (TYPICAL)

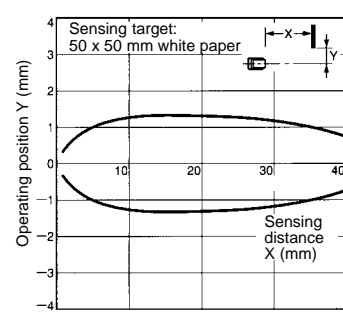
E3T-FD1□ (Diffuse Reflective)



E3T-SL1□ (Convergent Beam)

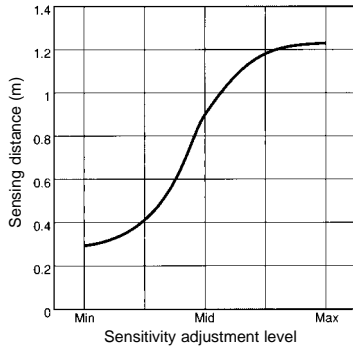


E3T-SL2□ (Convergent Beam)



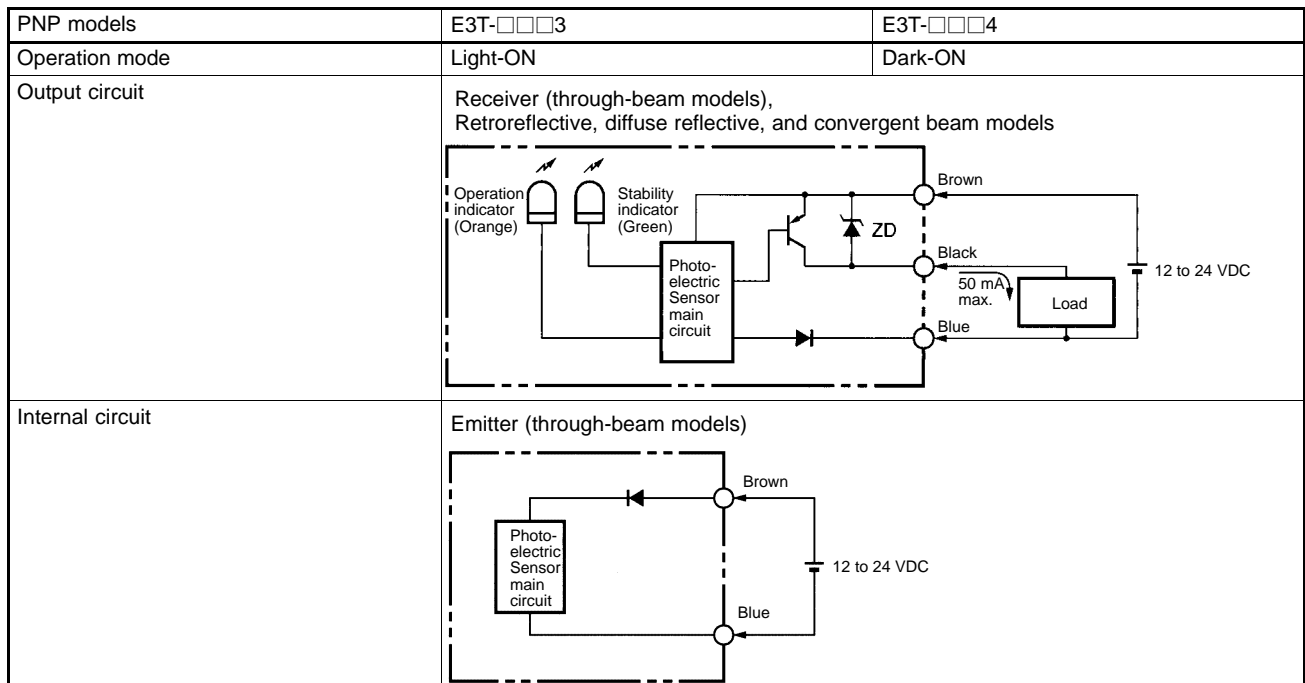
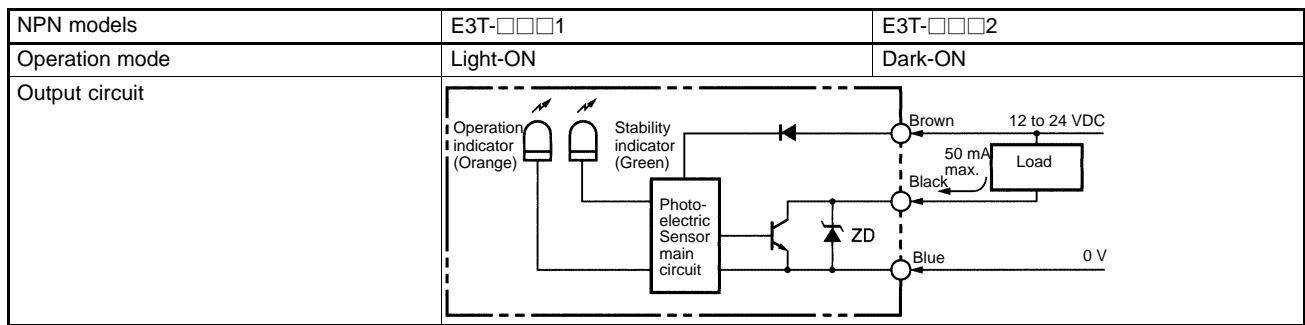
■ SENSING DISTANCE CHARACTERISTICS OF ADJUSTABLE APERTURE (WHEN COMPLETING OPTICAL AXIS ADJUSTMENT)

E3T-SL1□ with E39-E10



Operation

■ OUTPUT CIRCUITS



■ TIMING CHART

Diffuse and convergent beam	Light-ON		Dark-ON	
	Target present		Target present	
	Target not present		Target not present	
	Operation indicator (orange)	ON	Operation indicator (orange)	ON
		OFF		OFF
	Output transistor	ON	Output transistor	ON
		OFF		OFF
	Load	Energized	Load	Energized
		De-energized		De-energized
Retroreflective/through-beam	Light-ON		Dark-ON	
	Target present		Target present	
	Target not present		Target not present	
	Operation indicator (orange)	ON	Operation indicator (orange)	ON
		OFF		OFF
	Output transistor	ON	Output transistor	ON
		OFF		OFF
	Load	Energized	Load	Energized
		De-energized		De-energized

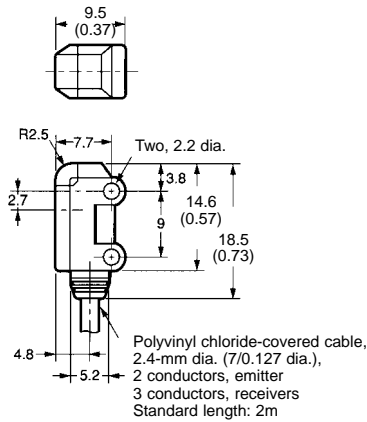
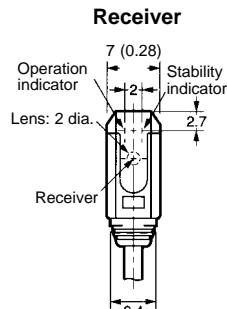
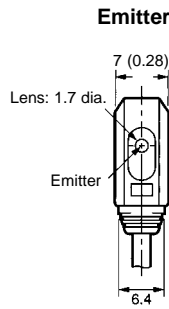
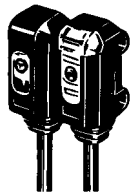
Dimensions

Unit: mm (inch)

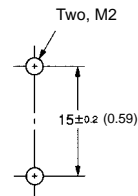
■ SIDE-VIEW SENSORS

(Through-beam Models)

- E3T-ST11
- E3T-ST12
- E3T-ST13
- E3T-ST14

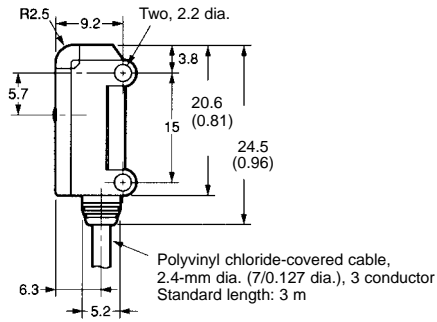
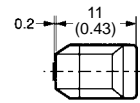
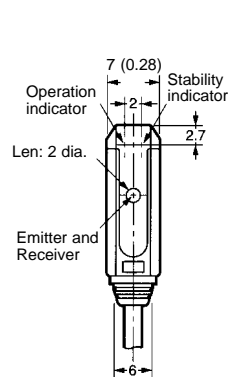


Mounting Holes

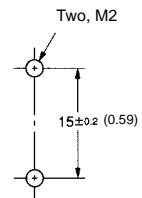


Retroreflective Models

- E3T-SR11
- E3T-SR12
- E3T-SR13
- E3T-SR14

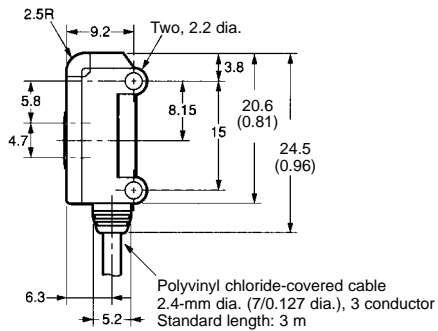
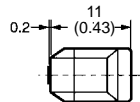
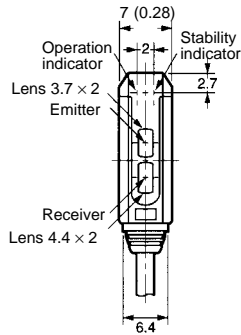


Mounting Holes

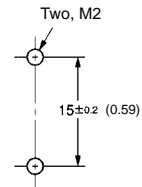


Convergent-beam Models

- E3T-SL11
- E3T-SL12
- E3T-SL13
- E3T-SL14
- E3T-SL21
- E3T-SL22
- E3T-SL23
- E3T-SL24



Mounting Holes

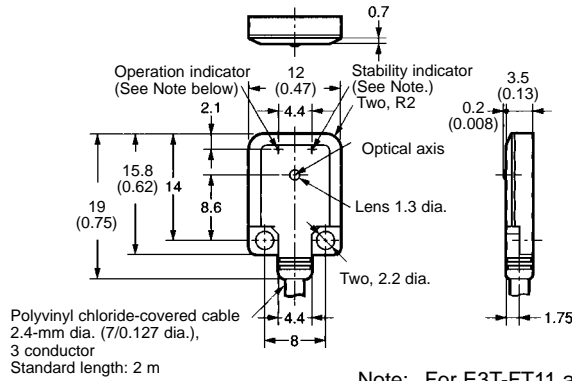
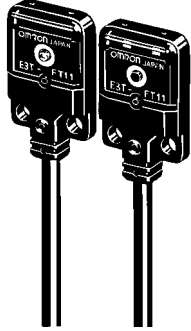


Unit: mm (inch)

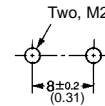
■ FLAT THIN SENSORS

Through-beam Emitter and Receiver Models

E3T-FT11
E3T-FT12
E3T-FT13
E3T-FT14



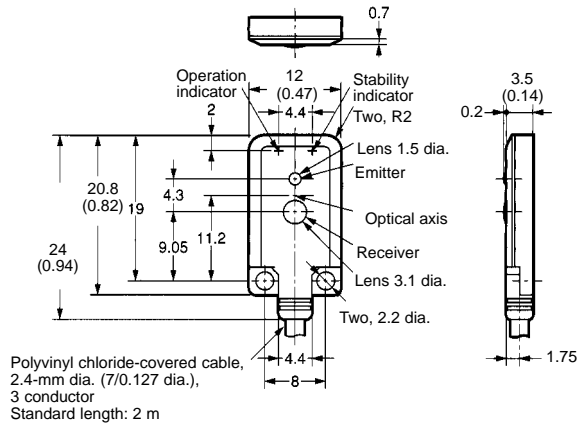
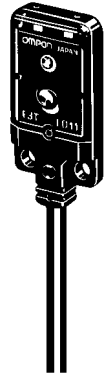
Mounting Holes



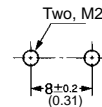
Note: For E3T-FT11 and E3T-FT12 Receivers only.

Diffuse Reflective Models

E3T-FD11-N
E3T-FD12-N
E3T-FD13-N
E3T-FD14-N



Mounting Holes



■ REFLECTORS

Retroreflector

E39-R4 (Provided with the E3T-SR1□)

