OMRON

E3F PHOTOELECTRIC SENSORS

The quick way to install reliable and accurate sensing



» Long sensor lifetime

» Fast installation

» High accuracy

realizing

Cylindrical photoelectric sensors portfolio



Completing the range... just choose the performance you need

Omron's range of cylindrical photoelectric sensors continues to expand. Already a global leader in this popular sensor shape, our range has been extended with new standard and special application models.

- New families of M5, M6, M8 and M12 sized sensors
- New transparent object sensor in M18 sized housing
- Portfolio extension in chemical resistant fiber optics
- Portfolio extension in heat resistant fiber optics



Features and benefits:

- Sizes from 500 µm diameter to M18
- Plastic, brass and stainless steel housings
- Best performance – application fit, just choose the performance you need

Range of photoelectric sensors in cylindrical housing						
Diameter / Type	• 0.5 mm	• 3 mm/M3	• M4 to M6	● M8	● M12	● M18
General	E32 Miniature		E32 Standard	**NEW: E3T-C**	**NEW: E3H2**	E3F
	Miniature fibers		Standard fibers	Miniature photo sensors		Standard photo sensors
Heat/chemical resistant	**EXTENSION: E32 chemical/heat resistant**					E3F2-_-S
Transparent detection	E32 Glass detection					**NEW: E3FZ-B**
Fast mount	E32 Easy mount					E3FZ
Special applications	E32 Vacuum resistant/E32 Area/ E32 Precision/E32 Robot/ E32 Long distance/E32 Special					E3F Radial/E3F2 Widebeam



Photoelectric sensor in plastic or brass M18 housing

The E3F2 family combines the high sensing performance of Omron's core sensing technology, with the simple mounting of the cylindrical shape. This makes the family ideally suited for a wide range of applications providing high reliability, long sensor lifetime and easy installation.

- Plastic or metal (brass) housings
- IP67, IP69K for highest water resistance

Ordering information

Sensor type	Sensing distance	Housing material	Connection method				Order code*1	
							NPN output	PNP output
Through-beam	7 m	Plastic	–	–	2 m	–	E3F2-7C4 2M	E3F2-7B4 2M
		Brass					E3F2-7C4-M 2M	E3F2-7B4-M 2M
		Plastic	–	■	–	–	E3F2-7C4-P1	E3F2-7B4-P1
		Brass					E3F2-7C4-M1-M	E3F2-7B4-M1-M
Retro-reflective with M.S.R.	0.1 to 4 m*2 (adjustable)	Plastic	–	–	2 m	–	E3F2-R4C4-E 2M	E4F2-R4B4-E 2M
		Brass					E3F2-R4C4-M-E 2M	E3F2-R4B4-M-E 2M
		Plastic	–	■	–	–	E3F2-R4C4-P1-E	E3F2-R4B4-P1-E
		Brass					E3F2-R4C4-M1-M-E	E3F2-R4B4-M1-M-E
Diffuse-reflective	0.3 m (adjustable)	Plastic	–	–	2 m	–	E3F2-DS30C4 2M	E3F2-DS30B4 2M
		Brass					E3F2-DS30C4-M 2M	E3F2-DS30B4-M 2M
		Plastic	–	■	–	–	E3F2-DS30C4-P1	E3F2-DS30B4-P1
		Brass					E3F2-DS30C4-M1-M	E3F2-DS30B4-M1-M
	1 m (adjustable)	Plastic	–	–	2 m	–	E3F2-D1C4 2M	E3FR-D1B4 2M
		Brass					E3F2-D1C4-M 2M	E3F2-D1B4-M 2M
		Plastic	–	■	–	–	E3F2-D1C4-P1	E3F2-D1B4-P1
		Brass					E3F2-D1C4-M1-M	E3F2-D1B4-M1-M
Diffuse-reflective (background suppression)	100 mm (fixed)	Plastic	–	–	2 m	–	E3F2-LS10C4 2M	E3F2-LS10B4 2M
		Brass					E3F2-LS10C4-M 2M	E3F2-LS10B4-M 2M
		Plastic	–	■	–	–	E3F2-LS10C4-P1	E3F2-LS10B4-P1
		Brass					E3F2-LS10C4-M1-M	E3F2-LS10B4-M1-M

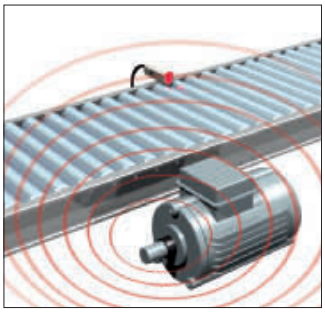
*1 Light-ON / Dark-ON selectable by wire
*2 Measured using E39-R1S

Specifications

Item		Through-beam	Retro-reflective with M.S.R.	Diffuse-reflective		Diffuse-reflective (background suppression)
		E3F2-7_	E3F2-R4_	E3F2-DS30_	E3F2-DS1_	E3F2-LS10_
Light source (wave length)		Infrared LED (950 nm)	Red LED (660 nm)	Infrared LED (880 nm)		Red LED (660 nm)
Power supply voltage		10 to 30 VDC				
Protective circuits		Output short-circuit protection and power supply reverse polarity protection				
Response time		2.5 ms max.	1 ms max.	2.5 ms max.	1 ms max.	
Ambient temperature	Operating	-25 to 55°C				
	Storage	-30 to 70°C (with no icing or condensation)				
Degree of protection		IEC 60529 IP67, IP69K after DIN 40050 part 9				
Material	Case	Plastic ABS Nickel plated brass				
	Lens	PMMA				



High ambient light immunity



High electromagnetic noise immunity



Photoelectric sensor in plastic M18 housing for standard applications

The E3F3 sensors in cylindrical M18 plastic housings provide excellent price-value ratio for standard applications in industrial automation.

- Models with M12 connector or 2 m PVC cable
- Reliable and accurate detection for standard applications

Ordering information

Sensor type	Sensing distance	Connection method				Operating mode	Order code	
							NPN output	PNP output
Through-beam	5 m	–	–	2 m	–	Light-ON	E3F3-T11 2M	E3F3-T31 2M
						Dark-ON	E3F3-T61 2M	E3F3-T81 2M
		–	■	–	–	Light-ON	E3F3-T16	E3F3-T36
						Dark-ON	E3F3-T66	E3F3-T86
Retro-reflective with M.S.R.	0.1 to 2 m*1	–	–	2 m	–	Light-ON	E3F3-R12 2M	E3F3-R32 2M
						Dark-ON	E3F3-R62 2M	E3F3-R82 2M
		–	■	–	–	Light-ON	E3F3-R17	E3F3-R37
						Dark-ON	E3F3-R67	E3F3-R87
Diffuse-reflective	100 mm	–	–	2 m	–	Light-ON	E3F3-D11 2M	E3F3-D31 2M
						Dark-ON	E3F3-D61 2M	E3F3-D81 2M
		–	■	–	–	Light-ON	E3F3-D16	E3F3-D36
						Dark-ON	E3F3-D66	E3F3-D86
	300 mm (adjustable)	–	–	2 m	–	Light-ON	E3F3-D12 2M	E3F3-D32 2M
						Dark-ON	E3F3-D62 2M	E3F3-D82 2M
		–	■	–	–	Light-ON	E3F3-D17	E3F3-D37
						Dark-ON	E3F3-D67	E3F3-D87

*1 Measured using E39-R1, provided with the product

Specifications

Item		Through-beam	Retro-reflective with M.S.R.	Diffuse-reflective	
		E3F3-T_	E3F3-R_	E3F3-D_1 E3F3-D_6	E3F3-D_2 E3F3-D_7
Light source (wave length)		Infrared LED (860 nm)	Red LED (680 nm)	Infrared LED (860 nm)	
Power supply voltage		10 to 24 VDC			
Protective circuits		Output short-circuit protection and power supply reverse polarity protection			
Ambient temperature		Operating: -25 to 55°C/Storage: -30 to 70°C (with no icing or condensation)			
Degree of protection		IEC 60529 IP66			
Material	Case	Plastic ABS			
	Lens	PMMA			
	Cable	PVC			



Easy Mounting photoelectric sensor in short plastic M18 housing

- High power LED for enhanced sensing distance
- SecureClick snap mounting for fast installation

Ordering information

Snap mounting - E3FZ[*1]

Sensor type	Sensing distance	Connection method				Order code	
						NPN output	PNP output
Through-beam	15 m	–	–	2 m	–[*2]	E3FZ-T61H 2M	E3FZ-T81H 2M
		–	■	–	–[*2]	E3FZ-T66H	E3FZ-T86H
Retro-reflective with M.S.R.	0.1 to 4 m[*3]	–	–	2 m	–[*2]	E3FZ-R61H 2M	E3FZ-R81H 2M
		–	■	–	–[*2]	E3FZ-R66H	E3FZ-R86H
Diffuse-reflective	1 m (adjustable)	–	–	2 m	–[*2]	E3FZ-D62 2M	E3FZ-D82 2M
		–	■	–	–[*2]	E3FZ-D67	E3FZ-D87
Diffuse-reflective (background suppression)	100 mm (fixed)	–	–	2 m	–[*2]	E3FZ-LS61H 2M	E3FZ-LS81H 2M
		–	■	–	–[*2]	E3FZ-LS66H	E3FZ-LS86H
	200 mm (fixed)	–	–	2 m	–[*2]	E3FZ-LS64H 2M	E3FZ-LS84H 2M
		–	■	–	–[*2]	E3FZ-LS69H	E3FZ-LS89H

Radial mounting - E3FR

Sensor type	Sensing distance	Connection method				Order code	
						NPN output	PNP output
Through-beam	15 m	–	–	2 m	–[*2]	E3FR-T61H 2M	E3FR-T81H 2M
		–	■	–	–[*2]	E3FR-T66H	E3FR-T86H
Retro-reflective with M.S.R.	0.1 to 4 m[*3]	–	–	2 m	–[*2]	E3FR-R61H 2M	E3FR-R81H 2M
		–	■	–	–[*2]	E3FR-R66H	E3FR-R86H
Diffuse-reflective	1 m (adjustable)	–	–	2 m	–[*2]	E3FR-D62 2M	E3FR-D82 2M
		–	■	–	–[*2]	E3FR-D67	E3FR-D87
Diffuse-reflective (background suppression)	100 mm (fixed)	–	–	2 m	–[*2]	E3FR-LS61H 2M	E3FR-LS81H 2M
		–	■	–	–[*2]	E3FR-LS66H	E3FR-LS86H
	200 mm (fixed)	–	–	2 m	–[*2]	E3FR-LS64H 2M	E3FR-LS84H 2M
		–	■	–	–[*2]	E3FR-LS69H	E3FR-LS89H

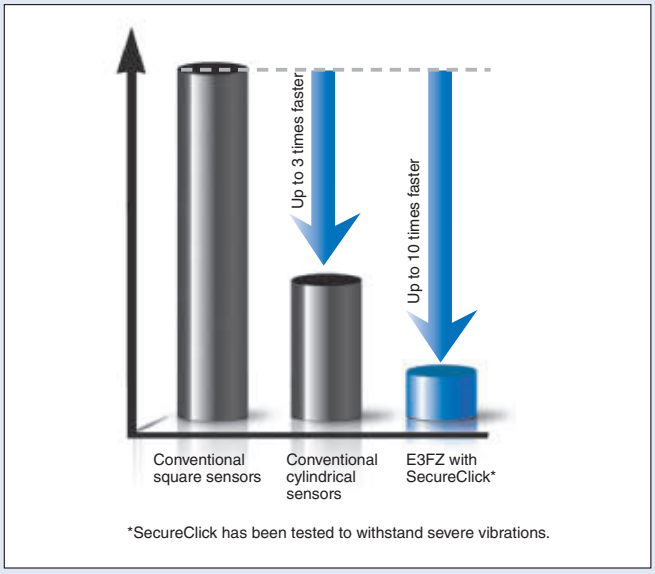
*1. Mounting with snap holder (provided with product) or M18 nuts (provided with product) possible.
*2. Pigtail connectors are available on request
*3. Measured with reflector E39-R1S

Specifications

	Through-beam	Retro-reflective with M.S.R.	Diffuse-reflective	Diffuse-reflective with background suppression	
Item	**E3FZ-T/E3FR-T**	**E3FZ-R/E3FR-R**	**E3FZ-D/E3FR-D**	**E3F_-LS_1H/E3F_-LS_6H**	**E3F_-LS_4H/E3F_-LS_9H**
Light source (wave length)	Infrared LED (870 nm)	Red LED (660 nm)	Infrared LED (860 nm)	Red LED (650 nm)	Red LED (660 nm)
Power supply voltage	10 to 30 VDC ±10% ripple (p-p): 10% max.				
Protective circuits	Output short-circuit and power supply reverse polarity protection				
Ambient temperature	Operating: -25 to 55°C/Storage: -40 to +70°C (with no icing or condensation)				
Degree of protection	IEC 60529 IP67, IP69K after DIN 40050 part 9				
Material	Plastic (case: ABS; lens: PMMA)				

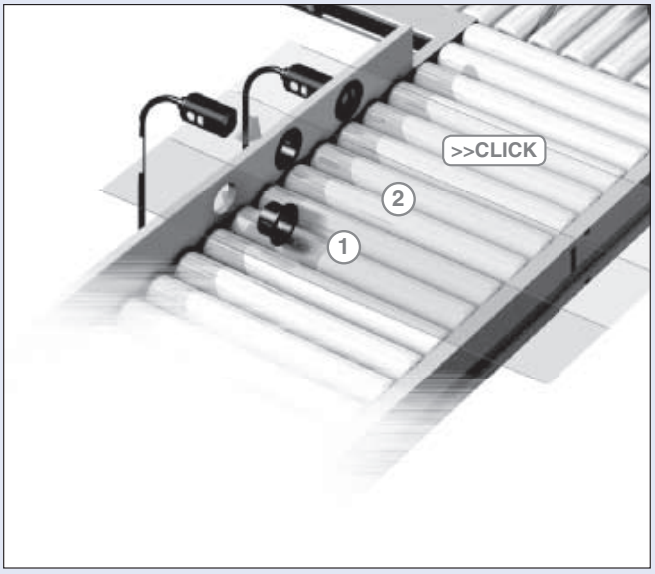
Easy and fast installation

Installation time can be reduced by up to 10 times compared to conventional sensors.



*SecureClick has been tested to withstand severe vibrations.

The **SecureClick** snap mounting mechanism provides easy installation in 2 steps and enhanced protection against vibration.





Photoelectric sensor in plastic or brass radial M18 housing

Radial (angled) optics for easy mounting, installation and adjustment

- Diffuse-reflective and retro-reflective models
- IP67 and IP69K

Ordering information

Sensor type	Sensing distance	Housing material	Connection method				Order code*1	
							NPN output	PNP output
Retro-reflective with M.S.R. 	0.1 to 2 m*2	Plastic	–	–	2 m	–	E3F2-R2RC41-E 2M	E3F2-R2RB41-E 2M
		Brass					E3F2-R2RC41-M-E 2M	E3F2-R2RB41-M-E 2M
		Plastic	–	■	–	–	E3F2-R2RC41-P1-E	E3F2-R2RB41-P1-E
		Brass					E3F2-R2RC41-M1-M-E	E3F2-R2RB41-M1-M-E
Diffuse-reflective 	300 mm (adjustable)	Plastic	–	–	2 m	–	E3F2-DS30C41 2M	E3F2-DS30B41 2M
		Brass					E3F2-DS30C41-M 2M	E3F2-DS30B41-M 2M
		Plastic	–	■	–	–	E3F2-DS30C41-P1	E3F2-DS30B41-P1
		Brass					E3F2-DS30C41-M1-M	E3F2-DS30B41-M1-M

*1 Light-ON / Dark-ON selectable by wire
*2 Measured with E39-R1S.

Specifications

Item		Retro-reflective with M.S.R.	Diffuse-reflective
		E3F2-R2R_41-_	E3F2-DS30_41-_
Light source (wave length)		Red LED (660 nm)	Infrared LED (880 nm)
Power supply voltage		10 to 30 VDC	
Protective circuits		Output short-circuit protection and power supply reverse polarity protection	
Response time		2.5 ms max.	
Ambient temperature	Operating	-25 to 55°C	
	Storage	-30 to 70°C (with no icing or condensation)	
Degree of protection		IEC 60529 IP67, IP69K after DIN 40050 part 9	
Material	Case	Nickel plated brass	
		Plastic (ABS)	
	Lens	PMMA	

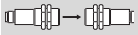
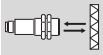


Photoelectric sensor in stainless steel M18 housing

For areas that undergo frequent cleaning the stainless steel housing of the E3F2-_-S provides enhanced detergent resistance and longer sensor lifetime.

- IP67, IP69K for highest water resistance
- Enhanced detergent resistance certified by ECOLAB

Ordering information

Sensor type	Sensing distance	Housing material	Connection method				Order code*1	
							NPN output	PNP output
Through-beam 	7 m	Stainless steel	–	–	2 m	–	E3F2-7C4-S 2M	E3F2-7B4-S 2M
			–	■	–	–	E3F2-7C4-M1-S	E3F2-7B4-M1-S
Retro-reflective with M.S.R. 	0.1 to 4 m*2 (adjustable)	Stainless steel	–	–	2 m	–	E3F2-R4C4-S-E 2M	E3F2-R4B4-S-E 2M
			–	■	–	–	E3F2-R4C4-M1-S-E	E3F2-R4B4-M1-S-E
Diffuse-reflective 	0.3 m (adjustable)	Stainless steel	–	–	2 m	–	E3F2-DS30C4-S 2M	E3F2-DS30B4-S 2M
			–	■	–	–	E3F2-DS30C4-M1-S	E3F2-DS30B4-M1-S
	1 m (adjustable)	Stainless steel	–	–	2 m	–	E3F2-D1C4-S 2M	E3F2-D1B4-S 2M
			–	■	–	–	E3F2-D1C4-M1-S	E3F2-D1B4-M1-S
Diffuse-reflective (background suppression) 	100 mm (fixed)	Stainless steel	–	–	2 m	–	E3F2-LS10C4-S 2M	E3F2-LS10B4-S 2M
			–	■	–	–	E3F2-LS10C4-M1-S	E3F2-LS10B4-M1-S

*1 Light-ON / Dark-ON selectable by wire
*2 Measured using E39-R1S

Specifications

Item		Through-beam	Retro-reflective with M.S.R.	Diffuse-reflective		Diffuse-reflective (background suppression)
		E3F2-7_	E3F2-R4_	E3F2-DS30_	E3F2-DS1_	E3F2-LS10_
Light source (wave length)		Infrared LED (950 nm)	Red LED (660 nm)	Infrared LED (880 nm)		Red LED (660 nm)
Power supply voltage		10 to 30 VDC				
Protective circuits		Output short-circuit protection and power supply reverse polarity protection				
Response time		2.5 ms max.	1 ms max.	2.5 ms max.	1 ms max.	
Ambient temperature	Operating	-25 to 55°C				
	Storage	-30 to 70°C (with no icing or condensation)				
Degree of protection		IEC 60529 IP67, IP69K after DIN 40050 part 9				
Material	Case	Stainless steel				
	Lens	PMMA				



High water and detergent resistance

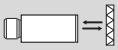


Transparent object detection sensor in compact M18 housing

The E3FZ-B provides enhanced detection stability for the detection of transparent objects. It allows an easy and intuitive adjustment by potentiometer to adjust to individual requirements.

- Easy adjustment to individual requirements for all transparent materials
- Easy mounting due to short M18 housing
- Coaxial optics for stable, position-independent detection

Ordering Information

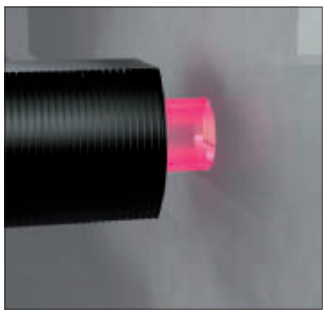
Sensor type	Sensing distance	Connection method				Order code*1	
					 *2	NPN output	PNP output
Retro-reflective with M.S.R. 	0 to 700 mm*3	–	–	2 m	–	E3FZ-B61 2M	E3FZ-B81 2M
		–	■	–	–	E3FZ-B66	E3FZ-B86

*1 Light-ON / Dark-ON selectable by wire
*2 For ordering pigtail versions contact your OMRON representative. Available options on request are:
- M3J:for M8 4-pin pigtail connector with 30 cm cable
- M5J:for M8 3-pin pigtail connector with 30 cm cable
- M1TJ: for M12 4-pin XS5 smart-click connector with 30 cm cable.

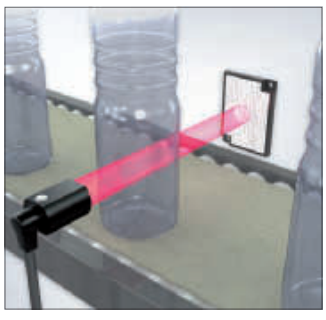
*3 Measured with E39-R1S.

Ratings and Specifications

Item		E3FZ-B_
Light source (wave length)		Red LED (650 nm)
Power supply voltage		10 to 30 VDC, including 10% ripple (p-p)
Protective circuits		Reversed power supply polarity, load short-circuit protection, mutual interference prevention, reversed output polarity protection
Response time		1 ms max.
Ambient temperature	Operating	–25 to 55°C
	Storage	–40 to 70°C (with no icing or condensation)
Degree of protection		IEC 60529: IP67, DIN 40050-9: IP69K
Material	Housing	ABS
	Lens	PMMA (polymethylmethacrylate)
	Cable	PVC (polyvinyl chloride)



Coaxial optics for detection through small holes



Position independent stable detection

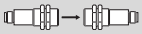
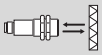


Miniature photoelectric sensors in cylindrical M8 and M12 housing

- M8 or M12 sized cylindrical housings when mounting space is crucial
- Retro-reflective models with two teaching modes for standard and semi-transparent objects
- pre-wired and connector models

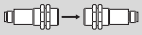
Ordering information

M12 cylindrical housing

Sensor type	Sensing distance	Connection method				Order code[*1]	
						NPN output	PNP output
Through-beam 	4 m (adjustable)	–	–	2 m	–	E3H2-T4C4M 2M	E3H2-T4B4M 2M
		–	■	–	–	E3H2-T4C4M-M1	E3H2-T4B4M-M1
Retro-reflective with M.S.R. 	2 m (teachable[*2])	–	–	2 m	–	E3H2-R2C4M 2M[*3]	E3H2-R2B4M 2M[*3]
		–	■	–	–	E3H2-R2C4M-M1[*3]	E3H2-R2B4M-M1[*3]
Diffuse-reflective 	300 mm (teachable)	–	–	2 m	–	E3H2-DS30C4M 2M	E3H2-DS30B4M 2M
		–	■	–	–	E3H2-DS30C4M-M1	E3H2-DS30B4M-M1
	100 mm (fixed)	–	–	2 m	–	E3H2-DS10C4M 2M	E3H2-DS10B4M 2M
		–	■	–	–	E3H2-DS10C4M-M1	E3H2-DS10B4M-M1

[*1] Light-ON / Dark-ON selectable by wire
[*2] Models without teach-button are available. Contact your OMRON representative.
[*3] Without reflector; order reflector separately

M8 cylindrical housing

Sensor type	Sensing distance	Connection method				Operation mode	Order code	
							NPN output	PNP output
Through-beam 	2 m	–	–	2 m	–	dark on	E3H2-T2C2S 2M	E3H2-T2B2S 2M
		■	–	–	–		E3H2-T2C2S-M5	E3H2-T2B2S-M5
		–	–	2 m	–	light on	E3H2-T2C1S 2M	E3H2-T2B1S 2M
		■	–	–	–		E3H2-T2C1S-M5	E3H2-T2B1S-M5

Specifications

Item		Through-beam		Retro-reflective with M.S.R.	Diffuse-reflective	
		E3H2-T4	E3H2-T2	E3H2-R	E3H2-DS30	E3H2-DS10
Light source (wave length)		Infrared LED (880 nm)		Red LED (660 nm)	Infrared LED (880 nm)	
Power supply voltage		10 to 30 VDC, 10% ripple				
Protective circuits		Power supply reverse polarity protection, output short circuit protection				
Response time		2.5 ms max	1 ms max.	1.1 ms max		
Sensitivity adjustment		Potentiometer adjuster	–	Teach-in		–
Ambient temperature	Operating	-25 to +55°C	-25 to +50°C	-25 to +55°C		
Degree of protection		EN 60529: IP67				
Material	Case	nickel-plated brass	stainless steel	nickel-plated brass		
	Lens	plastic				



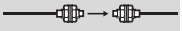
Miniature photoelectric sensors in M5 and M6 sized housing

The E3T-C family of miniature photoelectric sensors is the ideal solution when mounting space is crucial.

- axial and radial M5 sized through-beam sensors
- axial M6 sized diffuse-reflective sensors
- pre-wired models in stainless steel housing

Ordering information

M5 cylindrical housing

Sensor type	Sensing distance	Connection method				Operation mode	Order code	
							NPN output	PNP output
Through-beam (axial) 	1 m	–	–	2 m	–	dark on	E3T-CT12 2M	E3T-CT14 2M
Through-beam (radial) 	500 mm	–	–	2 m	–		E3T-CT22S 2M	E3T-CT24S 2M

M6 cylindrical housing

Sensor type	Sensing distance	Connection method				Operation mode	Order code	
							NPN output	PNP output
Diffuse-reflective 	50 mm (adjustable)	–	–	2 m	–	light on	E3T-CD11 2M	E3T-CD13 2M

Specifications

Item		E3T-CT1_	E3T-CT2_	E3T-CD1_
Light source (wave length)		Red LED (630 nm)	Red LED (625 nm)	Infrared LED (870 nm)
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p) 10% max.		
Protective circuits		Power supply reverse polarity protection, Output short-circuit protection		
Response time		0.5 ms max.		
Ambient temperature	Operating	–25 to +55°C		
	Storage	–30 to +70°C (with no icing or condensation)		
Degree of protection		IEC 60529 IP65		
Material	Case	SUS303		
	Display window	Polysulfone Epoxy		
	Lens	Polysulfone		



Standard cylindrical fiber sensor heads

The standard cylindrical fiber optic sensor heads provide reliable object detection, easy installation and long sensor lifetime for all general applications.

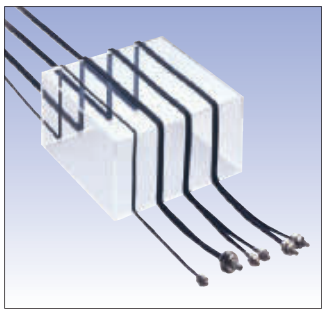
- High-flex fibers and 90° cable exit for fiber breakage prevention
- Models with hexagonal back for simplified one-nut mounting
- Sizes M3 to M6

Ordering information

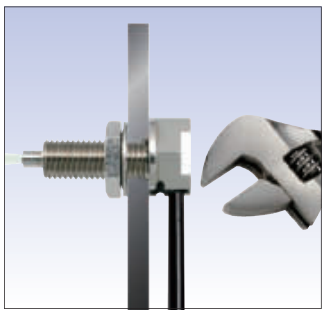
Sensor type	Size	Sensing distance (in mm)				Order code	
		Standard fiber		High-flex fiber		Standard fiber	High-flex fiber
		E3X-SD	E3X-DA-S	E3X-SD	E3X-DA-S		
	M4	800	1550	1100	1400	E32-TC200 2M	E32-ET11R 2M
	M3	200	450	50	130	E32-TC200E 2M	E32-ET21R 2M
	dia 4 mm	1100	1500	–		E32-ETC220 2M	–
easy mount	M4	–		530	1000	–	E32-T11N 2M
	M6	250		–		E32-R21	–
	M6	300	600	400	550	E32-DC200 2M	E32-ED11R 2M
	M4	70	160	30	60	E32-D211 2M	E32-D211R 2M
	M3	70	160	100	150	E32-DC200E 2M	E32-ED21R 2M
easy mount	M6	–		170	350	–	E32-D11N 2M
	dia 6 mm	80	220	35	100	E32-D14L 2M	E32-D14LR 2M

Specifications

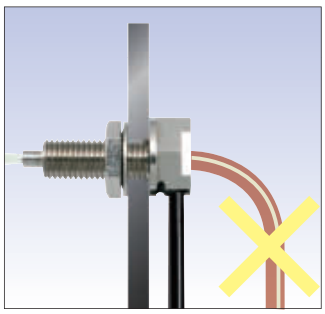
Item		Standard					High Flex			
		E32-_C200 E32-_C220	E32-D14L	E32-_C200E	E32-D211	E32-R21	E32-E_R	E32-D14LR	E32-D211R	E32-_11N
Permissible bending radius		R25		R10			R1			
Cut to length		Yes								
Ambient temperature		-40°C to 70°C								
Material	Head	Brass-nickel plated	Stainless steel	Brass-nickel plated	Stainless steel	Plastic (ABS)	Brass-nickel plated	Stainless steel		Brass-nickel plated
	Fiber	PMMA								
	Sheath	Polyethylene coating					PVC coating			
Degree of protection		IEC 60529 IP67								



Hi-flex multicore fibers for flexibility in installation without fiber breakage



Models with hexagonal back for simple one-nut mounting



Cable exit shifted by 90° for preventing fiber breakage



Easy-teach digital fiber amplifier

E3X-DA-SE-S and E3X-SD allow easy one button setting and provide the best value performance ratio for standard applications.

- Auto-teaching during machine operation
- Object or 2-point teaching within a few seconds
- Simple threshold adjustment with up/down keys
- Digital double display for incident level and threshold (E3X-DA-SE-S) or reduced size with one display (E3X-SD)

Ordering information

Item	Order code			
	Double display		Single display	
	NPN output	PNP output	NPN output	PNP output
Pre-wired	E3X-DA11SE-S 2M	E3X-DA41SE-S 2M	E3X-SD21	E3X-SD51
Fiber amplifier connector*1	E3X-DA6SE-S	E3X-DA8SE-S	E3X-SD7	E3X-SD9

*1 Order connector separately. For M8 connector models see E3X-DA-S.

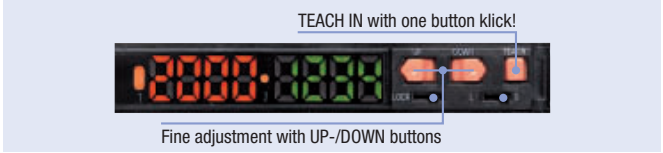
Fiber amplifier connectors

Shape	Type	Comment	Order code
	Fiber amplifier connector	2 m PVC cable	E3X-CN21
		30 cm PVC cable with M12 plug connector (4 pin)	E3X-CN21-M1J 0.3M
		30 cm PVC cable with M8 plug connector (4 pin)	E3X-CN21-M3J-2 0.3M

Specifications

Item		E3X-DA_SE-S	E3X-SD
Light source (wave length)		Red LED (650 nm)	Red, 4-element LED (625 nm)
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p): 10% max.	
Protective circuits		Power supply reverse polarity protection, output short-circuit protection, mutual interference prevention	
Response time		Operation or reset: 1 ms	Operation or reset: 200 µs max
Sensitivity setting		Teaching and digital up/down keys	
Functions	Auto power control	High-speed control method for emission current	
	Mutual interference prevention	Optical communications sync, possible for up to 10 units	Optical communication sync. possible for up to 5 units
Digital displays		Incident level + threshold	Incident level or threshold
Degree of protection		IEC 60529 IP50 (with protective cover attached)	

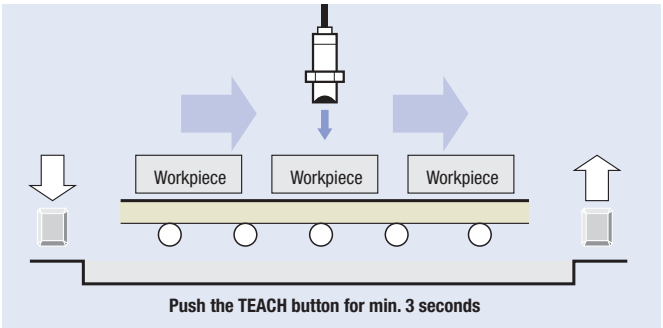
Easy view double display (E3X-DA-SE-S)



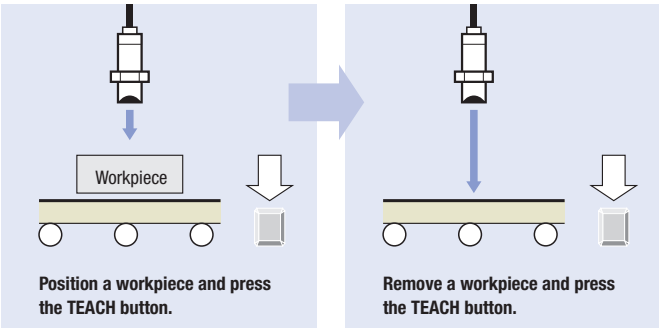
Space saving single display (E3X-SD)



1-button auto-teaching



2-point teaching





Digital fiber amplifier with potentiometer adjustment

The E3X-NA is the ideal amplifier for standard fiber applications providing quick & easy potentiometer adjustment and bargraph display.

- Easy adjustment with potentiometer
- Mutual interference prevention
- Enhanced water resistance types

Ordering information

Pre-wired

Item	Order code (for pre-wired types with 2 m cable length)	
	NPN output	PNP output
Standard	E3X-NA11 2M	E3X-NA41 2M
Enhanced water resistance	E3X-NA11V 2M	E3X-NA41V 2M

Connector version

Item	Order code	
	NPN output	PNP output
Standard (fiber amplifier connector)*1	E3X-NA6	E3X-NA8
Enhanced water resistance (M8 4-pin connector)	E3X-NA14V	E3X-NA44V

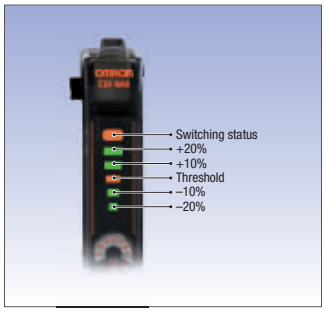
*1 Order connector separately.

Fiber amplifier connectors

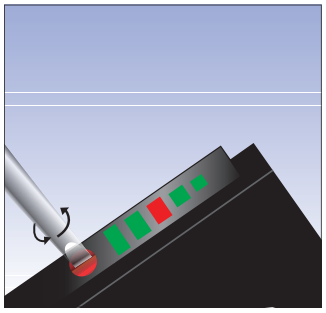
Shape	Type	Comment	Order code
	Fiber amplifier connector	2 m PVC cable	E3X-CN21
		30 cm PVC cable with M12 plug connector (4 pin)	E3X-CN21-M1J 0.3M
		30 cm PVC cable with M8 plug connector (4 pin)	E3X-CN21-M3J-2 0.3M

Specifications

Item		Standard	Enhanced water resistance
Output	NPN output	E3X-NA11, E3X-NA6	E3X-NA11V, E3X-NA14V
	PNP output	E3X-NA41, E3X-NA8	E3X-NA41V, E3X-NA44V
Light source (wave length)		Red LED (625 nm)	
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p): 10% max.	
Protective circuit		Reverse polarity protection, output short-circuit protection, mutual interference prevention	
Response time		Operation or reset: 200 µs max.	
Sensitivity setting		8-turn endless adjuster (potentiometer)	
Functions		OFF-delay timer: 40 ms (fixed)	
Degree of protection		IEC 60529 IP50 (with protective cover attached)	IEC 60529 IP66 (with protective cover attached)

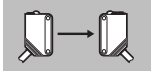
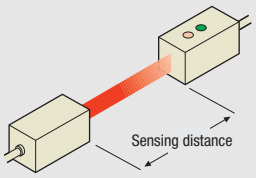
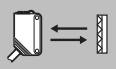
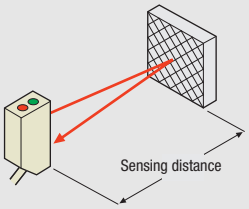
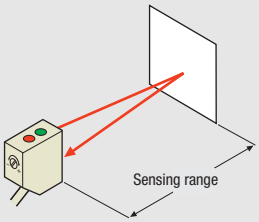
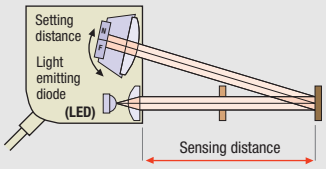
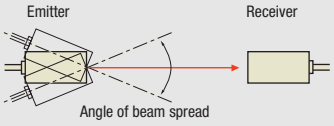
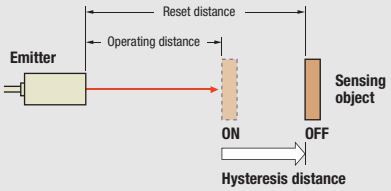
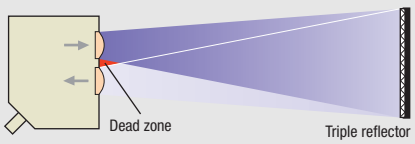
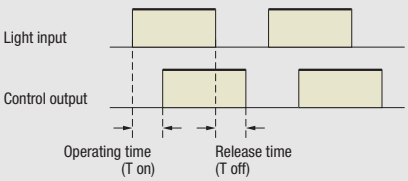


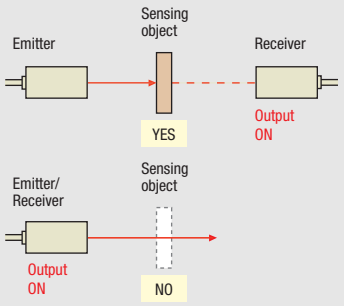
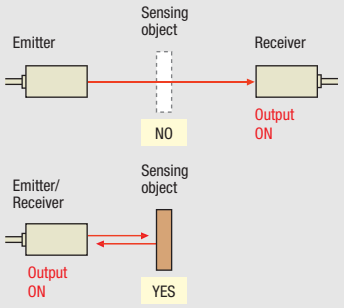
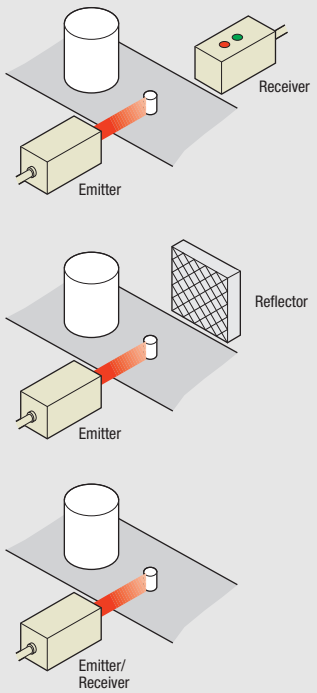
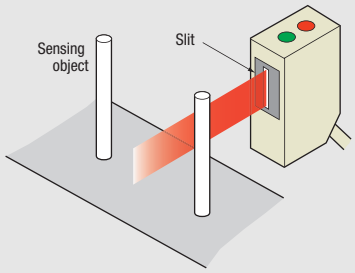
Bargraph display with light level, switching status and threshold indicators



Simple sensitivity adjustment by potentiometer

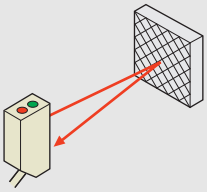
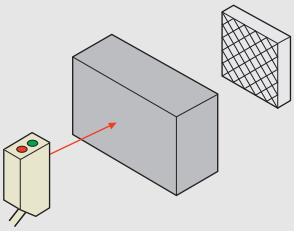
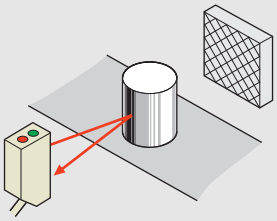
Explanation of terms

Item		Explanatory diagram	Meaning
Sensing distance	Throughbeam 		This is the maximum detection distance that can be set with stability for through-beam and retroreflective models, taking into account product deviations and temperature fluctuations. Actual distances in standard conditions will be longer than the rated detection distances for both models.
	Retroreflective 		
	Diffuse reflective 		This is the maximum detection distance that can be set with stability for the diffuse reflective models, taking into account product deviations and temperature fluctuations, using the standard test object (white drawing paper). Actual distances in standard conditions will be longer than the rated detection distance.
Detection range/ Set range	Distance setting 		In contrast to non distance-setting photoelectric sensors, which detect the presense (or not) of an object by means of the amount of light reflected back and thus have difficulty detecting objects with low reflectance, the distance-setting type detects the presense of the object based on the position, not the amount, of the reflected light. Suffering little from the effects of background objects and color, this type enables stable detection. A PSD (Position Detection Device) is used in the detector. Detection range: The range where detection is possible. Set range: A range where the distance to the detected object can be set.
Directional angle			Through-beam models, retroreflective models The range of angles where operation as a photoelectric sensor is possible.
Differential distance			Diffuse-reflective model The difference between the operating distance and the reset distance. Generally expressed in catalogs as a percentage of the detection distance.
Dead zone			The “Dead zone” is the non-operational area outside of the emission and detection areas near the lens surface in mark sensors, the distancesetting type, the limited reflective model, the diffuse-reflective model, and the retroreflective model. Detection is not possible in this area.
Response time			The “response time” is the lag time from the on/off of the light input to activation or reset of the control output. In general, for photoelectric sensors, activation time (Ton) ≈ release time (Toff).

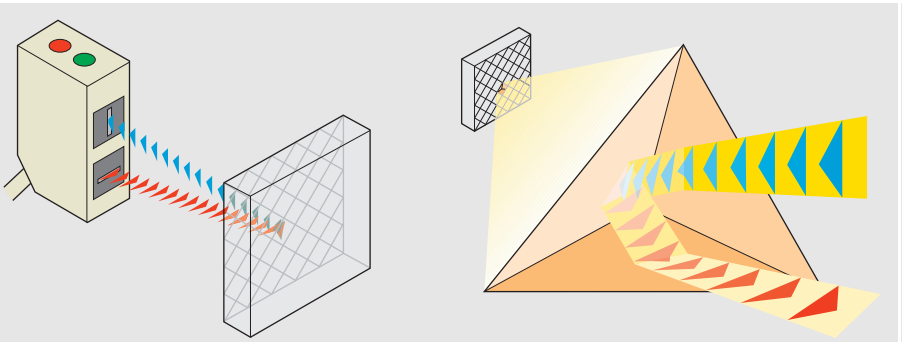
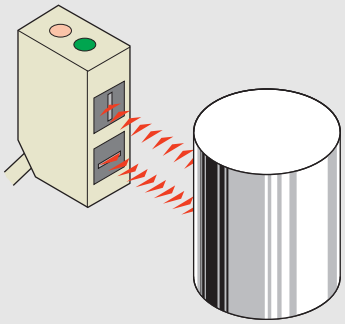
Item	Explanatory diagram	Meaning
Dark-on operation		"Dark on" is a model that outputs when the light entering the detector is shielded or decreases. The output method is expressed as DARK ON. "Light on" is a model that outputs when the light entering the detector increases. The output method is expressed as LIGHT ON.
Light-on operation		
Minimum detection object		Typical examples are given of the smallest objects that can be detected using Through-beam and retroreflective models with the sensitivity correctly adjusted to the light-on activation level at the rated detection distance. For the reflection model, typical examples are given of the smallest objects that can be detected with the sensitivity set to the highest level.
Smallest detection object with slit attached		Typical examples are given of the smallest objects that can be detected using Through-beam and retroreflective models with a slit attached. The sensitivity is correctly adjusted to the light-on activation level at the rated detection distance, and the slit is moved along its length and parallel to the object.

M.S.R. function

The Mirror Surface Rejection (MSR) is a function using the effect that light can be polarized and filtered according to the polarization direction. This effect can be used to avoid wrong detection of objects with smooth glossy surfaces like aluminium cans.

No object	Non-glossy object	Object with a smooth, glossy surface
The light from the emitter hits the reflective plate and returns to the detector.	Light from the emitter is obstructed by the object, does not reach the reflective plate, and does not return to the detector.	(Example: battery, can, etc.) Light from the emitter is reflected by the object and returns to the detector.
		

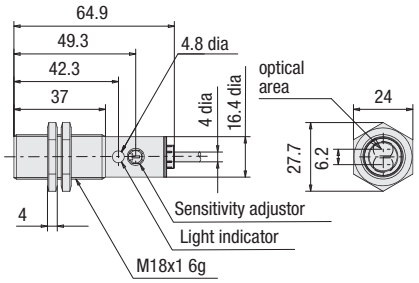
A direct reflection to the receiver from the surface of the object can be avoided by mounting the sensor at an angle. But for higher detection reliability the M.S.R. (Mirror Surface Rejection) function provides a solution for this type of application.

The light from the emitter is now polarized. The polarization plane is turned 90° by a reflector consisting of many small mirrors aligned so the light is reflected three times (triple reflector).	If an object with a smooth, glossy surface passes the emitted polarized light is returned to the receiver. As the polarization plane is not turned 90° the light does not pass the polarization filter in front of the receiver and the objects can be detected independant of their surface.
	

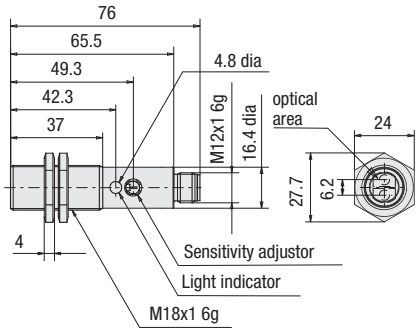
Product dimensions

Models: E3F2







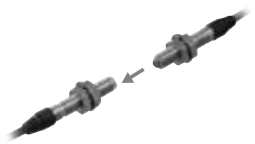


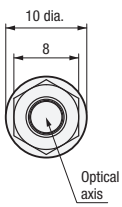
(Example: E3F2-R4, please note that minor variations of the dimensions are possible for different models e.g. position of indicator, etc. - please see complete datasheet for details)

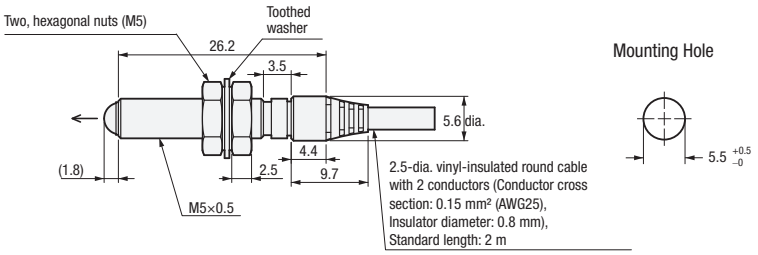
Model: E3T-C

Through-beam

E3T-CT1□ (Emitter)

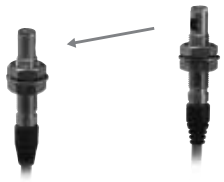


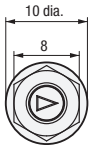


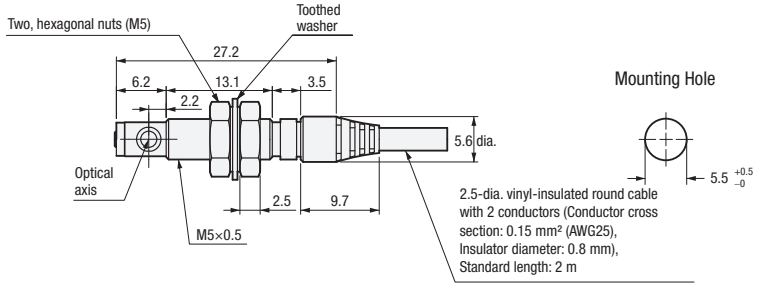


Through-beam

E3T-CT2□S (Emitter)



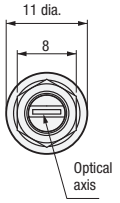


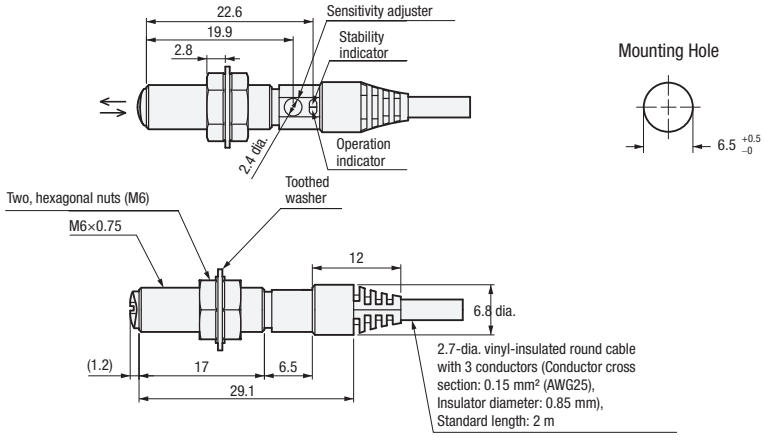


Diffuse-reflective

E3T-CD1□







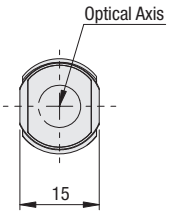
Note: The above information is exemplary. For full information on dimensions, specifications and performance diagrams refer to complete datasheet of each product family.

Product dimensions

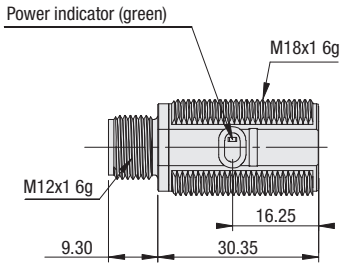
Models: E3FZ

E3FZ-T

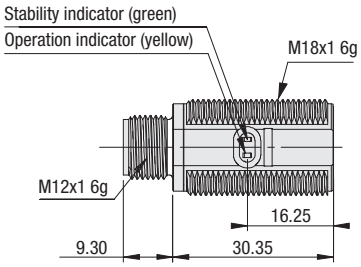




Emitter

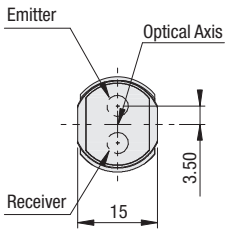


Receiver

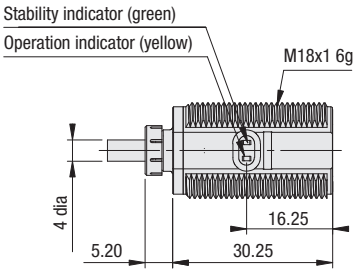


E3FZ-R
E3FZ-LS

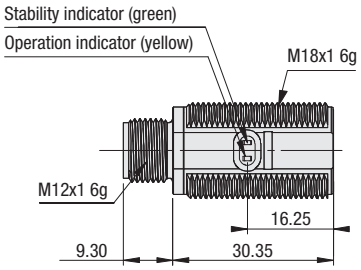




Prewired models

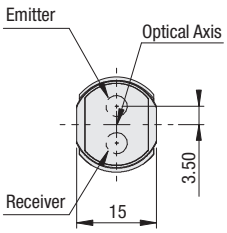


Connector models

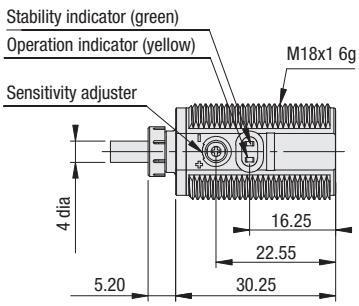


E3FZ-D

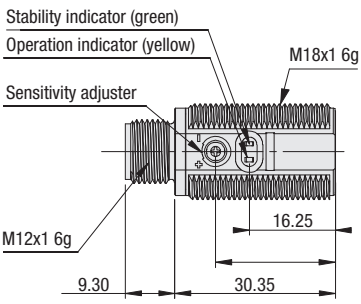




Prewired models

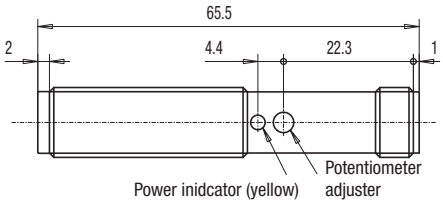


Connector models

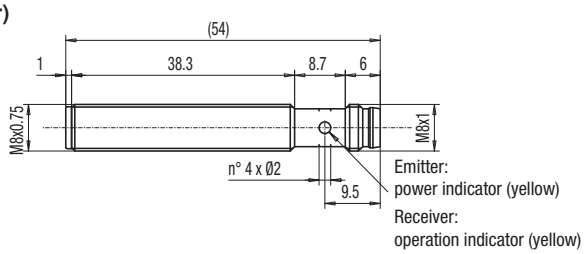


Models: E3H2

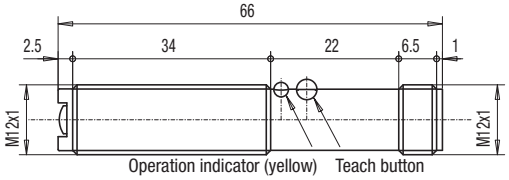
E3H2-T4 (Emitter)



E3H2-T2 (Emitter/Receiver)



E3H2-R2



Note: The above information is exemplary. For full information on dimensions, specifications and performance diagrams refer to complete datasheet of each product family.

READ AND UNDERSTAND THIS DOCUMENT

Please read and understand this document before using the products. Please consult your OMRON representative if you have any questions or comments.

WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

SUITABILITY FOR USE

THE PRODUCTS CONTAINED IN THIS DOCUMENT ARE NOT SAFETY RATED. THEY ARE NOT DESIGNED OR RATED FOR ENSURING SAFETY OF PERSONS, AND SHOULD NOT BE RELIED UPON AS A SAFETY COMPONENT OR PROTECTIVE DEVICE FOR SUCH PURPOSES. Please refer to separate catalogs for OMRON's safety rated products.

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the product.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PERFORMANCE DATA

Performance data given in this document is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the product may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

ERRORS AND OMISSIONS

The information in this document has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

COPYRIGHT AND COPY PERMISSION

This document shall not be copied for sales or promotions without permission.

This document is protected by copyright and is intended solely for use in conjunction with the product. Please notify us before copying or reproducing this document in any manner, for any other purpose. If copying or transmitting this document to another, please copy or transmit it in its entirety.

OMRON EUROPE B.V. Wegalaan 67-69, NL-2132 JD, Hoofddorp, The Netherlands. Tel: +31 (0) 23 568 13 00 Fax: +31 (0) 23 568 13 88 www.industrial.omron.eu

Austria
Tel: +43 (0) 2236 377 800
www.industrial.omron.at

Belgium
Tel: +32 (0) 2 466 24 80
www.industrial.omron.be

Czech Republic
Tel: +420 234 602 602
www.industrial.omron.cz

Denmark
Tel: +45 43 44 00 11
www.industrial.omron.dk

Finland
Tel: +358 (0) 207 464 200
www.industrial.omron.fi

France
Tel: +33 (0) 1 56 63 70 00
www.industrial.omron.fr

Germany
Tel: +49 (0) 2173 680 00
www.industrial.omron.de

Hungary
Tel: +36 1 399 30 50
www.industrial.omron.hu

Italy
Tel: +39 02 326 81
www.industrial.omron.it

Netherlands
Tel: +31 (0) 23 568 11 00
www.industrial.omron.nl

Norway
Tel: +47 (0) 22 65 75 00
www.industrial.omron.no

Poland
Tel: +48 (0) 22 645 78 60
www.industrial.omron.pl

Portugal
Tel: +351 21 942 94 00
www.industrial.omron.pt

Russia
Tel: +7 495 648 94 50
www.industrial.omron.ru

South-Africa
Tel: +27 (0)11 608 3041
www.industrial.omron.co.za

Spain
Tel: +34 913 777 900
www.industrial.omron.es

Sweden
Tel: +46 (0) 8 632 35 00
www.industrial.omron.se

Switzerland
Tel: +41 (0) 41 748 13 13
www.industrial.omron.ch

Turkey
Tel: +90 212 467 30 00
www.industrial.omron.com.tr

United Kingdom
Tel: +44 (0) 870 752 08 61
www.industrial.omron.co.uk

More Omron representatives
www.industrial.omron.eu

Authorised Distributor:

Control Systems
• Programmable logic controllers • Human-machine interfaces • Remote I/O

Motion & Drives
• Motion controllers • Servo systems • Inverters

Control Components
• Temperature controllers • Power supplies • Timers • Counters • Programmable relays
• Digital panel indicators • Electromechanical relays • Monitoring products • Solid-state relays
• Limit switches • Pushbutton switches • Low voltage switch gear

Sensing & Safety
• Photoelectric sensors • Inductive sensors • Capacitive & pressure sensors • Cable connectors
• Displacement & width-measuring sensors • Vision systems • Safety networks • Safety sensors
• Safety units/relay units • Safety door/guard lock switches

E73E-EN-02+CylindricalPES

Although we strive for perfection, Omron Europe BV and/or its subsidiary and affiliated companies do not warrant or make any representations regarding the correctness or completeness of the information described in this document. We reserve the right to make any changes at any time without prior notice.