NEVER-FAIL

“It’s not about our products, it’s about your production”

Our "Never-fail" concept looks beyond device reliability. The whole chain of machine control and management should be able to diagnose a potential malfunction and alert the operator while production continues.

For standard machine part or object detection, our high reliability sensors and limit switches provide the operational stability ensuring a continuous machine operation ... even beyond specifications.

And for special objects or environments you can choose the performance level you need from our wide range of application specific sensors ... without over- or underdesigning.

Our measurement and vision sensors and inspection systems are easy to set up and operate and provide the flexibility to choose the fitting quality control measures to ensure 100% perfect product quality.

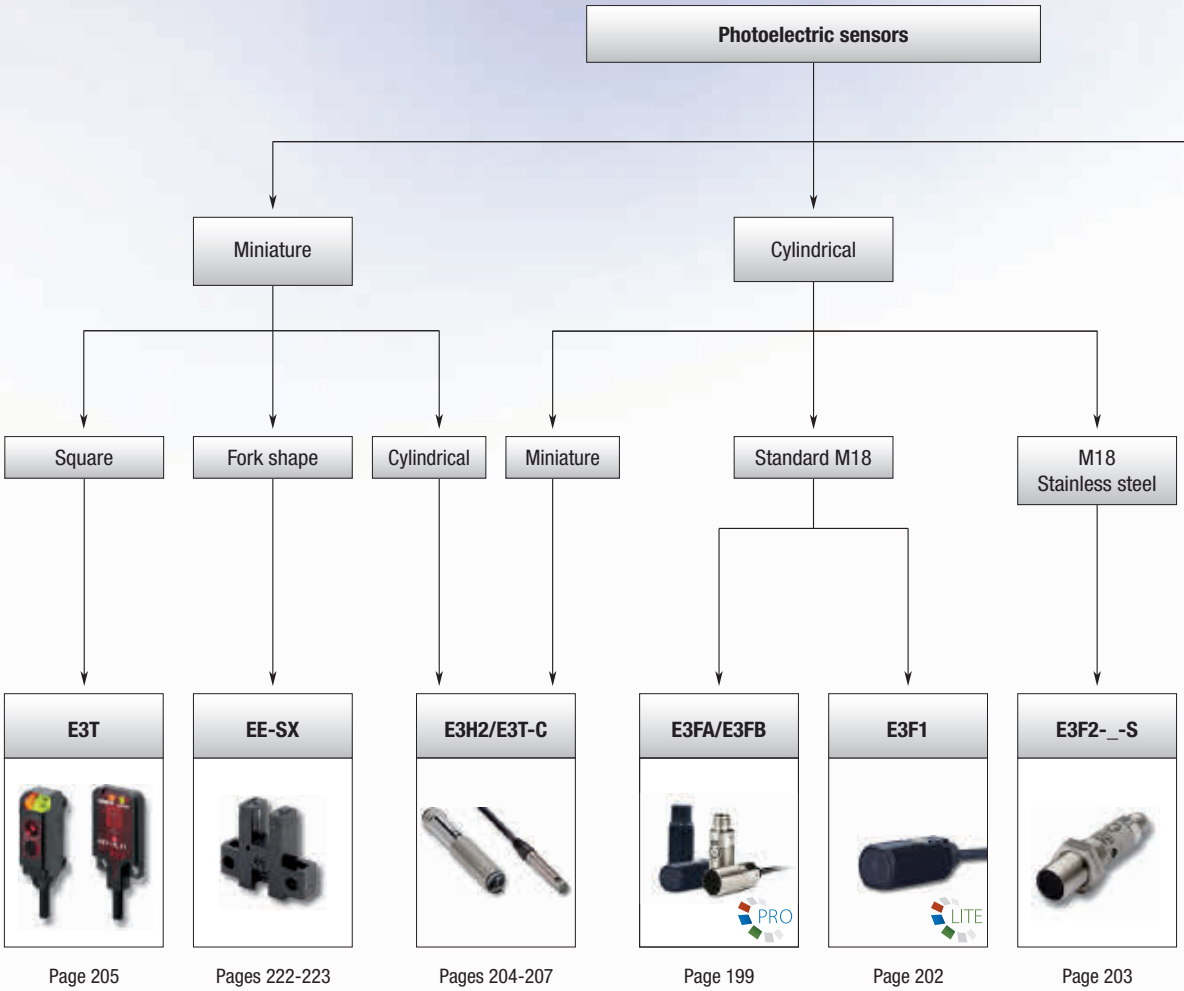
Sensing – Table of contents

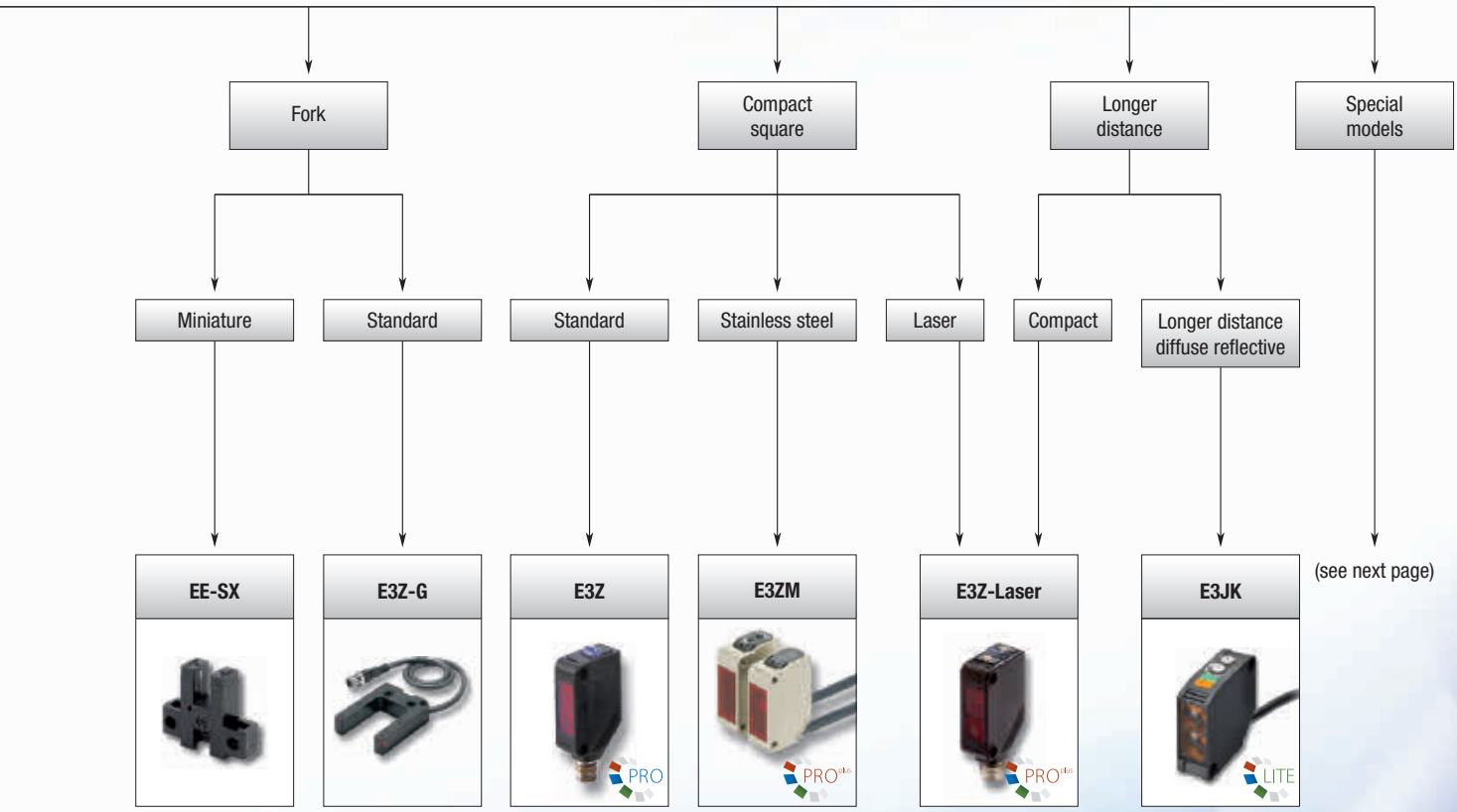
FOR MACHINES BUILT TO LAST

Reliability and accuracy confirmed by millions… every day

With more than one million units sold, the E3Z is among the world's most popular and successful photoelectric sensors.
Manufactured to exceptionally high engineering standards, you can take the performance reliability for granted.

- Optimal sensing performance tuned to your application
- Various housing designs fitting your application concept
- Proven performance and unmatched reliability





Page 222
Page 198
Pages 189-191
Page 193
Page 191
Page 210

Selection table

Type	Compact square			Longer distance	
					
Model	**E3Z**	**E3ZM**	**E3Z Laser**	**E3S-CL**	**E3JK**
361°	PRO	PRO^{plus}	PRO^{plus}	n.a.	LITE
Housing	PBT	Stainless steel	PBT	Zinc diecast	ABS
Through-beam	15 m, 30 m	15 m	60 m	–	40 m
Retro-reflective with M.S.R.	5 m	4 m	15 m	–	7 m
Diffuse-reflective (energetic)	1 m	1 m	–	–	2.5 m
Diffuse-reflective (background suppression)	200 mm	200 mm	300 mm	500 mm	–
Page	189	193	191	208	210

Type	Oil resistant	Mark detection	Transparent detection		
					
Model	**E3ZM-C**	**E3ZM-V**	**E3ZM-B**	**E3Z-B**	**E3FA-B/-V**
361°	PRO^{plus}	PRO^{plus}	PRO^{plus}	PRO^{plus}	PRO^{plus}
Key features	Oil and lubricant resistant stainless steel housing	White LED for optimal contrast	Optimised optical system for all transparent objects	Optical system for standard transparent objects	Optimised optical system for all transparent objects
Housing	Stainless steel	Stainless steel	Stainless steel	PBT	M18 PBT/metal
Through-beam	20 m	–	–	–	–
Retro-reflective with M.S.R.	4 m		500 mm	500 mm, 2 m	2 m
Diffuse-reflective	1 m	12mm±2mm	–	–	–
Diffuse-reflective (background suppression)	200 mm	–	–	–	50 mm
Page	195	231	197	192	201

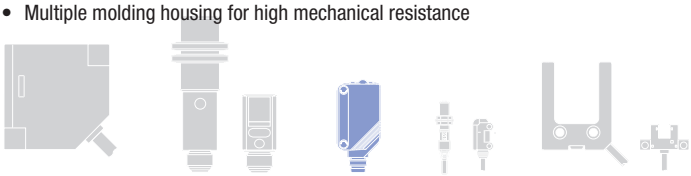
Cylindrical				Miniature		Fork	
							
E3FA/E3FB	**E3F1**	**E3F2-_-S**	**E3H2**	**E3T-C**	**E3T**	**EE-SX**	**E3Z-G**
PRO	LITE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
M18 PBT, metal	ABS	M18 stainless steel	M12 metal, M8 stainless steel	M5, M6 stainless steel	PBT	PBT	PBT
20 m	15 m	7 m	4 m, 2 m	1 m	1 m, 2 m	5 mm (slot width)	25 mm
4 m	3 m	4 m	2 m	–	200 mm	–	–
1 m	300 mm	1 m	300 mm	50 mm	30 mm	–	–
200 mm	–	100 mm	–	–	30 mm	–	–
199	202	203	204	207	205	222	198

High precision positioning		Structured object detection	Multi voltage power supply
			
E3NC-L/E3NC-S	**E3C-LDA**	**E3S-LS3**	**E3JK, E3JM, E3G-_M**
n.a.	n.a.	n.a.	n.a.
N-Smart Laser sensors 0.1 mm Laser spot	Up to 10 µm accuracy	Wide beam	AC/DC power supply and relay output
PBT	PBT	PBT	ABS, ABS, PBT
–	–	–	40 m, 10 m, –
–	7 m	–	9 m, 4 m, 10 m
1.2 m	1 m	60 mm	2.5 m, 700 mm, 2 m
250 mm	–	–	–, –, 1.2 m
214	219	218	210/212/213

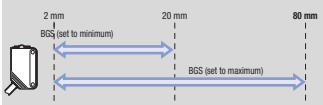
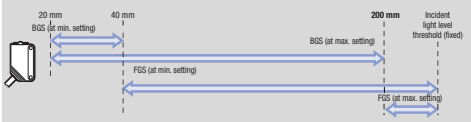
General purpose sensor in compact plastic housing

The compact housing size and the high-power LED provide an excellent performance-size ratio and the high optical precision and long sensor lifetime make the sensor the first choice for standard and challenging applications.

- Minimal optical axis deviation for easy alignment
- IP67 and IP69K for highest water resistance
- Intensive shielding for highest noise immunity (EMC)
- Multiple molding housing for high mechanical resistance



Ordering information

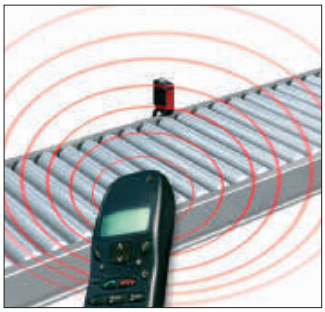
Sensor type		Sensing distance	Connection method				Order code*1	
							NPN output	PNP output
Through-beam		30 m (Infrared light)	–	–	2 m	For ordering pigtail versions replace '2M' of cable types with: - M1J: M12 with 30 cm cable - M3J: M8 4-pin with 30 cm cable - M5J: M8 3-pin with 30 cm cable	E3Z-T62 2M	E3Z-T82 2M
			■	–	–		E3Z-T67	E3Z-T87
		10 m (Red light)	–	–	2 m		E3Z-T61A 2M	E3Z-T81A 2M
			■	–	–		E3Z-T66A	E3Z-T86A
Retro-reflective with M.S.R.		0.1 to 4 m*2 (Red light)	–	–	2 m		E3Z-R61 2M	E3Z-R81 2M
			■	–	–		E3Z-R66	E3Z-R86
Retro-reflective without M.S.R.		0.1 to 5 m*2 (Infrared light)	–	–	2 m		E3Z-R61-4 2M	E3Z-R81-4 2M
			■	–	–		E3Z-R66-4	E3Z-R86-4
Diffuse-reflective		1 m (adjustable) (Infrared light)	–	–	2 m		E3Z-D62 2M	E3Z-D82 2M
			■	–	–		E3Z-D67	E3Z-D87
Diffuse-reflective wide beam		100 mm (adjustable) (Infrared light)	–	–	2 m		E3Z-D61 2M	E3Z-D81 2M
			■	–	–		E3Z-D66	E3Z-D86
Distance settable (background suppression)	Small spot (Red light)		–	–	2 m		E3Z-LS63 2M	E3Z-LS83 2M
			■	–	–		E3Z-LS68	E3Z-LS88
	Standard (Red light)		–	–	2 m		E3Z-LS61 2M*3	E3Z-LS81 2M*3
			■	–	–		E3Z-LS66*3	E3Z-LS86*3

*1 Light-ON/Dark-ON switch selectable
*2 Measured with E39-R1S
*3 For infrared LED models contact your Omron representative

Specifications

Item		Through-beam		Retro-reflective with M.S.R	Retro-reflective without M.S.R	Diffuse-reflective	Diffuse-reflective (wide beam)	Distance-settable (background suppression)	
				Red LED	Infrared LED			Standard	Small spot
	NPN	E3Z-T62/T67	E3Z-T61A/T66A	E3Z-R61/R66	E3Z-R6_-4	E3Z-D62/D67	E3Z-D61/D66	E3Z-LS61/66	E3Z-LS63/68
	PNP	E3Z-T82/T87	E3Z-T81A/T86A	E3Z-R81/R86	E3Z-R8_-4	E3Z-D82/D87	E3Z-D81/D86	E3Z-LS81/86	E3Z-LS83/88
Directional angle		Both emitter and receiver: 3° to 15°		2° to 10°		–			
Black/white error		–						10% of set distance max.	5% of set distance max.
Light source (wave length)		Infrared LED (870 nm)	RED LED (700 nm)	Red LED (680 nm)	Infrared LED (870 nm)	Infrared LED (860 nm)		Red LED (680 nm)	Red LED (650 nm)
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p): 10% max.							
Protective circuits		Reverse polarity protection, short-circuit protection, output reverse polarity protection	Output short-circuit protection, power supply, reverse polarity protection	Reverse polarity protection, output short-circuit protection, mutual interference prevention, output reverse polarity protection				Reverse polarity protection, output short-circuit protection, mutual interference prevention	
Response time		2 ms max.	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, IP69K after DIN 40050 part 9							
Material	Case	PBT (polybutylene terephthalate)							
	Lens	Denatured polyacrylate resin		Methacrylate resin		Denatured polyacrylate resin			

High ambient light immunity



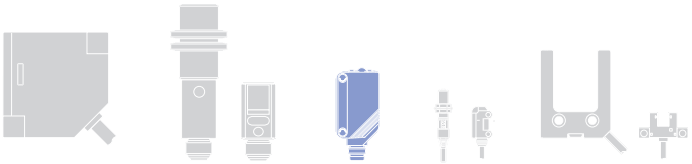
High electromagnetic noise immunity

Robust and tight housing construction

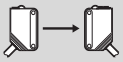
LASER sensor in compact plastic housing

The E3Z LASER sensor in compact plastic housing features visible LASER light for precision positioning and detection applications.

- Visible LASER light for precision positioning and small object detection
- High power LD for long range precision
- Class 1 LASER
- Precise background suppression and low black/white error for accurate detection



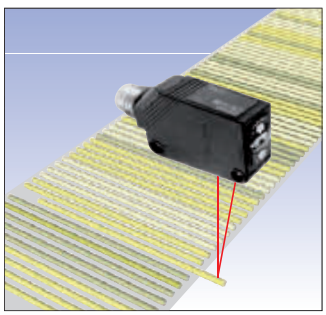
Ordering information

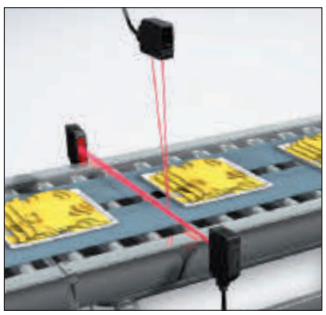
Sensor type	Sensing distance	Response time	Connection method				Order code*1	
							NPN output	PNP output
Through-beam 	60 m	1 ms	–	–	2 m	For ordering pigtail versions replace '2M' of cable types with: - M1J: M12 with 30 cm cable - M3J: M8 4-pin with 30 cm cable - M5J: M8 3-pin with 30 cm cable	E3Z-LT61 2M	E3Z-LT81 2M
			■	–	–		E3Z-LT66	E3Z-LT86
Retro-reflective with M.S.R. 	0.3 to 15 m*2		–	–	2 m		E3Z-LR61 2M	E3Z-LR81 2M
			■	–	–		E3Z-LR66	E3Z-LR86
Distance-settable (background suppression) 	20 to 300 mm		–	–	2 m		E3Z-LL61 2M	E3Z-LL81 2M
			■	–	–		E3Z-LL66	E3Z-LL86
	25 to 300 mm	0.5 ms	–	–	2 m		E3Z-LL63 2M	E3Z-LL83 2M
			■	–	–		E3Z-LL68	E3Z-LL88

*1 Light-ON / Dark-ON switch selectable
*2 Measured with E39-R1

Specifications

Item		Through-beam	Retro-reflective with M.S.R.	Distance settable (background suppression)	
		Standard model			High-speed model
	NPN output	E3Z-LT61/-LT66	E3Z-LR61/-LR66	E3Z-LL61/-LL66	E3Z-LL63/-LL68
	PNP output	E3Z-LT81/-LT86	E3Z-LR81/-LR86	E3Z-LL81/-LL86	E3Z-LL83/-LL88
Black/white error		–		5% (at 160 mm)	5% (at 100 mm)
Light source (wave length)		Red LD (655 nm), JIS Class 1, IEC Class 1, FDA Class II			
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p): 10% max.			
Protective circuits		Power supply reverse polarity, protection, short circuit protection, output reverse polarity protection	Power supply reverse polarity protection, short circuit protection, output reverse polarity protection, mutual interference prevention		
Response time		1 ms max.			0.5 ms max.
Ambient temperature	Operating	-10 to 55°C			
	Storage	-25 to 70°C (with no icing or condensation)			
Degree of protection		IEC 60529 IP67, IP69K after DIN 40050 part 9			
Material	Case	PBT (polybutylene terephthalate)			
	Lens	Modified polyacrylate resin	Methacrylate	Modified polyacrylate resin	


Low black/white error for precise detection

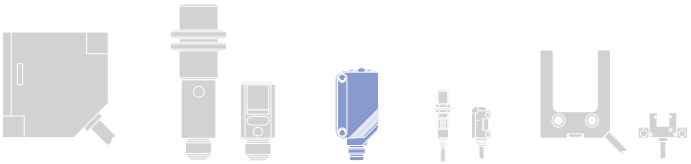

Visible laser light for precision positioning


Class 1 laser

Transparent object detection photoelectric sensor in compact plastic housing

The E3Z-B provides easy adjustment for the detection of a large variety of standard transparent objects.

- Detects a wide range of bottles from single bottles to sets of stocked bottles
- IP67/IP69K tested for highest water resistance



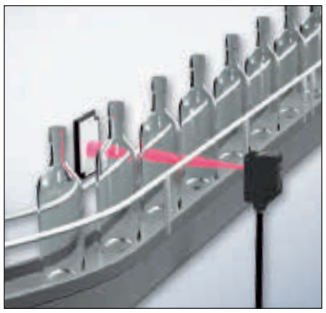
Ordering information

Sensor type	Sensing distance	Connection method				Order code*1	
						NPN output	PNP output
Retro-reflective without M.S.R. 	80 to 500 mm*2 (adjustable)	–	–	2 m	–	E3Z-B61 2M	E3Z-B81 2M
		■	–	–	–	E3Z-B66	E3Z-B86
	0.5 to 2 m*2 (adjustable)	–	–	2 m	–	E3Z-B62 2M	E3Z-B82 2M
		■	–	–	–	E3Z-B67	E3Z-B87

*1 Light-ON / Dark-ON switch selectable
*2 Measured with E39-R1S

Specifications

Item		Retro-reflective without M.S.R.	
	NPN output	E3Z-B61/E3Z-B66	E3Z-B62/E3Z-B67
	PNP output	E3Z-B81/E3Z-B86	E3Z-B82/E3Z-B87
Light source (wave length)		Red LED (680 nm)	
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p) : 10% max.	
Protective circuits		Reverse polarity protection, output short-circuit protection, mutual interference prevention	
Response time		1 ms max.	
Ambient temperature	Operating	-25°C to 55°C	
	Storage	-40°C to 70°C (with no icing or condensation)	
Degree of protection		IEC 60529 IP67, IP69K after DIN 40050 part 9	
Material	Case	PBT (polybutylene terephthalate)	
	Lens	Methacrylate resin	

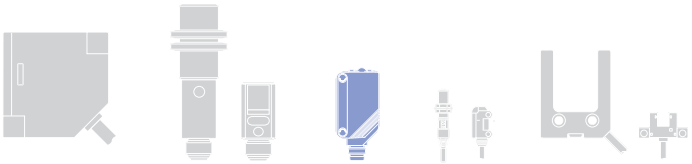


Easy adjustment for the detection of a large variety of transparent objects

Photoelectric sensor in compact stainless steel housing

Compact housing size and high power LED for excellent performance-size ratio in a rugged, detergent-resistant stainless steel housing for demanding environments.

- High grade stainless steel housing (SUS316L)
- IP67 and IP69k for highest water resistance
- ECOLAB tested and certified detergent resistance



Ordering information

Sensor type	Sensing distance	Connection method				Order code*1	
						NPN output	PNP output
Through-beam	15 m	–	–	2 m	*2	E3ZM-T61 2M	E3ZM-T81 2M
		■	–	–		E3ZM-T66	E3ZM-T86
	0.8 m with built-in slit	–	–	2 m		E3ZM-T63 2M	E3ZM-T83 2M
		■	–	–		E3ZM-T68	E3ZM-T88
Retro-reflective with M.S.R.	0.1 to 4 m	–	–	2 m		E3ZM-R61 2M	E3ZM-R81 2M
		■	–	–		E3ZM-R66	E3ZM-R86
Diffuse-reflective	1 m (adjustable)	–	–	2 m		E3ZM-D62 2M	E3ZM-D82 2M
		■	–	–		E3ZM-D67	E3ZM-D87
Diffuse-reflective (background suppression)	10 to 100 mm (fixed)	–	–	2 m		E3ZM-LS61X 2M*3	E3ZM-LS81X 2M*3
		■	–	–		E3ZM-LS66X*3	E3ZM-LS86X*3
	10 to 200 mm (fixed)	–	–	2 m		E3ZM-LS64X 2M*3	E3ZM-LS84X 2M*3
		■	–	–		E3ZM-LS69X*3	E3ZM-LS89X*3

*1 Light-ON / Dark-ON switch selectable except for E3ZM-LS
*2 For ordering pigtail versions replace '2M' of the cable types with:
- S1J: for M12 stainless steel plug with 30 cm cable
- S3J: for M8 4-pin stainless steel plug with 30cm cable
- S5J: for M8 3-pin stainless steel plug with 30cm cable (except for background suppression types)
- M1J: for M12 brass plug with 30cm cable
- M3J: for M8 4-pin brass plug with 30cm cable
- M5J: for M8 3-pin brass plug with 30cm cable (except for background suppression types)

*3 E3ZM-LS_X are fixed LIGHT-ON models. For fixed DARK-ON models please order E3ZM-LS_Y and for L-ON/D-ON selectable by wire please order E3ZM-LS_H.

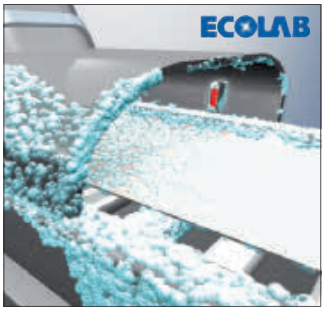
Specifications

Item		Through-beam		Retro-reflective with M.S.R.	Diffuse-reflective
	NPN	E3ZM-T61 E3ZM-T66	E3ZM-T63 E3ZM-T68	E3ZM-R61 E3ZM-R66	E3ZM-D62 E3ZM-D67
	PNP	E3ZM-T81 E3ZM-T86	E3ZM-T83 E3ZM-T88	E3ZM-R81 E3ZM-R86	E3ZM-D82 E3ZM-D87
Light source (wave length)		Infrared LED (870 nm)		Red LED (660 nm)	Infrared LED (860 nm)
Power supply voltage		10 to 30 VDC, ±10% ripple (p-p)			
Protective circuits		Power supply reverse polarity protection, output short-circuit protection, output reverse polarity protection		Power supply reverse polarity protection, output short-circuit protection, mutual interference prevention, output reverse polarity protection	
Response time		1 ms max.			
Ambient temperature	Operating	-25°C to 55°C			
	Storage	-40°C to 70°C (with no icing or condensation)			
Degree of protection		IEC 60529 IP67, IP69K after DIN 40050 part 9			
Material	Case	SUS316L			
	Lens	Methacrylic resin			
	Display	PES (polyether sulfone)			
	Sensitivity adjustment and operation switch	PEEK (polyether ether ketone)			
	Seals	Fluoro rubber			

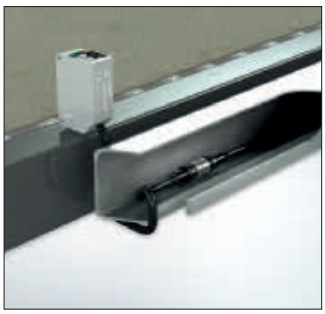
Item		Diffuse-reflective with background suppression (fixed distance)	
	NPN	E3ZM-LS61X E3ZM-LS66X	E3ZM-LS64X E3ZM-LS69X
	PNP	E3ZM-LS81X E3ZM-LS86X	E3ZM-LS84X E3ZM-LS89X
Light source (adjustable)		Red LED (650 nm)	Red LED (660 nm)
Black/white error		5% of sensing distance max.	20% of sensing distance max.
Power supply voltage		10 to 30 VDC, ±10% ripple (p-p): 10% max.	
Protective circuits		Power supply reverse polarity protection, output short-circuit protection, output reverse polarity protection, mutual interference protection	
Response time		1 ms max.	
Ambient temperature range	Operating	-25°C to 55°C	
	Storage	-40°C to 70°C (with no icing or condensation)	
Degree of protection		IEC 60529 IP67, IP69K after DIN 40050 part 9	
Material	Case	SUS316L	
	Lens	Methacrylic resin	
	Display	PES (polyether sulfone)	
	Sensitivity adjustment and operation switch	PEEK (polyether ether ketone)	
	Seals	Fluoro rubber	

Robust construction

Tight housing



Detergent resistant

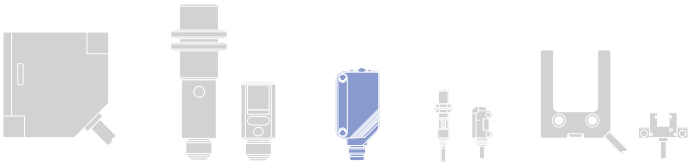


Pre-wired models with stainless steel plug connectors for best combination of highest water ingress protection with fast connect & disconnect..

Oil-resistant photoelectric sensor in compact stainless steel housing

The oil-resistant compact photoelectric sensor in a robust stainless steel housing features an enhanced functional reserve for reliable object detection in dirty and mechanically demanding environments such as automotive assembly lines.

- Oil-resistant stainless steel housing
- IP67 and IP69k for highest water resistance
- High visibility orange LED in through-beam model for easy alignment



Ordering information

Sensor type	Sensing distance	Connection method				Order code*1	
						NPN output	PNP output
Through-beam	15 m (Infrared light)	–	–	2 m	–	E3ZM-CT61 2M	E3ZM-CT81 2M
		–	–	–	■*2	E3ZM-CT61-M1TJ	E3ZM-CT81-M1TJ
		■	–	–	–	E3ZM-CT66	E3ZM-CT86
	20 m (Orange light)	–	–	2 m	–	E3ZM-CT62B 2M	E3ZM-CT82B 2M
		–	–	–	■*2	E3ZM-CT62B-M1TJ	E3ZM-CT82B-M1TJ
		■	–	–	–	E3ZM-CT67B	E3ZM-CT87B
Retro-reflective with M.S.R.	0.1 to 4m*3	–	–	2 m	–	E3ZM-CR61 2M	E3ZM-CR81 2M
		–	–	–	■*2	E3ZM-CR61-M1TJ	E3ZM-CR81-M1TJ
		■	–	–	–	E3ZM-CR66	E3ZM-CR86
Diffuse-reflective	1 m (adjustable)	–	–	2 m	–	E3ZM-CD62 2M	E3ZM-CD82 2M
		–	–	–	■*2	E3ZM-CD62-M1TJ	E3ZM-CD82-M1TJ
		■	–	–	–	E3ZM-CD67	E3ZM-CD87
Diffuse-reflective (background suppression)	10 to 100 mm (fixed)	–	–	2 m	–	E3ZM-CL61H 2M	E3ZM-CL81H 2M
		–	–	–	■*2	E3ZM-CL61H-M1TJ	E3ZM-CL81H-M1TJ
		■	–	–	–	E3ZM-CL66H	E3ZM-CL86H
	10 to 200 mm (fixed)	–	–	2 m	–	E3ZM-CL64H 2M	E3ZM-CL84H 2M
		–	–	–	■*2	E3ZM-CL64H-M1TJ	E3ZM-CL84H-M1TJ
		■	–	–	–	E3ZM-CL69H	E3ZM-CL89H

*1 Light-ON/ Dark-ON switch selectable for E3ZM-CT, E3ZM-CR and E3ZM-CD. Light-ON/ Dark-ON selectable by wire for E3ZM-CL.
*2 uses OMRON's Twist & Click M12 connector XS5.
*3 Measured with E39-R1S.

Specifications

Item		Through-beam		Retro-reflective with M.S.R.	Diffuse-reflective
	NPN	E3ZM-CT61 (-M1TJ) E3ZM-CT66	E3ZM-CT62B (-M1TJ) E3ZM-CT67B	E3ZM-CR61 (-M1TJ) E3ZM-CR66	E3ZM-CD62 (-M1TJ) E3ZM-CD67
	PNP	E3ZM-CT81 (-M1TJ) E3ZM-CT86	E3ZM-CT82B (-M1TJ) E3ZM-CT87B	E3ZM-CR81 (-M1TJ) E3ZM-CR86	E3ZM-CD82 (-M1TJ) E3ZM-CD87
Light source (wave length)		Infrared LED (870 nm)	Orange LED (615 nm)	Red LED (660 nm)	Infrared LED (860 nm)
Power supply voltage		10 to 30 VDC, including 10% ripple (p-p)			
Protective circuits		Power supply reverse polarity protection, output short-circuit protection, output reverse polarity protection		Power supply reverse polarity protection, output short-circuit protection, output reverse polarity protection, and mutual interference prevention	
Response time		1 ms max.	2 ms max.	1 ms max.	
Ambient temperature	Operating	-25°C to 55°C			
	Storage	-40°C to 70°C (with no icing or condensation)			
Degree of protection		IEC 60529 IP67, IP69K after DIN 40050 part 9			
Material	Case	SUS316L			
	Lens	PMMA (polymethylmethacrylate)			
	Display	PES (polyether sulfone)			
	Sensitivity adjustment and operation switch	PEEK (polyether ether ketone)			
	Seals	Fluoro rubber			

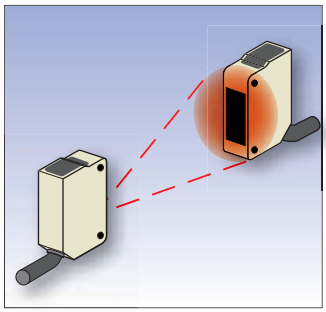
Item			Diffuse-reflective with background suppression (fixed distance)	
		NPN	E3ZM-CL61H (-M1TJ) E3ZM-CL66H	E3ZM-CL64H (-M1TJ) E3ZM-CL69H
		PNP	E3ZM-CL81H (-M1TJ) E3ZM-CL86H	E3ZM-CL84H (-M1TJ) E3ZM-CL89H
Light source (wave length)			Red LED (650 nm)	Red LED (660 nm)
Power supply voltage			10 to 30 VDC, ±10% ripple (p-p): 10% max.	
Protective circuits			Reversed power supply polarity protection, output short-circuit protection, reversed output polarity protection, mutual interference protection	
Response time			1 ms max.	
Ambient temperature		Operating	-25°C to 55°C	
		Storage	-40°C to 70°C (with no icing or condensation)	
Degree of protection			IEC 60529 IP67, IP69K after DIN 40050 part 9	
Material	Case		SUS316L	
	Cable		Oil-resistant vinyl cable	
	Lens		PMMA (polymethylmethacrylate)	
	Display		PES (polyethersulfone)	
	Seals		Fluoro rubber	

Tested oil and lubricant resistance

Oil Resistance

Test oil type	Product name	Kinetic viscosity at 40°C (mm^2/s)	pH (dilution rate)
Lubricants	Velocity Oil No. 3	2.02	–
Non-water-soluble cutting oils	Yushiron Oil No.2 AC	Less than 10	–
Water-soluble cutting oils	Yushiroken EC50T3	–	10.1 (×30)
	Yushiroken EC50T5		9.9 (×30)
	Yushiroken S46D		9.9 (×50)
	Yushiroken S50N		8.6 (×50)
	Yushiron Lubic HWC68		9.1 (×30)
	Yushiroken Synthetic #770TG		9.9 (×20)
	Emulcut FA-900ST		9.7 (×30)
	Multicool CSF-9000		9.7 (×20)
	Sugicut CS-68JS-1		9.6 (×20)
	Toyocool 3A-666		9.6 (×20)
	Gryton 1700		9.1 (×10)
	Gryton 1700D		9.3 (×3)

1. The Sensor was immersed in the above oils for 240 h at 55°C and then passed an insulation resistance test at 100 MΩ.
2. Use the kinetic viscosities and pHs in the above table as a guide when using the Sensor in environments containing oils not listed in the table. Additives in the oil may also affect performance. Always test applicability in advance.

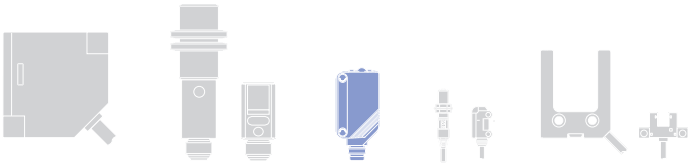


Highly visible orange LED

Transparent object detection sensor in compact stainless steel housing

The E3ZM-B family provides models for the general transparent material detection and specialized models providing highest stability for the detection of PET bottles.

- Stable PET detection using double refraction and AC^3 power control technology
- Detergent resistant compact SUS316L housing



Ordering information

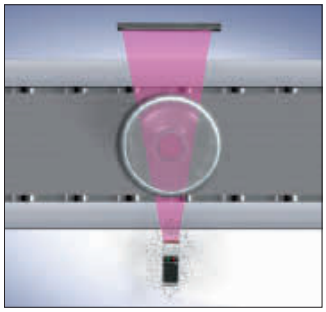
Sensor type		Sensing distance	Special reflector	Connection method				Order code*1	
								NPN output	PNP output
Retro-reflective with M.S.R.	Optimised for PET bottles and trays	100 to 500 mm (teachable)	Order separately*2	–	–	2 m	–	E3ZM-B61 2M	E3ZM-B81 2M
				■	–	–	–	E3ZM-B66	E3ZM-B86
			E39-RP1 included	–	–	2 m	–	E3ZM-B61-C 2M	E3ZM-B81-C 2M
				■	–	–	–	E3ZM-B66-C	E3ZM-B86-C
Retro-reflective with M.S.R.	For all transparent media (glass, PET, foils)	100 to 500 mm (potentiometer adjustment)*3	Order separately*4	–	–	2 m	–	E3ZM-B61T 2M	E3ZM-B81T 2M
				■	–	–	–	E3ZM-B66T	E3ZM-B86T

*1 PET optimised models are Light-ON / Dark-ON selectable by wire. E3ZM-B_T all transparent media types are Light-ON/ Dark-ON switch selectable
*2 For higher signal stability using circular polarisation functionality for PET bottles, order special reflector E39-RP1 separately
*3 Teachable all-transparent-media types are available. Contact your OMRON representative
*4 Order reflector separately

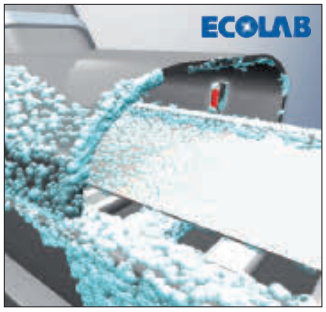
Specifications

Item		PET optimised (teachable)	all-transparent-media (potentiometer adjustment)
	NPN	E3ZM-B61(-C)/-B66(-C)	E3ZM-B6_T
	PNP	E3ZM-B81(-C)/-B86(-C)	E3ZM-B8_T
Light source (wave length)		Red LED (650 nm)	
Power supply voltage		10 to 30 VDC, ±10% ripple (p-p): 10% max.	
Protective circuits		Reversed power supply polarity protection, output short-circuit protection, mutual interference prevention, and reversed output polarity protection	
Repsonse time		1 ms max.	
Ambient temperature	Operating	-40°C to 60°C	-25° to 55°C
	Storage	-40°C to 70°C (with no icing or condensation)	
Degree of protection		IEC 60529 IP67, IP69K after DIN 40050 part 9	
Material	Case	SUS316L	
	Lens	PMMA (polymethylmethacrylate)	
	Display	PES (polyether sulfone)	
	Seals	Fluoro rubber	
	Cable	PVC (polyvinyl chloride)	

Utilisation of double reflection effect in PET for higher detection stability (PET optimised models)



Automatic LED power adjustment (AC^3) to compensate for soiling and temperature fluctuations (PET optimised models)

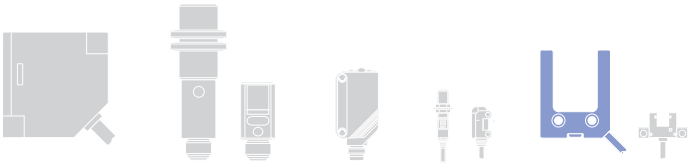


Detergent resistant

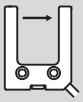
Photoelectric sensor in 25 mm plastic fork shape housing

The forked shape optical through-beam sensors combine simple installation with reliable passage detection of object, machine parts or transportation elements like hanggliders.

- Fork shape for simple installation
- 1 or 2 axis models



Ordering information

Sensor type	Sensing distance	Number of optical axes	Connection method				Order code*1	
							NPN output	PNP output
Through-beam 	25 mm (Infrared light)	1	–	–	2 m	–	E3Z-G61 2M	E3Z-G81 2M
			–	–	–	■ M8 4-pin	E3Z-G61-M3J	E3Z-G81-M3J
		2	–	–	2 m	–	E3Z-G62 2M	E3Z-G822M
			–	–	–	■ M8 4-pin	E3Z-G62-M3J	E3Z-G82-M3J

*1 Light-ON / Dark-ON switch selectable

Specifications

Item		Through-beam
		E3Z-G
Power supply voltage		12 to 24 VDC ±10% max. ripple (p-p): 10%
Protective circuits		Output short-circuit protection, and mutual interference prevention, power supply, reverse 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		IEC60529 IP64
Material		ABS

High performance photoelectric sensor in compact M18 housing

E3FA/E3FB series represents a new generation of OMRON photoelectric sensors with large varieties of reliable and easy-to use photoelectric sensors. Featuring many standard and special functions this line is addressing many kinds of industries such as packaging, ceramics and material handling.

- Large variety of standard and special types
- High power and visible red LED enabling easy alignment and long sensing distance
- Compact and robust housing for easy integration into machines

Ordering information

Straight types

Sensor type	Sensing distance	Connection method				Order code			
						E3FA (plastic housing)		E3FB (metal housing)	
						NPN output	PNP output	NPN output	PNP output
Through-beam	20 m	–	–	2 m	–	E3FA-TN11 2M	E3FA-TP11 2M	E3FB-TN11 2M	E3FB-TP11 2M
		–	■	–	–	E3FA-TN21	E3FA-TP21	E3FB-TN21	E3FB-TP21
Retro-reflective with MSR*1	0.1 to 4 m (with E39-R1S)	–	–	2 m	–	E3FA-RN11 2M	E3FA-RP11 2M	E3FB-RN11 2M	E3FB-RP11 2M
		–	■	–	–	E3FA-RN21	E3FA-RP21	E3FB-RN21	E3FB-RP21
Coaxial Retro-reflective with MSR*1	0 to 500 mm (with E39-R1S)	–	–	2 m	–	E3FA-RN12 2M	E3FA-RP12 2M	E3FB-RN12 2M	E3FB-RP12 2M
		–	■	–	–	E3FA-RN22	E3FA-RP22	E3FB-RN22	E3FB-RP22
Diffuse-reflective	100 mm	–	–	2 m	–	E3FA-DN11 2M	E3FA-DP11 2M	E3FB-DN11 2M	E3FB-DP11 2M
		–	■	–	–	E3FA-DN21	E3FA-DP21	E3FB-DN21	E3FB-DP21
	300 mm	–	–	2 m	–	E3FA-DN12 2M	E3FA-DP12 2M	E3FB-DN12 2M	E3FB-DP12 2M
		–	■	–	–	E3FA-DN22	E3FA-DP22	E3FB-DN22	E3FB-DP22
	1 m	–	–	2 m	–	E3FA-DN13 2M	E3FA-DP13 2M	E3FB-DN13 2M	E3FB-DP13 2M
		–	■	–	–	E3FA-DN23	E3FA-DP23	E3FB-DN23	E3FB-DP23
BGS (background suppression)	100 mm	–	–	2 m	–	E3FA-LN11 2M	E3FA-LP11 2M	E3FB-LN11 2M	E3FB-LP11 2M
		–	■	–	–	E3FA-LN21	E3FA-LP21	E3FB-LN21	E3FB-LP21
	200 mm	–	–	2 m	–	E3FA-LN12 2M	E3FA-LP12 2M	E3FB-LN12 2M	E3FB-LP12 2M
		–	■	–	–	E3FA-LN22	E3FA-LP22	E3FB-LN22	E3FB-LP22

Radial types

Sensor type	Sensing distance	Connection method				Order code			
						E3RA (plastic housing)		E3RB (metal housing)	
						NPN output	PNP output	NPN output	PNP output
Through-beam	15 m	–	–	2 m	–	E3RA-TN11 2M	E3RA-TP11 2M	E3RB-TN11 2M	E3RB-TP11 2M
		–	■	–	–	E3RA-TN21	E3RA-TP21	E3RB-TN21	E3RB-TP21
Retro-reflective with MSR*1.	0.1 to 3 m (with E39-R1S)	–	–	2 m	–	E3RA-RN11 2M	E3RA-RP11 2M	E3RB-RN11 2M	E3RB-RP11 2M
		–	■	–	–	E3RA-RN21	E3RA-RP21	E3RB-RN21	E3RB-RP21
Diffuse reflective	100 mm	–	–	2 m	–	E3RA-DN11 2M	E3RA-DP11 2M	E3RB-DN11 2M	E3RB-DP11 2M
		–	■	–	–	E3RA-DN21	E3RA-DP21	E3RB-DN21	E3RB-DP21
	300 mm	–	–	2 m	–	E3RA-DN12 2M	E3RA-DP12 2M	E3RB-DN12 2M	E3RB-DP12 2M
		–	■	–	–	E3RA-DN22	E3RA-DP22	E3RB-DN22	E3RB-DP22
	700 mm	–	–	2 m	–	E3RA-DN13 2M	E3RA-DP13 2M	E3RB-DN13 2M	E3RB-DP13 2M
		–	■	–	–	E3RA-DN23	E3RA-DP23	E3RB-DN23	E3RB-DP23

*1 The Reflector is sold separately. Select the Reflector model most suited to the application.

Specifications

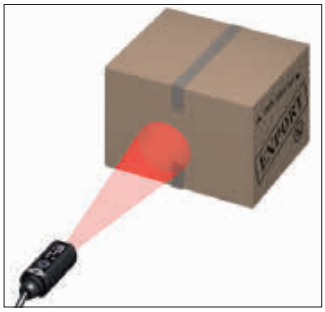
Straight type

Item										
Sensing method			Through-beam	Retro-reflective	Coaxial Retro-reflective	Diffuse-reflective			BGS (Background suppression)	
Model	NPN output	Pre-wired	E3F_-TN11 2M	E3F_-RN11 2M	E3F_-RN12 2M	E3F_-DN11 2M	E3F_-DN12 2M	E3F_-DN13 2M	E3F_-LN11 2M	E3F_-LN12 2M
		M12 Connector	E3F_-TN21	E3F_-RN21	E3F_-RN22	E3F_-DN21	E3F_-DN22	E3F_-DN23	E3F_-LN21	E3F_-LN22
	PNP output	Pre-wired	E3F_-TP11 2M	E3F_-RP11 2M	E3F_-RP12 2M	E3F_-DP11 2M	E3F_-DP12 2M	E3F_-DP13 2M	E3F_-LP11 2M	E3F_-LP12 2M
		M12 Connector	E3F_-TP21	E3F_-RP21	E3F_-RP22	E3F_-DP21	E3F_-DP22	E3F_-DP23	E3F_-LP21	E3F_-LP22
Sensing distance			20 m	0.1 to 4 m	0 to 500 mm	100 mm	300 mm	1 m	100 mm	200 mm
Light source (wavelength)			Red LED (624 nm)							
Power supply voltage			10 to 30 VDC (include voltage ripple of 10%(p-p) max.)							
Operation mode			Light-ON/Dark-ON selectable by wiring							
Sensitivity adjustment			One-turn adjuster						Fixed	
Protection circuits			Reversed power supply polarity protection, Output short-circuit protection and Reversed output polarity protection							
Response time			0.5 ms							
Ambient temperature		Operating	–25 to 55°C							
		Storage	–30 to 70°C (with no icing or condensation)							
Degree of protection			IEC: IP67, DIN 40050-9: IP69K							
Material	Case and Nut		E3FA: ABS, E3FB: Nickel brass							
	Lens and Display		PMMA							
	Adjuster		POM							

Radial type

Item							
Sensing method			Through-beam	Retro-reflective	Diffuse-reflective		
Model	NPN output	Pre-wired	E3R_-TN11 2M	E3R_-RN11 2M	E3R_-DN11 2M	E3R_-DN12 2M	E3R_-DN13 2M
		M12 Connector	E3R_-TN21	E3R_-RN21	E3R_-DN21	E3R_-DN22	E3R_-DN23
	PNP output	Pre-wired	E3R_-TP11 2M	E3R_-RP11 2M	E3R_-DP11 2M	E3R_-DP12 2M	E3R_-DP13 2M
		M12 Connector	E3R_-TP21	E3R_-RP21	E3R_-DP21	E3R_-DP22	E3R_-DP23
Sensing distance			15 m	0.1 to 3 m	100 mm	300 mm	700 mm
Light source (wavelength)			Red LED (624 nm)				
Power supply voltage			10 to 30 VDC (include voltage ripple of 10%(p-p) max.)				
Operation mode			Light-ON/Dark-ON selectable by wiring				
Sensitivity adjustment			One-turn adjuster				
Protection circuits			Reversed power supply polarity protection, Output short-circuit protection and Reversed output polarity protection				
Response time			0.5 ms				
Ambient temperature		Operating	–25 to 55°C				
		Storage	–30 to 70°C (with no icing or condensation)				
Degree of protection			IEC: IP67, DIN 40050-9: IP69K				
Material	Case and Nut		E3FA: ABS, E3FB: Nickel brass				
	Lens and Display		PMMA				
	Adjuster		POM				

Compact size and shape. Can be installed almost anywhere.

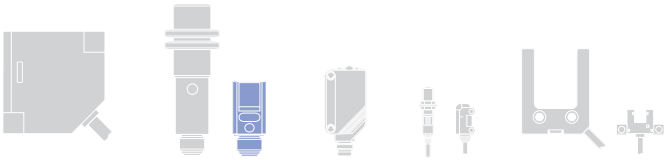


Visible LED light for easy alignment.

Transparent object detection sensor in compact M18 housing

The E3F_-B/-V provide enhanced detection stability for the detection of transparent objects. It allows an easy and intuitive adjustment to individual requirements.

- Easy adjustment to individual requirements for all transparent materials
- P-opaquing technology enables reliable detection of PET bottles also in dusty environments
- Coaxial optics (E3F_-B__1) for stable, position-independent detection



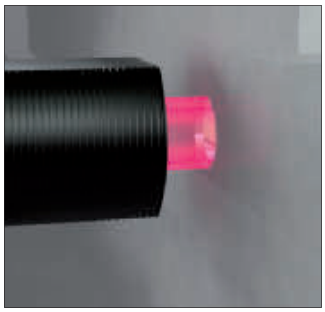
Ordering Information

Sensor type	Sensing distance	Connection method				Order code			
						E3FA (plastic housing)		E3FB (metal housing)	
						NPN output	PNP output	NPN output	PNP output
Limited distance reflective	10 to 50 mm	–	–	2 m	–	E3FA-VN11 2M	E3FA-VP11 2M	E3FB-VN11 2M	E3FB-VP11 2M
		–	■	–	–	E3FA-VN21	E3FA-VP21	E3FB-VN21	E3FB-VP21
Coaxial retro-reflective with P-opaquing function*1	0 to 500 mm (with E39-RP1)	–	–	2 m	–	E3FA-BN11 2M	E3FA-BP11 2M	E3FB-BN11 2M	E3FB-BP11 2M
		–	■	–	–	E3FA-BN21	E3FA-BP21	E3FB-BN21	E3FB-BP21
Retro-reflective with P-opaquing function*1	0.1 to 2m (with E39-RP1)	–	–	2 m	–	E3FA-BN12 2M	E3FA-BP12 2M	E3FB-BN12 2M	E3FB-BP12 2M
		–	■	–	–	E3FA-BN22	E3FA-BN22	E3FB-BN22	E3FB-BN22

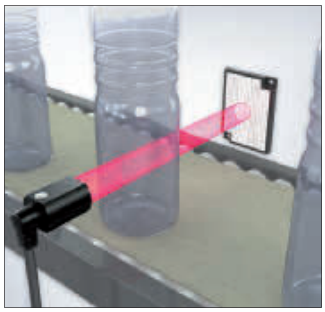
*1 The Reflector is sold separately. Select the Reflector model most suited to the application. For PET detection E39-RP1 is recommended for best detection stability.

Ratings and Specifications

Model / Item	Sensing method		Limited distance reflective	Retro-reflective with P-opaquing function	
	NPN output	Pre-wired	E3F_-VN11 2M	E3F_-BN11 2M	E3F_-BN12 2M
		M12 Connector	E3F_-VN21	E3F_-BN21	E3F_-BN22
	PNP output	Pre-wired	E3F_-VP11 2M	E3F_-BP11 2M	E3F_-BP12 2M
		M12 Connector	E3F_-VP21	E3F_-BP21	E3F_-BP22
Sensing distance			10 to 50 mm	0 to 500 mm (coaxial)	0.1 to 2 m
Light source (wavelength)			Red LED (624 nm)		
Power supply voltage			10 to 30 VDC (include voltage ripple of 10%(p-p) max.)		
Operation mode			Light-ON/Dark-ON selectable by wiring		
Sensitivity adjustment			One-turn adjuster		
Protection circuits			Reversed power supply polarity protection, Output short-circuit protection and Reversed output polarity protection		
Response time			0.5 ms		
Ambient temperature		Operating	–25 to 55°C		
		Storage	–30 to 70°C (with no icing or condensation)		
Degree of protection			IEC: IP67, DIN 40050-9: IP69K		
Material	Case and Nut		E3FA: ABS, E3FB: Nickel brass		
	Lens and Display		PMMA		



Coaxial optics (E3F_-B) for detection through small holes



Reliable detection of PET bottles by unique p-opaquing technology

Limited-reflective types suitable for detecting transparant film to shiny, mirror film.

Standard M18 Photosensor with best price-value ratio

OMRON E3F1 series represents an M18 size Photoelectric sensor with best value at competitive price. It features the same compact housing as E3FA and meets all requirements for standard industrial applications.

- Bright visible red LED enabling easy alignment
- Reliable operation in all industrial environments
- Compact and robust housing for easy integration into machines

Special models M18 cylindrical Compact Miniature Fork

Ordering information

Sensor type	Sensing distance	Connection method				Order code	
						NPN output	PNP output
Through-beam	15 m	–	–	2 m	–	E3F1-TN11 2M*1	E3F1-TP11 2M*1
		–	■	–	–	E3F1-TN21*1	E3F1-TP21*1
Retro-reflective*2	0.1 to 3 m (with E39-R1S)	–	–	2 m	–	E3F1-RN11 2M	E3F1-RP11 2M
		–	■	–	–	E3F1-RN21	E3F1-RP21
Diffuse-reflective	100 mm	–	–	2 m	–	E3F1-DN11 2M	E3F1-DP11 2M
		–	■	–	–	E3F1-DN21	E3F1-DP21
	300 mm	–	–	2 m	–	E3F1-DN12 2M	E3F1-DP12 2M
		–	■	–	–	E3F1-DN22	E3F1-DP22

*1 Includes the emitter and receiver.
*2 The Reflector is sold separately.

Specifications

Model / Item			Through-beam	Retro-reflective	Diffuse-reflective	
Model	Sensing method		Through-beam	Retro-reflective	Diffuse-reflective	
	NPN output	Pre-wired	E3F1-TN11 2M	E3F1-RN11 2M	E3F1-DN11 2M	E3F1-DN12 2M
		M12 Connector	E3F1-TN21	E3F1-RN21	E3F1-DN21	E3F1-DN22
	PNP output	Pre-wired	E3F1-TP11 2M	E3F1-RP11 2M	E3F1-DP11 2M	E3F1-DP12 2M
Item		M12 Connector	E3F1-TP21	E3F1-RP21	E3F1-DP21	E3F1-DP22
Sensing distance			15 m	0.1 to 3 m	100 mm	300 mm
Light source (wavelength)			Red LED (624 nm)			
Power supply voltage			10 to 30 VDC (include voltage ripple of 10%(p-p) max.)			
Operation mode			Light-ON/Dark-ON selectable by wiring			
Sensitivity adjustment			One-turn adjuster			
Protection circuits			Reversed power supply polarity protection, Output short-circuit protection and Reversed output polarity protection			
Response time			0.5 ms			
Ambient temperature		Operating	–25 to 55°C			
		Storage	–30 to 70°C (with no icing or condensation)			
Degree of protection			IEC: IP66			
Material	Case		ABS			
	Lens and Display		PMMA			

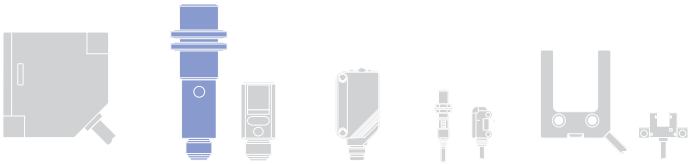
Compact size and shape. Can be installed almost anywhere.

Visible LED light for easy alignment.

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-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

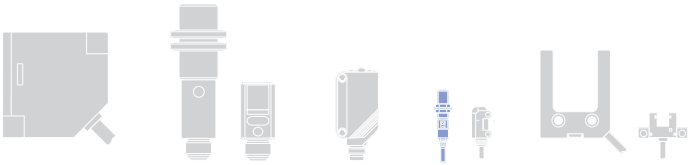
Specifications

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

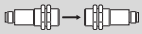
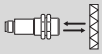
Miniature photoelectric sensors in cylindrical M8 and M12 housing

- 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



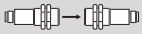
Ordering information

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

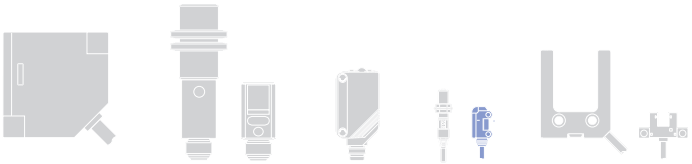
Specifications

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				

Photoelectric sensor in miniature plastic housing

Small sized photoelectric sensors in flat and side view shape for demanding mounting conditions.

- Small size with precision pinpoint LED where space is crucial
- 3.5 mm flat model with reliable background suppression and small black/white error
- Unique optical alignment technology ensuring minimal deviation of optical axis
- High EMC and ambient light immunity



Ordering information

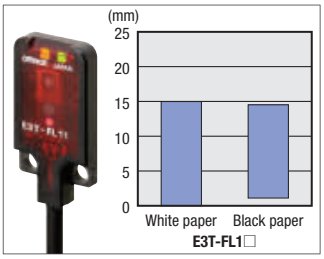
Sensor type	Sensing distance	Connection method				Operation mode	Mounting screw size	Order code*1	
								NPN output	PNP output
Through-beam	2 m	–	–	2 m	For ordering pigtail versions replace '2M' of cable types with: - M1J: M12 with 30 cm cable - M3J: M8 4-pin with 30 cm cable - M5J: M8 3-pin with 30 cm cable	Light-ON	M2	E3T-ST31 2M	E3T-ST33 2M
						Dark-ON	M2	E3T-ST32 2M	E3T-ST34 2M
	1 m					Light-ON	M2	E3T-ST11 2M	E3T-ST13 2M
							M3	E3T-ST11M 2M	E3T-ST13M 2M
						Dark-ON	M2	E3T-ST12 2M	E3T-ST14 2M
							M3	E3T-ST12M 2M	E3T-ST14M 2M
	300 mm					Light-ON	M2	E3T-ST21 2M	E3T-ST23 2M
							M3	E3T-ST21M 2M	E3T-ST23M 2M
						Dark-ON	M2	E3T-ST22 2M	E3T-ST24 2M
							M3	E3T-ST22M 2M	E3T-ST24M 2M
Through-beam	500 mm					Light-ON	M2	E3T-FT11 2M	E3T-FT13 2M
						Dark-ON	M2	E3T-FT12 2M	E3T-FT14 2M
	300 mm					Light-ON	M2	E3T-FT21 2M	E3T-FT23 2M
						Dark-ON	M2	E3T-FT22 2M	E3T-FT24 2M
Retro-reflective	30 to 200 mm*2 on reflectors/ 10 to 100 mm*2 on reflective foils					Light-ON	M2	E3T-SR41-C 2M*3	E3T-SR43-C 2M*3
						Dark-ON	M2	E3T-SR42-C 2M*3	E3T-SR44-C 2M*3
Diffuse-reflective	5 to 30 mm					Light-ON	M2	E3T-FD11 2M	E3T-FD13 2M
							M3	E3T-FD11M 2M	E3T-FD13M 2M
						Dark-ON	M2	E3T-FD12 2M	E3T-FD14 2M
							M3	E3T-FD12M 2M	E3T-FD14M 2M
Limited-reflective	5 to 15 mm					Light-ON	M2	E3T-SL11 2M	E3T-SL13 2M
							M3	E3T-SL11M 2M	E3T-SL13M 2M
						Dark-ON	M2	E3T-SL12 2M	E3T-SL14 2M
							M3	E3T-SL12M 2M	E3T-SL14M 2M
	5 to 30 mm					Light-ON	M2	E3T-SL21 2M	E3T-SL23 2M
							M3	E3T-SL21M 2M	E3T-SL23M 2M
						Dark-ON	M2	E3T-SL22 2M	E3T-SL24 2M
							M3	E3T-SL22M 2M	E3T-SL24M 2M
Diffuse-reflective (background suppression)	1 to 15 mm					Light-ON	M2	E3T-FL11 2M	E3T-FL13 2M
						Dark-ON	M2	E3T-FL12 2M	E3T-FL14 2M
	1 to 30 mm					Light-ON	M2	E3T-FL21 2M	E3T-FL23 2M
						Dark-ON	M2	E3T-FL22 2M	E3T-FL24 2M

*1 For pre-wired models with robotic cables add '-R' to the order code (example: E3T-FT21R 2M)
*2 The distances are measured with reflector E39-R4 and reflective foil E39-R37-CA. For applications with shorter distances between the sensor and the reflector contact your OMRON representative.
*3 Order reflector separately. Models with included reflectors are available.

Specifications

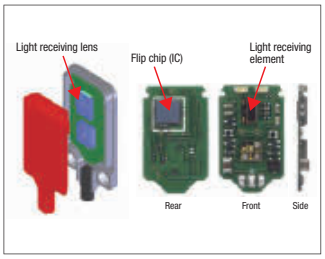
Item		Through-beam		Retro-reflective
		Side-view	Flat	Side-view
		E3T-ST1 E3T-ST2 E3T-ST3	E3T-FT1 E3T-FT2	E3T-SR4
Sensing distance		E3T-ST3_: 2 m E3T-ST1_: 1 m E3T-ST2_: 300 mm	E3T-FT1_: 500 mm E3T-FT2_: 300 mm	30 to 200 mm (with E39-R4) 10 to 100 mm (with E39-R37-CA)
Light source (wave length)		Red LED (“Pin-point” LED) λ = 650 nm		
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p) 10% max.		
Protective circuits		Power supply and control output reverse polarity protection Output short-circuit protection		Power supply and control output reverse polarity protection Output short-circuit protection, mutual interference prevention, surge suppressor
Response time		1 ms max.		
Ambient temperature	Operating	-25 to 55°C (with no icing or condensation)		
	Storage	-40 to 70°C (with no icing or condensation)		
Degree of protection		IEC60529 IP67		
Material	Case	PBT (polybutylene terephthalate)		
	Display window	Denatured polyarylate		
	Lens	Denatured polyarylate		Methacrylic resin

Item		Diffuse-reflective	Limited-reflective		Diffuse-reflective (background suppression)	
		Flat	Side-view		Flat	
		E3T-FD1	E3T-SL1	E3T-SL2	E3T-FL1	E3T-FL2
Sensing distance		5 to 30 mm	5 to 15 mm	5 to 30 mm	1 to 15 mm	1 to 30 mm
Black/white error		–			15% max.	
Light source (wave length)		Red LED (“Pin-point” LED) λ = 650 nm				
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p) 10% max.				
Protective circuits		Power supply and control output reverse polarity protection Output short-circuit protection, Mutual interference prevention				
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		IEC60529 IP67				
Material	Case	PBT (polybutylene terephthalate)				
	Display window	Denatured polyarylate				
	Lens	Denatured polyarylate				



Minimal black / white error

The coaxial optics and the small focal lens of the retro-reflective models allow the detection of small (dia 2 mm) objects or through small holes (dia 2 mm).



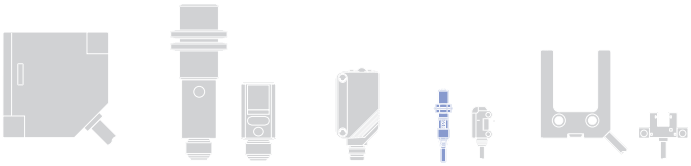
The unique light receiving lens shape and the chip mounting technology, provide appropriate sensing distances for very precise and reliable detection even through smallest slits and gaps with e.g. 0.5 mm dia.

Models with mounting holes for M2 or M3 screws

Miniature photoelectric sensors in M5 and M6 sized housing

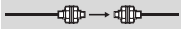
The E3T-C family of miniature photoelectric sensors is the ideal solution when mounting space is crucial.

- 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

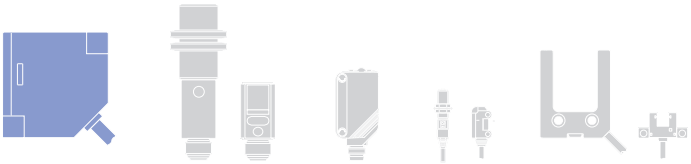
Sensor type	Sensing distance	Connection method				Operation mode	Order code	
							NPN output	PNP output
Diffuse-reflective 	50 mm (adjustable)	–	–	2 m	–	light on	E3T-CD11 2M	E3T-CD13 2M

Specifications

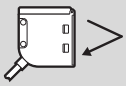
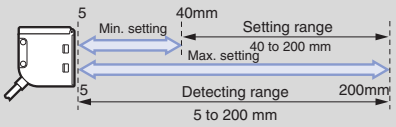
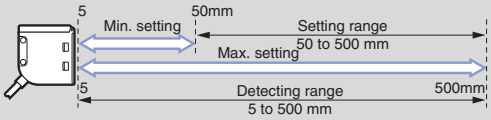
Item		E3T-CT1_	E3T-CT2_	E3T-CD1_
Light source (wave length)		Red LED (630 nm)	Red LED (625 nm)	Infrared LED (870 nm)
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p) 10% max.		
Protective circuits		Power supply reverse polarity protection, Output short-circuit protection		
Response time		0.5 ms 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		

Distance-settable photoelectric sensor in metal housing

- Minimal black/white error for highest reliability detecting differently coloured objects (E3S-CL1)
- Setting distance up to 500 mm with reliable background suppression



Ordering information

Sensortype	Sensing distance	Connection method				Order code*1
Distance-settable (background suppression) 		–	–	■	–	E3S-CL1 2M
		–	–	–	■ M12	E3S-CL1-M1J
		–	–	■	–	E3S-CL2 2M
		–	–	–	■ M12	E3S-CL2-M1J

*1 Light-ON / Dark-ON switch selectable. NPN/PNP switch selectable

Specifications

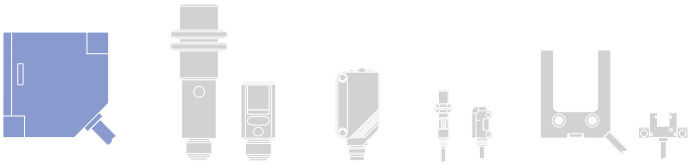
Item		Distance-settable (background suppression)	
		E3S-CL1	E3S-CL2
Light source (wave length)		Red LED (700 nm)	Infrared LED (860 nm)
Black/white error*1		2% max.	10% max.
Power supply voltage		10 to 30 VDC [ripple (p-p) 10% included]	
Protective circuits		Reverse polarity protection, output short-circuit protection, mutual interference prevention	
Response time		1 ms max.	2 ms max.
Ambient temperature	Operating	-25 to 55°C (with no icing or condensation)	
	Storage		
Degree of protection		IEC 60529 IP67	
Material	Case	Zinc diecast	
	Operation panel cover	Polyethyl sulfon	
	Lens	Acrylics	

*1 Sensing distance difference between standard white paper (reflectivity 90%) and standard black paper (reflectivity 5%)

Long distance photoelectric sensor in plastic housing

Long distance retro-reflective and teachable distance-settable sensors in plastic housing.

- Distance-settable model with 1.2 m maximum setting distance
- M12 rotary connector or pre-wired models



Ordering information

Sensor type	Sensing distance	Connection method				Order code*1
						
Retro-reflective with M.S.R. 	0.5 to 10 m*2	–	–	2 m	–	E3G-R13-G 2M
		–	■	–	–	E3G-R17-G
Distance-settable (background suppression) 	0.2 to 2 m (0.2 to 1.2 m distance settable)	–	–	2 m	–	E3G-L73 2M
		–	■	–	–	E3G-L77

*1 Light-ON / Dark-ON switch selectable. NPN / PNP switch selectable
*2 Measured with E39-R2

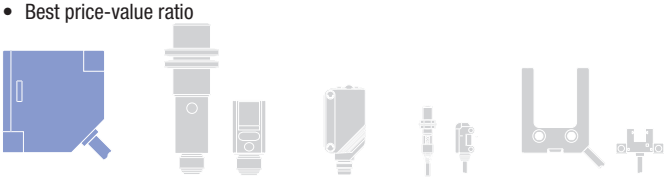
Specifications

Item		Retro-reflective with M.S.R.		Distance-settable (background suppression)	
		E3G-R13-G	E3G-R17-G	E3G-L73	E3G-L77
Light source (wave length)		Red LED (700 nm)		Infrared LED (860 nm)	
Power supply voltage		10 to 30 VDC (Ripple (p-p) 10% included)		10 to 30 VDC (Ripple (p-p) 10% included)	
Protective circuits		Reverse polarity protection, output short-circuit protection, mutual interference prevention		Reverse polarity protection, output short-circuit protection, mutual interference prevention	
Response time		1 ms		5 ms	
Ambient temperature	Operating	-25 to 55°C			
	Storage	-30 to 70°C (with no icing or condensation)			
Degree of protection		IEC 60529 IP67 (with Protective Cover attached)			
Material	Case	PBT (polybutylene terephthalate)			
	Lens	Acrylics (PMMA)			

All voltage photoelectric sensor with long sensing distance

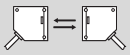
The new generation of square sized E3JK family provides significantly enhanced sensing performance and ease of operation. The family features 24 to 240 VAC power models as well as models with PNP/NPN transistor output.

- High power and visible red LED for all models enabling easy alignment and long sensing distance
- Bright indicator LEDs that are visible even at a large distance
- Best price-value ratio



Special models M18 cylindrical Compact Miniature Fork

Ordering information

Sensor type	Sensing distance	Connection method				Order code		
						Relay models (AC/DC)	NPN models	PNP models
Through-beam 	40 m (adjustable)	–	–	2 m	–	E3JK-TR11 2M	E3JK-TN11 2M	E3JK-TP11 2M
Retro-reflective without M.S.R. 	9 m*1 (adjustable)					E3JK-RR11 2M	E3JK-RN11 2M	E3JK-RP11 2M
Retro-reflective with M.S.R. 	7 m*1 (adjustable)					E3JK-RR12 2M	E3JK-RN12 2M	E3JK-RP12 2M
Diffuse-reflective 	2.5 m (adjustable)					E3JK-DR11 2M	E3JK-DN11 2M	E3JK-DP11 2M
	300 mm (adjustable)					E3JK-DR12 2M	E3JK-DN12 2M	E3JK-DP12 2M

*1 Measured with E39-R1S. Please order reflector separately.

Accessories

Appearance	Description	Order code
	Mounting bracket*1 (A mounting bracket is not provided with the sensor. Order a mounting bracket separately if required.)	E39-L40

*1 When using a through-beam sensor, order one mounting bracket for the receiver and one for the emitter.

Specifications

AC models

Item		Through-beam	Retro-reflective without M.S.R.	Retro-reflective with M.S.R.	Diffuse-reflective	
		E3JK-TR11	E3JK-RR11	E3JK-RR12	E3JK-DR11	E3JK-DR12
Sensing distance		40 m	9 m	7 m	2.5 m	300 mm
Light source (wave length)		Red LED (624 nm)				
Power supply voltage		24 to 240 VDC ±10% ripple (p-p): 10% max. 24 to 240 VAC ±10% 50/60 Hz				
Control output		Relay output SPDT, 250 VAC, 3 A max. (cosϕ= 1), 5 VDC, 10 mA min., Light-ON/Dark-ON selectable				
Response time		20 ms max.				
Sensitivity adjustment		One-turn adjuster				
Ambient temperature	Operating	–25 to 55°C				
	Storage	–30 to 70°C (with no icing or condensation)				
Degree of protection		IEC60529 IP64				
Material	Case	ABS				
	Lens	Methacrylics (PMMA)				

DC models

Item		Through-beam	Retro-reflective without M.S.R.	Retro-reflective with M.S.R.	Diffuse-reflective	
	NPN output	E3JK-TN11	E3JK-RN11	E3JK-RN12	E3JK-DN11	E3JK-DN12
	PNP output	E3JK-TP11	E3JK-RP11	E3JK-RP12	E3JK-DP11	E3JK-DP12
Sensing distance		40 m	9 m	7 m	2.5 m	300 mm
Light source (wave length)		Red LED (624 nm)				
Power supply voltage		10 to 30 VDC, including ripple (p-p): 10%				
Control output		Open collector output (NPN/PNP), Load current: 100 mA max., Light-ON/Dark-ON selectable				
Response time		1 ms max.				
Sensitivity adjustment		One-turn adjuster				
Ambient temperature	Operating	–25 to 55°C				
	Storage	–30 to 70°C (with no icing or condensation)				
Degree of protection		IEC60529 IP64				
Material	Case	ABS				
	Lens	Methacrylics (PMMA)				

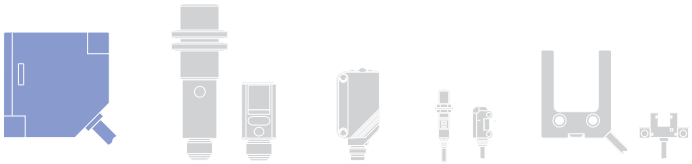
AC power-supply fits for building installations like industrial doors, elevators or car parks

Long sensing distance up to 40 m

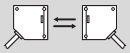
All voltage photoelectric sensor in plastic housing with timer function

The square sized E3JM family provides 12 to 240 VDC and 24 to 240 VAC power supply voltage, an enhanced sensing distance and a timer function.

- 12 to 240 VDC and 24 to 240 VAC supply voltage
- Relay or solid state relay output
- Models with timer function



Ordering information

Sensor type	Sensing distance	Connection method	Timer function	Order code*1		
				Relay output	DC SSR output	
					minus common	plus common
Through-beam 	10 m	Terminal block (with PG 13.5)	–	E3JM-10M4-G-N	E3JM-10S4-G-N	E3JM-10R4-G-N
			ON or OFF delay 0.1 s to 5 s (adjustable)	E3JM-10M4T-G-N	E3JM-10S4T-G-N	E3JM-10R4T-G-N
Retro-reflective with M.S.R. 	4 m		–	E3JM-R4M4-G	E3JM-R4S4-G	E3JM-R4R4-G
			ON or OFF delay 0.1 s to 5 s (adjustable)	E3JM-R4M4T-G	E3JM-R4S4T-G	E3JM-R4R4T-G
Diffuse-reflective 	700 mm (adjustable)		–	E3JM-DS70M4-G	E3JM-DS70S4-G	E3JM-DS70R4-G
			ON or OFF delay 0.1 s to 5 s (adjustable)	E3JM-DS70M4T-G	E3JM-DS70S4T-G	E3JM-DS70R4T-G

*1 Light-ON / Dark-ON switch selectable

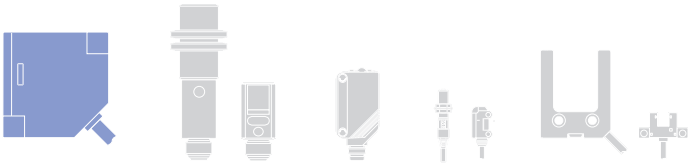
Specifications

Item		Through-beam		Retro-reflective with M.S.R.		Diffuse-reflective	
		E3JM-10	E3JM-10_T	E3JM-R	E3JM-R_T	E3JM-D	E3JM-D_T
Light source (wave length)		Infrared LED (950 nm)		Red LED (660 nm)		Infrared LED (950 nm)	
Power supply voltage		12 to 240 VDC ±10% ripple (p-p) : 10% max. 24 to 240 VAC ±10% 50/60 Hz					
Control output	Relay output	250 VAC, 3 A max.; 5 VDC, 10 mA min.					
	DC SSR output	48 VDC, 100 mA max.; residual voltage 2V					
Response time	Relay output	30 ms max.					
	DC SSR output	5 ms max.					
Timer function	ON/OFF delay	–	0.1 s to 5 s	–	0.1 s to 5 s	–	0.1 s to 5 s
Ambient temperature	Operating	-25 to 55°C					
	Storage	-30 to 70°C (with no icing or condensation)					
Degree of protection		IEC60529 IP66					
Material	Case	ABS					
	Lens	Methacrylate resin					

Long distance all voltage photoelectric sensor in plastic housing

The E3G-M series offers the long sensing distance of the E3G family for all voltage (AC and DC) installations.

- 12 to 240 VDC and 24 to 240 VAC power supply
- Terminal block connection



Ordering information

Sensor type	Sensing distance	Connection method	Timer function	Order code*1
				Relay output
Retro-reflective with M.S.R. 	0.5 to 10 m*2 (Red light)	Terminal block (with PG 13.5 conduit)	–	E3G-MR19-G
			ON or OFF delay 0 to 5 s (adjustable)	E3G-MR19T-G
Distance-settable (background suppression) 	0.2 to 2 m (0.2 to 1.2 m distance settable)		–	E3G-ML79-G
			ON or OFF delay 0 to 5 s (adjustable)	E3G-ML79T-G

*1 Light-ON / Dark-ON switch selectable
*2 Measured with E39-R2

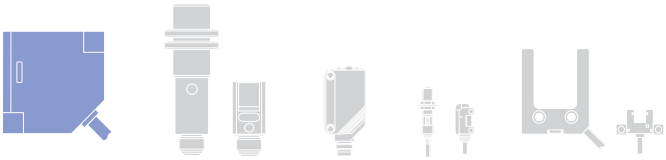
Specifications

Item		Retro-reflective with M.S.R.		Distance-settable (background suppression)	
		E3G-MR19-G	E3G-MR19T-G	E3G-ML79-G	E3G-ML79T-G
Light source (wave length)		Red LED (700 nm)		Infrared LED (860 nm)	
Power supply voltage		12 to 240 VDC ±10% ripple (p-p): 10% max. 24 to 240 VAC ±10% 50/60 Hz			
Response time		30 ms			
Timer function		–	ON delay/OFF delay 0 to 5 s (Adjuster variable system)	–	ON delay/OFF delay 0 to 5 s (Adjuster variable system)
Ambient temperature	Operating	-25 to 55°C			
	Storage	-30 to 70°C (with no icing or condensation)			
Degree of protection		IEC 60529 IP67 (with protective cover attached)			
Material	Case	PBT (polybutylene terephthalate)			
	Lens	Acrylics (PMMA)			

High precision laser sensor with separate amplifier

The separate amplifier laser sensors feature sensing heads with variable spot for highest precision positioning and detection applications.

- Easy installation due to adjustable focus point and smart tuning functions
- Sensor heads up to 1.2 m sensing distance covering a wide area of applications
- High speed network connectivity to field busses like EtherCAT



Special models | M18 cylindrical | Compact | Miniature | Fork

Ordering information

Sensor heads

Sensor type	Sensing distance	Remarks	Order code
Diffuse-reflective 	1,200 mm	Variable spot (diffuse reflective)	E3NC-LH02 2M
	70±15 mm	Fixed spot (limited reflective)	E3NC-LH01 2M

Amplifier units

Item	Order code					
	pre-wired		with connector*1		M8 connector	
	NPN output	PNP output	NPN output	PNP output	NPN output	PNP output
2 outputs + 1 input models	E3NC-LA21 2M	E3NC-LA51 2M	–		–	
1 output + 1 input models	–		E3NC-LA7	E3NC-LA9	E3NC-LA24	E3NC-LA54
Networking model*2	E3NC-LA0					

*1 order connector (E3X-CN21_) separately from accessories
*2 for network connection please order networking unit E3NW

Amplifier connectors

Shape	Type	Comment	Order code
	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

Communication units

Shape	Communications method	Applicable Amplifier Units	Order code
	Sensor communication unit for EtherCAT	E3NX-FA0 E3NC-LA0 E3NC-SA0	E3NW-ECT
	Sensor dispersion (slave) unit		E3NW-DS

Specifications

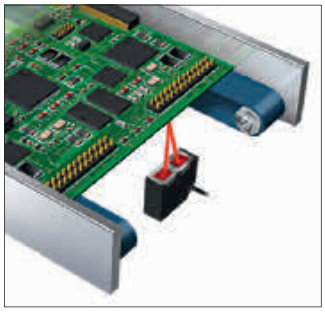
Sensor heads

Item		Diffuse-reflective	
		E3NC-LH02	E3NC-LH01
Light source (emission wave length)		Red laser diode (660 nm), 315 µW max. (JIS Class 1, IEC/EN Class 1, and FDA Class 1)	
Sensing distance		Giga-power mode (GIGA): 1,200 mm Standard mode (Stnd): 750 mm High-speed mode (HS): 250 mm Super-high-speed mode (SHS): 200 mm	70±15 mm
Beam size (typical)		0.8 mm max. (at distances up to 300 mm)	0.1 mm (at 70 mm)
Degree of protection		IEC60529 IP65	

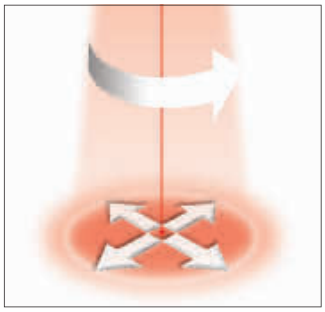
Amplifier units

Item			2 output/1 input models	1 output/1 input models	Networking models
		NPN output	E3NC-LA21	E3NC-LA7/E3NC-LA24	E3NC-LA0
		PNP output	E3NC-LA51	E3NC-LA9/E3NC-LA54	
Outputs			2 outputs	1 output	2 outputs
Inputs			1 input		–
Supply voltage			10 to 30 VDC±10%, ripple (p-p) 10% max.		
Response time	Super-high-speed mode		80 µs		
	High-speed mode		250 µs		
	Standard mode		1 ms		
	Giga-power mode		16 ms		
Functions	Smart tuning		2-point tuning, full auto tuning, position tuning, maximum sensitivity tuning, power tuning, or percentage tuning (–99% to 99%)		
	Timer function		Select from timer disabled, OFF-delay, ON-delay, one-shot, or ON-delay + OFF-delay timer: 1 to 9,999 ms		
	Eco mode		Select from OFF (digital displays lit) or ECO (digital displays not lit)		
	Bank switching		Select from banks 1 to 4		
	Dynamic Power Control (DPC)		Provided (automatically controls light intensity and compensates incident level changes)		
Ambient temperature range	Operating		–10 to 55°C		
	Storage		–25 to 70°C (with no icing or condensation)		
Digital display			7-segment displays (sub digital display: green, main digital display: white) Display direction: switchable between normal and reversed		
Degree of protection			IP50 (IEC 60529)		

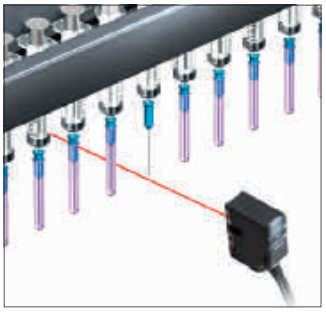
Integration into new N-Smart platform



High precision positioning



Focal point adjustment

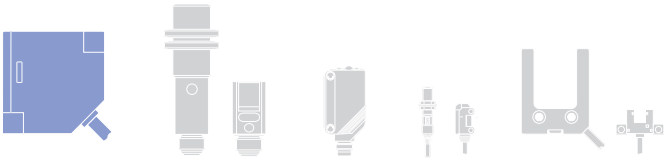


High precision detection over long range

High precision laser CMOS sensor with separate amplifier

The separate amplifier high-precision photoelectric sensors feature advanced CMOS laser sensors for high precision positioning and reliable background suppression.

- High detection stability independent from color or surface structure
- Robust IP67 sensing heads for industrial applications
- Network connectivity to field busses like EtherCAT



Special models | M18 cylindrical | Compact | Miniature | Fork

Ordering information

Sensor heads

Sensor type	Sensing distance	Order code
Diffuse-reflective (distance-settable) 	35–100 mm	E3NC-SH100 2M
	35–250 mm	E3NC-SH250 2M

Amplifier units

Item	Order code					
	pre-wired		with connector*1		M8 connector	
	NPN output	PNP output	NPN output	PNP output	NPN output	PNP output
2 outputs + 1 input models	E3NC-SA21 2M	E3NC-SA51 2M	–		–	
1 output + 1 input models	–		E3NC-SA7	E3NC-SA9	E3NC-SA24	E3NC-SA54
Networking model*2	E3NC-SA0					

*1 order connector (E3X-CN21_) separately from accessories
*2 for network connection please order networking unit E3NW

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

Communication units

Shape	Communications method	Applicable Amplifier Units	Order code
	Sensor communication unit for EtherCAT	E3NX-FA0 E3NC-LA0 E3NC-SA0	E3NW-ECT
	Sensor dispersion (slave) unit		E3NW-DS

Specifications

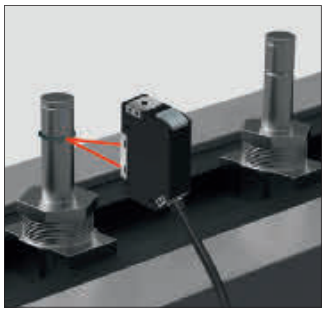
Sensor heads

Item		Diffuse-reflective (distance-settable)	
		E3NC-SH250	E3NC-SH100
Light source (emission wave length)		Red laser diode (660 nm), 100 μW max. (JIS Class 1, IEC/EN Class 1, and FDA Class 1)	
Measurement range		35 to 250 mm (display value: 350 to 2,500)	35 to 100 mm (display value: 350 to 1,000)
Spot diameter		1 mm (at 250 mm)	0.5 mm (at 100 mm)
Degree of protection		IEC60529 IP67	

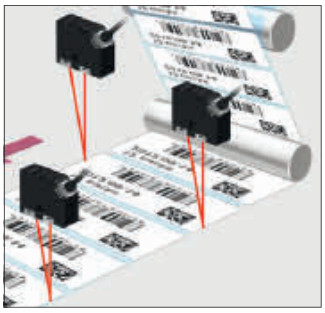
Amplifier units

Item		2 output/1 input models	1 output/1 input models	Networking models
	NPN output	E3NC-SA21	E3NC-SA7/E3NC-SA24	E3NC-SA0
	PNP output	E3NC-SA51	E3NC-SA9/E3NC-SA54	
Outputs		2 outputs	1 output	2 outputs
Inputs		1 input		–
Supply voltage		10 to 30 VDC±10%, ripple (p-p) 10% max.		
Response time	Super-high-speed mode	1.5 ms		
	High-speed mode	5 ms		
	Standard mode	10 ms		
	Giga-power mode	50 ms		
Functions	Smart tuning	2-point tuning, full auto tuning, 1-point tuning, tuning without workpiece, 2-point area tuning, 1-point area tuning, or area tuning without workpiece		
	Timer function	Select from timer disabled, OFF-delay, ON-delay, one-shot, or ON-delay + OFF-delay timer: 1 to 9,999 ms		
	Bank switching	Select from banks 1 to 4		
Ambient temperature range	Operating	–10 to 55°C		
	Storage	–25 to 70°C (with no icing or condensation)		
Digital display		7-segment displays (sub digital display: green, main digital display: white) Display direction: switchable between normal and reversed.		
Degree of protection		IP50 (IEC 60529)		

Integration into new N-Smart platform



Detection of presence of rubber O-Ring

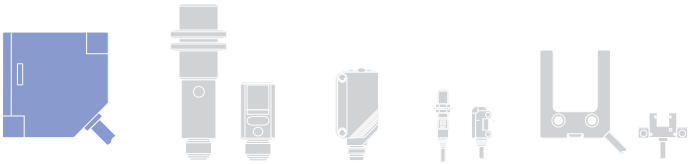


Precise positioning of packaging foil

Photoelectric sensor for structured object detection in plastic housing

The special wide beam and limited-reflective optics of the E3S-LS3 ensures reliable detection of structured objects (with holes or different heights) and can be used for example to detect printed circuit boards (PCBs).

- Wide beam and limited-reflective optics for the reliable detection of structured, shiny and irregularly shaped objects



Ordering information

Sensor type	Sensing distance	Connection method				Timer function	Output	Order code
								Light ON
Limited-reflective 	20 to 35 mm (Red light)	–	–	2 m	–	No	NPN	E3S-LS3N 2M
	10 to 60 mm (Red light)							E3S-LS3NW 2M
	20 to 35 mm	–	–	2 m	–	No	PNP	E3S-LS3P 2M
						Yes		E3S-LS3PT 2M
		–	–	–	■ M8 3-pin	No		E3S-LS3P-M5J
						Yes		E3S-LS3PT-M5J
		–	–	–	■ M8 4-pin	No		E3S-LS3P-M3J
						Yes		E3S-LS3PT-M3J
	10 to 60 mm	–	–	2 m	–	No		E3S-LS3PW 2M
						Yes		E3S-LS3PWT 2M
		–	–	–	■ M8 3-pin	No		E3S-LS3PW-M5J
						Yes		E3S-LS3PWT-M5J
		–	–	–	■ M8 4-pin	No		E3S-LS3PW-M3J
						Yes		E3S-LS3PWT-M3J

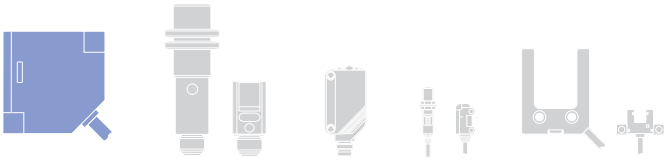
Specifications

Item		Limited-reflective
		E3S-LS3_
Light source (wave length)		Red LED (660 nm)
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p) 10% max.
Response time		1 ms max.
Timer function		Available with E3S-LS3P(W)T models only. Time range: 0.1 to 1.0 s (adjustable)
Ambient temperature	Operating	-10 to 55°C (with no icing or condensation)
	Storage	-25 to 70°C (with no icing or condensation)
Degree of protection		IEC60529 IP40
Material	Case	ABS
	Lens	Acrylic

High precision Laser sensor with separate amplifier

The separate amplifier high-precision photoelectric sensors feature a large variety of different laser sensing heads for highest precision positioning and detection applications.

- Easy installation due to adjustable focus point and optical axis
- Wide range sensor head portfolio with different laser beam shapes
- Controller functions with easy wiring concept and power tuning function



Special models | M18 cylindrical | Compact | Miniature | Fork

Ordering information

Sensor heads

Sensor type	Beam type	Remarks	Order code
Diffuse-reflective 	Spot	Mounting a beam unit (sold separately) allows the use of line and area beams	E3C-LD11 2M
	Line	This model number is for the set consisting of the E39-P11 mounted to the E3C-LD11	E3C-LD21 2M
	Area	This model number is for the set consisting of the E39-P21 mounted to the E3C-LD11	E3C-LD31 2M
Retro-reflective with M.S.R. (coaxial) 	Spot (variable)	Mounting a beam unit (sold separately) allows the use of line and area beams	E3C-LR11 2M
	Spot (2.0 mm fixed dia.)	–	E3C-LR12 2M

Amplifier units

Item	Functions	Order code			
		pre-wired		with connector*1	
		NPN output	PNP output	NPN output	PNP output
Twin-output models	Area output, self-diagnosis, differential operation	E3C-LDA11	E3C-LDA41	E3C-LDA6	E3C-LDA8
External-input models	Remote setting, counter, differential operation	E3C-LDA21	E3C-LDA51	E3C-LDA7	E3C-LDA9
ATC models	Active threshold control	E3C-LDA11AT	E3C-LDA41AT	E3C-LDA6AT	E3C-LDA8AT
Analog models	Analog output	E3C-LDA11AN	E3C-LDA41AN	–	

*1 order connector (E3X-CN21_) separately from accessories

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

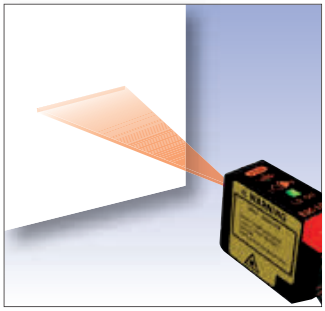
Sensor heads

Item	Diffuse-reflective			Retro-reflective with M.S.R. (coaxial)			
	E3C-LD11	E3C-LD21	E3C-LD31	E3C-LR11	E3C-LR11 + E39-P31	E3C-LR11 + E39-P41	E3C-LR12
Light source (emission wave length)	Red semiconductor laser diode (650 nm), 2.5 mW max. (JIS standard: Class 2, FDA standard: Class II)						1 mW max. (JIS standard Class 1)
Sensing distance	High-resolution mode: 30 to 1,000 mm Standard mode: 30 to 700 mm Super-high-speed mode: 30 to 250 mm			7 m 5 m 2 m	1,700 mm, 1,300 mm 700 mm	900 mm 700 mm 400 mm	7 m 5 m 2 m
Beam size (typical)	0.8 mm max. (at distances up to 300 mm)	33 mm (at 150 mm)	33x15 mm (at 150 mm)	0.8 mm max. (at distances up to 1,000 mm)	28 mm (at 150 mm)	28 × 16 mm (at 150 mm)	2.0 mm dia. (at distances up to 1,000 mm)
Functions	Variable focal point mechanism (beam size adjustment), optical axis adjustment mechanism (axis adjustment)						
Degree of protection	IEC60529 IP40						

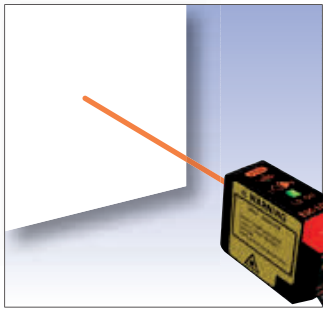
Amplifier units

Item		External-input models		Twin-output models		ATC-output models		Analog output models
	NPN output	E3C-LDA21	E3C-LDA7	E3C-LDA11	E3C-LDA6	E3C-LDA11AT	E3C-LDA6AT	E3C-LDA11AN
	PNP output	E3C-LDA51	E3C-LDA9	E3C-LDA41	E3C-LDA8	E3C-LDA41AT	E3C-LDA8AT	E3C-LDA41AN
Supply voltage		12 to 24 VDC±10%, ripple (p-p) 10% max.						
Response time	Super-high-speed mode	80 µs		100 µs				
	High-speed mode	250 µs						
	Standard mode	1 ms						
	High-resolution mode	4 ms						
Functions	Differential detection	Switchable between single edge and double edge detection mode Single edge: Can be set to 250 µs, 500 µs, 1 ms, 10 ms, or 100 ms Double edge: Can be set to 500 µs, 1 ms, 2 ms, 20 ms, or 200 ms						
	Timer function	Select from OFF-delay, ON-delay, or one-shot timer 1 ms to 5 s (1 to 20 ms set in 1-ms increments, 20 to 200 ms set in 10 ms increments, 200 ms to 1 s set in 100-ms increments, and 1 to 5 s set in 1 s increments)						
	Counter	Switchable between up counter and down counter Set count: 0 to 9,999,999		–				
	Analog output	–						1 to 5 VDC
	I/O settings	External input setting (Select from teaching, power tuning, zero reset, light OFF,or counter reset)		Output setting (Select from channel 2 output, area output, or self-diagnosis)		Output setting (Select from channel 2 output, area output, self-diagnosis, or ATC error output)		Analog output offset voltage adjustment
Digital display		Select from digital incident level + threshold or six other patterns						
Display orientation		Switching between normal/reversed display is possible						
Degree of protection		IP50 (IEC 60529)						

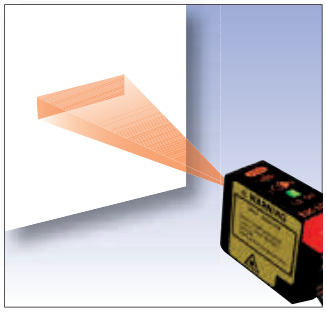
Full control over the beam shape



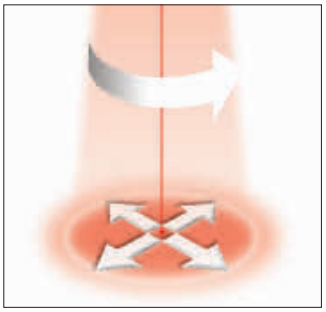
Line beam



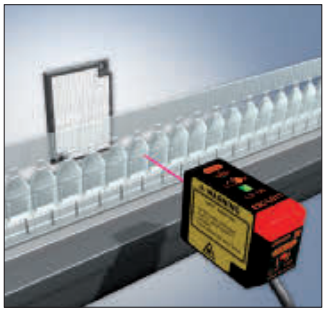
Spot beam



Area beam



Axis and focal point adjustment

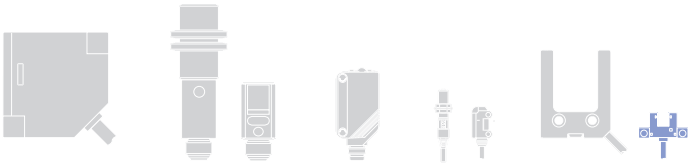


High precision positioning and detection over long range
Diffuse reflective: 1 m
Retro-reflective: 7 m

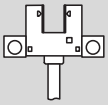
Photomicrosensor in 13 mm plastic fork shape housing

With a slot width of 13 mm the EE-SPX_03 provides stable detection of machine parts or smaller objects.

- 13 mm slot width
- 12 to 24 VDC supply voltage



Ordering information

Sensor type	Sensing distance	Connection method	Operation mode	Order code	
				NPN output	PNP output
Through-beam 	13 mm (slot width) (infrared light)	Connector 3-pin*1	Dark-ON	EE-SPX303N	EE-SPX303N + EE-2002
			Light-ON	EE-SPX403N	EE-SPX403N + EE-2002

*1 Order connector separately from accessories for either NPN or PNP types

Accessories

Type	Cable	Comment	Order code
Cable connector	2M PVC	For NPN types only (cannot be combined with EE-2002)	EE-1010 2M
	2M robotic PVC		EE-1010-R 2M
NPN/PNP conversion cable	0.5 m incl converter	Special cable to convert NPN to PNP + Brown OUT Black – Blue	EE-2002

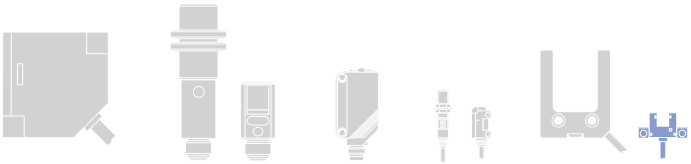
Specifications

Item		Through-beam
Power supply voltage		12 to 24 VDC ±10% max. ripple (p-p): 5% max.
Response frequency		100 Hz min
Ambient temperature	Operating	-10° to +55°C
	Storage	-25° to 65°C
Degree of protection		IEC 60529 IP50
Material	Case	Polycarbonate

Photomicrosensor in 5 mm plastic fork shape housing

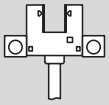
The small sized EE-SX97 family of photomicrosensors provides accurate detection of machine parts or small objects independent of material or magnetic fields and at best value for money.

- Response frequency up to 1 kHz
- Space saving housing and connector integration



Ordering information

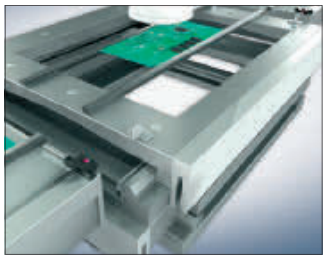
Connector models

Sensor type	Sensing distance	Connection method	Operation Mode	Shape*1	Order code *2	
					NPN output	PNP output
Through-beam 	5 mm (slot width) (Infrared light)	Connector (4 pin)*3	Dark-ON/Light-ON (selectable)	Standard	EE-SX970-C1	EE-SX970P-C1
				L-shaped	EE-SX971-C1	EE-SX971P-C1
				T-shaped, 7 mm	EE-SX972-C1	EE-SX972P-C1
				Close-mounting	EE-SX974-C1	EE-SX974P-C1
				T-shaped, 10 mm	EE-SX975-C1	EE-SX975P-C1
				F-shaped	EE-SX976-C1	EE-SX976P-C1
				R-shaped	EE-SX977-C1	EE-SX977P-C1

*1 For shape dimensions and variations see dimensions in back of the guide or refer to www.industrial.omron.eu
*2 Antivalent output (Light-ON and Dark-ON output available on different pins)
*3 Order the special connector separately from the cable connector section. For pre-wired models with 1m cable refer to EE-SX67 family in complete datasheet.

Specifications

Item		Through-beam
Power supply voltage		5 to 24 VDC ±10%, ripple (p-p): 10% max.
Response frequency		1 kHz min. (3 kHz average)
Ambient temperature	Operating	-25 to +55°C
	Storage	-30 to +80°C (with no icing or condensation)
Degree of protection		IEC60529 IP50
Material	Case	PBT (polybutylene terephthalate)
	Lens	Polycarbonate

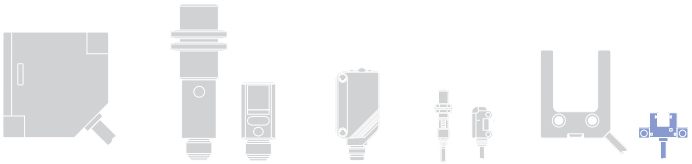


Easy to mount end position detection / limit sensors (contactless).

Photomicrosensor in thin 5 mm fork shape plastic housing

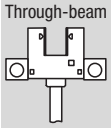
Thin shaped photomicrosensor for space saving mounting.

- Compact, thin profile enables mounting where space is crucial
- Indicator is visible from both sides
- Operating voltage range: 5 to 24 VDC



Ordering information

Pre-wired models

Sensor type	Sensing distance	Connection method				Shape*1	Operation mode	Order code	
								NPN output	PNP output
Through-beam 	5 mm (slot width) (Infrared light)	–	–	2 m	–	Standard	Dark-ON	EE-SX770	EE-SX770P
							Light-ON	EE-SX870	EE-SX870P
						L-shaped	Dark-ON	EE-SX771	EE-SX771P
							Light-ON	EE-SX871	EE-SX871P
						T-shaped	Dark-ON	EE-SX772	EE-SX772P
							Light-ON	EE-SX872	EE-SX872P

*1 For shape dimensions refer to www.industrial.omron.eu

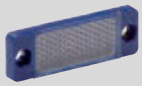
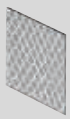
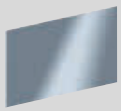
Specifications

Item		Through-beam
		EE-SX77/EE-SX87
Sensing distance		5 mm (slot width)
Power supply voltage		5 to 24 VDC ±10%, ripple (p-p): 10% max.
Response frequency		1 kHz min. (3 kHz average)
Ambient temperature	Operating	-25 to +55°C
	Storag	-30 to +80°C (with no icing)
Degree of protection		IEC60529 IP60
Material	Case	PBT (polybutylene terephthalate)
	Lens	Polycarbonate

Reflectors for retro-reflective photoelectric sensors

Shape	Type	Housing material	Features	Size in mm	Applicable Sensor	Order code
	**General purpose reflectors**	• ABS base • Acrylic surface	Surface screw mounting (diagonal holes)	40x60x7.5	• Retro-reflective photoelectric sensors - without M.S.R • Retro-reflective photoelectric sensors - with M.S.R.	E39-R1S
			Surface screw mounting (holes on one side only)	35.4x42.3x8		E39-R9
				51.4x60.3x8.5		E39-R42
	**Small size**		Side screw mounting or surface selfadhesive	41.8x22.5x11		E39-R3
			Surface screw mounting	23x13.7x4.9		E39-R4
	**Large size**			100x100x9		E39-R8
				84.5x84.5x8.7		E39-R40
	**High precision**		Microtripel for improved performance with fine beam sensors	52x40x4.8	Recommended for fine beam coaxial models (E3C-LR, E3S-CR62/67, E3T-SR4)	E39-R6
				30x45		E39-R12
				14x23x1		E39-R37-CA
				12x24		E39-R13
	**Simple mounting**		Round shape with centered mounting hole for simple screw mounting	Diameter: 84 Depth: 7.4	Photoelectric sensors with and without M.S.R.	E39-R7
	**Snap mounting**		Snap mounting for fast installation	Diameter: 30 Diameter of snap mount tool: 5	Recommended for snap mounting sensor E3FZ	E39-R49

Note: the ambient operating temperature is -25°C to 55°C unless otherwise specified

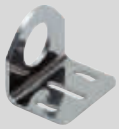
Shape	Type	Housing material	Features	Size in mm	Applicable Sensor	Order code
	**Enhanced detergent resistance**	• PVC	• Surface screw mounting • IP69k after DIN 40050 part 9	40x60x7.5	Recommended for harsh environment sensors	E39-R50
				20x60x6		E39-R51
	**Highest detergent resistance**	• SUS316L • Borosilicat	• Surface screw mounting	43x30x5		E39-R16
	**Heat resistant**	• Borosilicat	• Surface screw mounting • 450°C heat resistance • Suitable for vacuum environment	95x51x8		E39-R47
	**Non-fogging reflector**	• ABS • Acrylic surface	Anti-fogging coating	40x60x7.5		E39-R1K
	**Special polarizing**	• ABS base • PMMA surface	Special polarizing filter to PET	44x80x8.5	E3ZM-B	E39-RP1
	**General purpose tape reflectors**	• Acrylic	• Self adhesive • Pre cut	35x10x0.6	Photoelectric sensors with and without M.S.R.	E39-RS1
					Optimised for E3T-SR4	E39-RS1-CA
				40x35x0.6		E39-RS2
					Optimised for E3T-SR4	E39-RS2-CA
				80x70x0.6		E39-RS3
					Optimised for E3T-SR4	E39-RS3-CA
			• Self adhesive • Cut-to-length, roll material	25 mm x 5 m		E39-RS25 5 m
				25 mm x 22.8 m		E39-RS25 22.8 m
				50 mm x 5 m		E39-RS50 5 m
				50 mm x 22.8 m		E39-RS50 22.8 m
	**High precision tape reflectors**		• Self adhesive • Pre cut	195x22	Recommended for fine beam and laser sensors (E3S-CR62/67, E3C, E3X)	E39-RS4
				108x46		E39-RS5

Note: Note: the ambient operating temperature is -25°C to 55°C unless otherwise specified

Mounting brackets

Shape	Type	Material	Features	Order code
	M8 nuts	brass	100 pcs	ASMM0800
		stainless steel		ASMM0801
	M12 nuts	brass		ASMM1200
	M18 nuts			ASMM1800
		stainless steel		ASMM1802
		plastic	1 pc	ASMK1802
	M30 nuts	brass	100 pcs	ASMM3000
	M8 Washer	brass	1,000 pcs	ASZA0800
	M12 Washer			ASZA1200
		stainless steel	500pcs	ASZA1201
	M18 Washer	brass	100 pcs	ASZA1801
		stainless steel	200 pcs	ASZA1802
	M30 Washer	brass	100 pcs	ASZA3001

Mounting brackets

Shape	Type	Order code
	Quick access - snap fix for cylindrical sensors; sizes M8, M12, M18, M30	Y92E-BC08 Y92E-BC12 Y92E-BC18 Y92E-BC30
	Surface mounting for snap mount sensor E3FZ (dia 20mm hole)	E39-EL8
	Surface mounting for M18 cylindrical sensors (dia 18mm)	E39-EL12
	Telescope mounting for 12 mm rod for snap mount sensor E3FZ	E39-EL9
	Standard-surface mounting (for pre-wired or pigtail models)	E39-L104 *1
	Standard-backwall mounting	E39-L44 *1
	Protection-wall mounting (for pre-wired or pigtail models)	E39-L142 *1
	Protection-surface mounting	E39-L98 *1
	Telescope mounting	E39-L93FH
	3D rotation mounting	E39-EL4
	Snap mount accessory for E3Z (for 3mm wall thickness; hole size 33 x 14.5mm, 10 pcs. per package)	E39-EL7S-E3Z

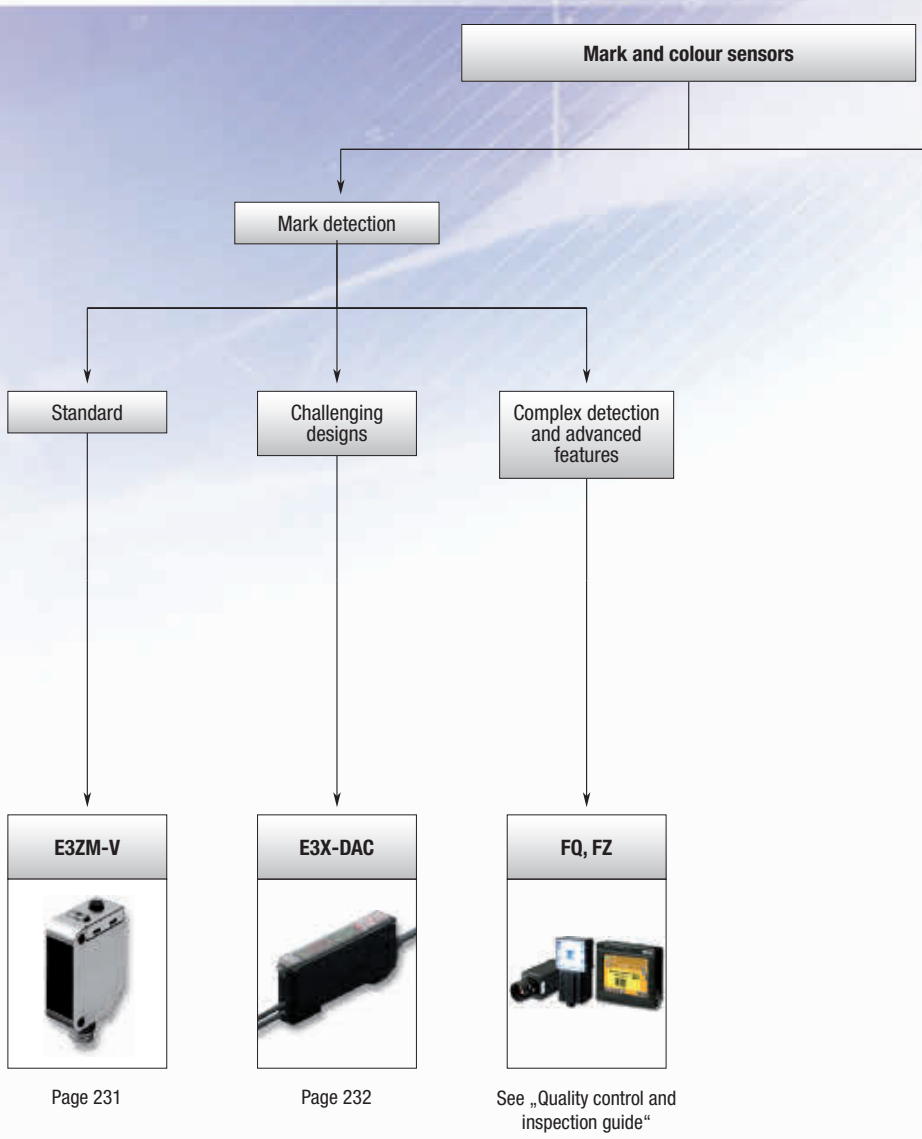
*1 The order references are examples for the E3Z sensor family. Refer to the sensor accessory datasheet E26E for the complete list of mounting brackets.

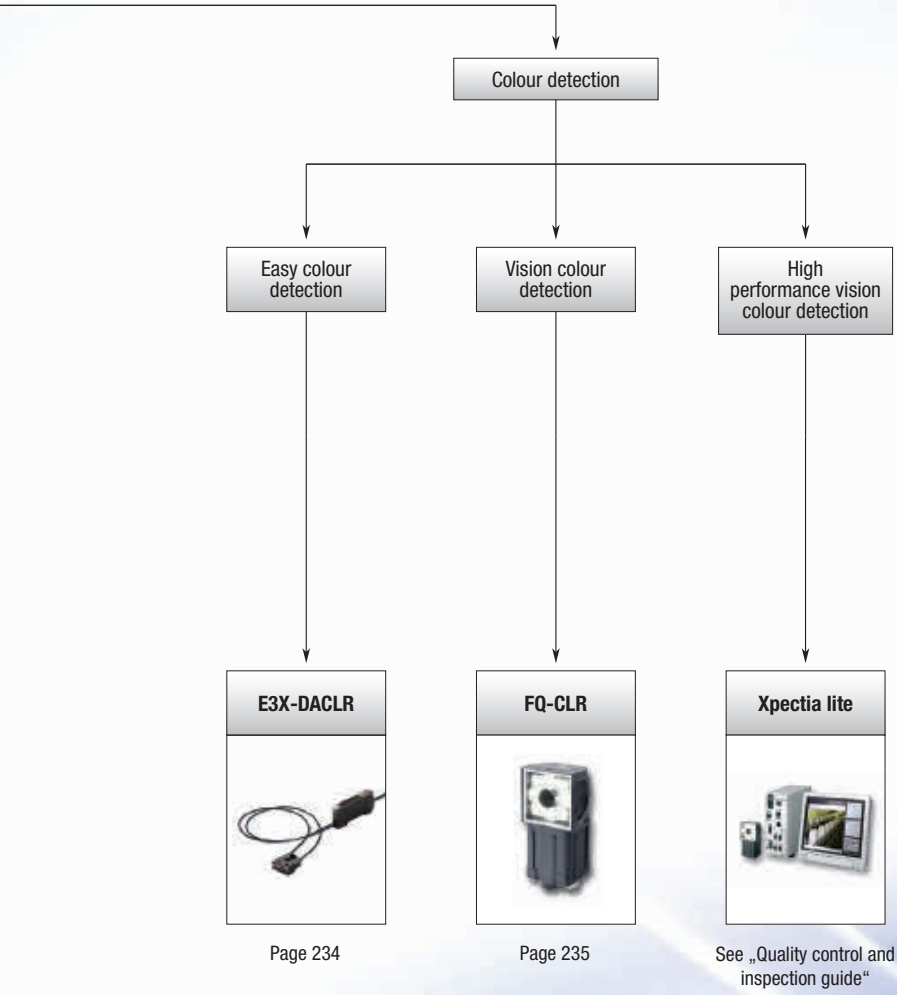
FAST ADAPTION TO CHANGING PACKAGINGS

Choose the performance you need

Packaging machines have to adapt quickly to a large variety of different packaging designs with minimal change-over time and no quality loss. For sensors detecting registration marks or colours this requires flexibility and simplicity in handling while keeping the precision and operational stability. At OMRON we closely work together with leading packaging machine makers to evaluate the requirements for sensors from commonly used packaging material as well as most critical designs or materials. Our portfolio is set up to balance the performance and budget requirements in these situations ... simply choose the performance you need.

- Reliable mark detection even in changing environmental conditions during machine operation
- Fast and easy setup up after packaging material exchange
- Performance levels fitting the machine value concept




Colour detection
Easy colour detection
Vision colour detection
High performance vision colour detection
E3X-DACLR
FQ-CLR
Xpectia lite
Page 234
Page 235
See „Quality control and inspection guide“

Type		Standard print mark detection	Challenging designs	Complex detection and advanced features
				
Model		E3ZM-V	E3X-DAC	FQ, FZ
Key feature		White LED, stainless steel housing	White LED, RGB ratio comparison and extended functionality	High performance vision inspection functionality
Detection distance		12±2mm	5–50mm	See QUALITY CONTROL AND INSPECTION GUIDE
Response time		50 µs	60 µs	
Page		231	232	

Type		Easy colour detection	Vision colour detection	High performace vision colour detection
				
Model		E3X-DACLR	FQ-CLR	Xpectia lite
Key feature		Easy one-button teach operation		
No of simultaneous colour inspections		1 to 4	1 to 32	1 to 128
Output	Colour detected – digital out	■	■	■
	RGB value out (via ethernet)	–	■	■
	HSI value out (via ethernet)	–	–	■
Tolerance adjustment	Auto tolerance	■	–	–
	Teachable	■	■	■
	Manually adjustable	–	■	■
	Advanced	–	–	■
Page		234	235	See QUALITY CONTROL AND INSPECTION GUIDE

Registration mark sensor in compact stainless steel housing

The registration mark detection sensor in a compact stainless steel housing provides reliable detection of all common registration marks in food packaging applications.

- White LED for stable detection of differently coloured or black print marks
- SUS 316L stainless steel housing
- Easy-to-use teach-in button or remote teach
- Fast response time of 50 µs

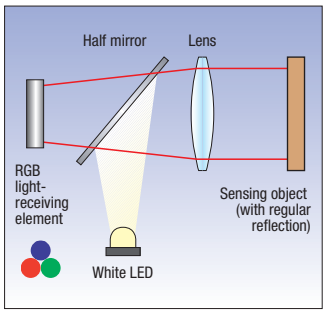
Ordering information

Sensor type	Sensing distance	Connection method				Order code*1	
						NPN output	PNP output
Mark sensor 	12±2 mm	–	–	2 m	–	E3ZM-V61 2M	E3ZM-V81 2M
		■	–	–	–	E3ZM-V66	E3ZM-V86

*1 The output configuration (ON or OFF when mark is detected) is teachable. Common operation is output is ON when mark is detected.

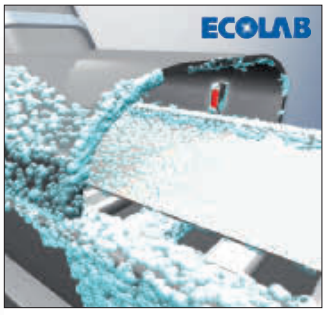
Specifications

Item		NPN	E3ZM-V6_
		PNP	E3ZM-V8_
Light source (wave length)			White LED (450 to 700 nm)
Power supply voltage			10 to 30 VDC ±10%, ripple (p-p) 10% max.
Protective circuits			Reversed power supply polarity protection, output short-circuit protection, Reversed output polarity protection, and mutual interference prevention
Ambient temperature		Operating	-25°C to 55°C
		Storage	-40°C to 70°C (with no icing or condensation)
Response time			50 µs
Degree of protection			IEC: IP67, DIN 40050-9: IP69K
Material	Case		SUS316L
	Lens		PMMA (polymethylmethacrylate)
	Display		PES (polyether sulfone)
	Sensitivity adjustment and operation switch		PEEK (polyether ether ketone)
	Seals		Fluoro rubber



Coaxial optical system with white LED

Remote teaching



Detergent resistant

Reliable detection of standard or semi-transparent marks at normal or high speed

E3X-DAC-S high functionality mark detection sensor

The E3X-DAC-S provides reliable mark detection for standard as well as challenging applications. The separate sensing head setup allows the easy adaption to the mounting requirements even when space is crucial. The remote amplifier provides easy teaching for standard applications but also on demand full control over the detection performance for most challenging applications.

Ordering information

Pre-wired

Item	Functions	Order code (for pre-wired types with 2 m cable length)	
		NPN output	PNP output
Standard models	Timer, response speed change	E3X-DAC11-S	E3X-DAC41-S
Advanced models	Same as standard models + simultaneous determination (2 colours) AND/OR output, remote setting	E3X-DAC21-S	E3X-DAC51-S

Connector versions

Item	Functions	Order code	
		NPN output	PNP output
Standard models (fiber amplifier connector) *1	Timer, response speed change	E3X-DAC6-S	E3X-DAC8-S

*1 Order connector separately

Specifications

Item		Standard models	Advanced models
		E3X-DAC1, E3X-DAC4 E3X-DAC6, E3X-DAC8	E3X-DAC2, E3X-DAC5
Light source (wave length)		White LED (420 to 700 nm)	
Number of registered marks		1	2 (simultaneous determination)
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p) 10% max.	
Protective circuits		Power supply reverse polarity protection, output short circuit protection, output reverse polarity protection, mutual interference prevention	
Ambient temperature	Operating	-25° to 55°C	
	Storage	-30° to 70°C (with no icing or condensation)	
Response time	Super-high-speed mode	Operation or reset: 60 µs	Operation or reset: 120 µs
	Standard mode	Operation or reset: 1 ms	Operation or reset: 2 ms
Sensitivity setting		Teaching (one-point teaching or teaching with/without workpiece) or manual adjustment	
Functions	Detection mode	Automode (automatic selection of C-mode or I-mode) C-mode (RGB ratio) I-mode (light intensity) Mark mode (Intensity and ratio of RGB values)	
	Operating mode	ON for match (ON for same colour as registered colour) or ON for mismatch (ON for different colour from registered colour)	
	Timer function	Timer type: OFF delay, ON delay, or one-short Timer time: 1 ms to 5 s (variable)	
	Control outputs	–	Output for each channel, AND output, and OR output
	Remote control	–	One-point teaching, teaching with/without workpiece, zero reset, and light emission OFF
Degree of protection		IEC60529 IP50 (with protective cover attached)	

Recommended fiber heads

Sensor type	Size	Recommended operating distance (mm)	Comment	Order code
	M6	5	Standard mark detection	E32-CC200 2M
	29x25.5x11.2 mm	40-50	Long distance - plastic	E32-L15 2M
	23x20x9 mm	25-30	Long distance - metal	E32-A09 2M
	M3	10	High precision mark detection (dia 1mm spot)	E32-EC31 2M + E39-EF51

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

Easy to operate detection of challenging or coloured registration marks.

Detection of challenging registration marks e.g. with texts or graphics.

Easy-Teach Colour Detection Sensor

The E3X-DACLR provides reliable and easy to set up one-touch colour verification. Up to four colours can be identified. The separate amplifier allows mounting in easily accessible areas for operators while the small sensor head can be mounted in locations even when space is limited.

- Easy to set up one-touch colour verification for 1 to 4 colours
- Model for remote teaching
- Small sensor head for easy mounting even when space is tight
- White LED and multi detection modes for reliable operation even for challenging applications

Ordering information

Type	Output	Tolerance adjustment	Connection method	Order code PNP[*1]
Single colour detection	Digital colour detected out	– Object teaching (good sample) with auto-tolerance – 2-point teaching (good and bad sample)	M8 4-pin pigtail (with 30 cm PVC cable)[*2]	E3X-DACLRX1P-M3J 0.3M
1 to 4 colour detection	Digital colour detected out (with bank switching)		2 m PVC cable	E3X-DACLRX4P 2M

[*1] NPN models are available. Contact your Omron representative.
[*2] Models with 2 m PVC cable or M12 pigtail connector are available. Contact your Omron representative.

Specifications (amplifier and sensing head)

Item		Single colour detection	1 to 4 colour detection
Light source (wave length)		White LED (420 to 700 nm)	
Number of registered marks		1	1 to 4 (2 banks switchable by external input with 2 colours each)
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p) 10% max.	
Protective circuits		Power supply reverse polarity protection, output short circuit protection, output reverse polarity protection, mutual interference prevention	
Ambient temperature	Operating	-25° to 55°C (amplifier) -40° to 70°C (sensing head)	
	Storage	-30° to 70°C (amplifier); (without icing or condensation) -40° to 70°C (sensing head)	
Response time	Super-high-speed mode Standard mode	Operation or reset: 60 µs Operation or reset: 1 ms	Operation or reset: 120 µs Operation or reset: 2 ms
Functions	Operating mode	ON for match (ON for same colour as registered colour) or ON for mismatch (ON for different colour from registered colour)	
	Timer function	Timer type: OFF delay, ON delay, or one-short Timer time: 1 ms to 5 s (variable)	
	Remote control	–	One-point teaching, teaching with/without workpiece, zero reset, and light emission OFF
Degree of protection		IEC60529 IP50 (with protective cover attached)	

Vision Colour Sensor with teachable inspection area and RGB value processing

The vision colour sensor FQ2-CLR provides real colour identification functionality in combination with the flexibility and functionality of a vision sensor. The teachable inspection area provides an easy and flexible set up. The colour processing and evaluation can be carried out by the FQ2-CLR directly or the RGB values are available via Ethernet to other devices.

- Teachable inspection area
- Models with single colour detection or up to 32 colour and image processing tasks
- RGB values via Ethernet

Ordering information

Type	Output	Tolerance adjustment	Connection method	Order code PNP[*1]
Single colour	Digital colour detected out and/or RGB value out (via ethernet)	– Object teaching (good sample) with auto-tolerance – 2-point teaching (good and bad sample)	3 m PVC cable or 3 m Ethernet cable[*2]	FQ2-CLR-V1P 3M[*3]
1 to 32 colour and image processing tasks				FQ2-CLR-V32P 3M

*1 NPN models are available. Contact your Omron representative.
*2 I/O and Ethernet cables are included. Other cable lengths can be provided on request. Contact your Omron representative.
*3 Programming device 'Touch Finder FQ2-D31' is not included. Order separately incl. AC power supply and battery or use PC Tool to program FQ2-CLR.

Programming device

Type		Order code
	Touch Finder (included in FQ2-CLR-V32P)[*1]	FQ2-D31
	AC power supply (plug type c) for FQ2-D31	FQ-AC4
	Rechargeable battery for FQ2-D31	FQ-BAT1

*1 The FQ2-CLR can be programmed either with the Touch Finder or via a PC using the FQ2 PC Tool. After programming the FQ2-CLR, the programming device can be disconnected. Only one programming device is required for programming multiple FQ2-CLR. Contact your OMRON representative for FQ2-CLR-V32P version without included Touch Finder.

Specifications

Item		FQ2-CLR-V□
Field of view		13 x 8.2 to 53 x 33 mm
Installation distance		56 to 215 mm
Ambient temperature	Operating	0° to 50°C
	Storage	-25° to 65°C (without icing or condensation)
Degree of protection		IEC 60529 IP67

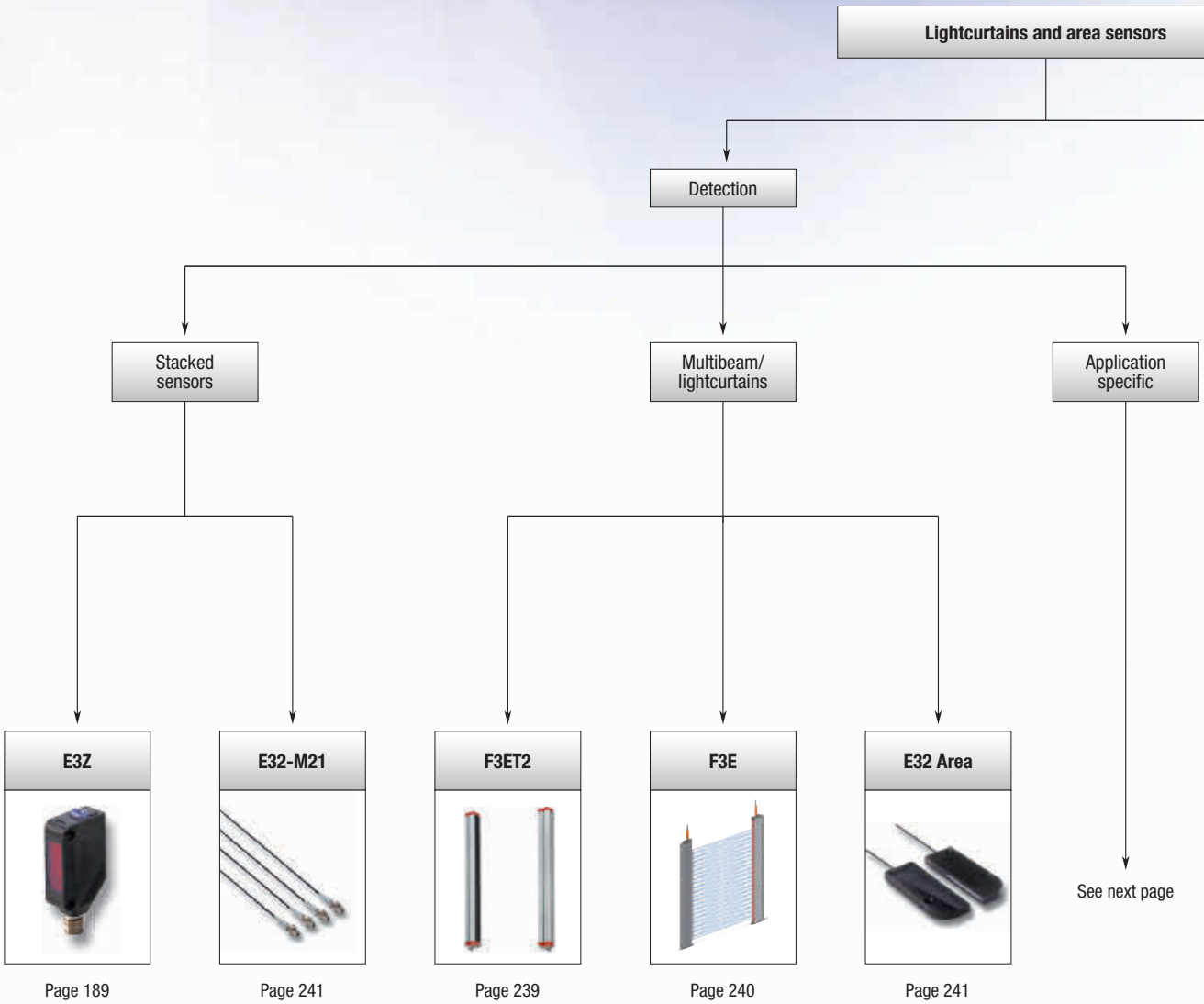
PRESENCE, HEIGHT OR PROFILE ...

... choose the accuracy you need

Objects with varying positions or heights or objects with holes can create multiple signals or stay undetected when using single beam sensors. These objects (e.g. parcels, bikes or natural products like ham or fish) are then wrongly classified as multiple smaller items or are not detected correctly.

Detecting these objects over their whole length or acquiring the more detailed object profile can be realized using multiple sensors or light curtains.

Omron offers a wide range of models with varying max detection heights, different resolutions and with digital, analog or serial outputs to provide the best performance match fitting your application.



Measurement

(Mü)m resolution

mm resolution

cm resolution

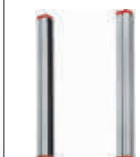
ZX-GT

Page 427

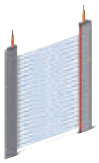
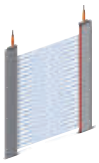
E32 Area

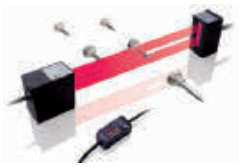
Page 241

F3EM2



Page 242

Type	Stacked sensors		Multibeam sensors/lightcurtains			Application specific lightcurtains	
							
Model	**E3Z**	**E32-M21**	**F3ET2**	**F3E**	**E32 area**	**Safety lightcurtains**	**F3E Elevator lightcurtains**
Key features	Mutual interference prevention	4 × M3 heads combined in one fiber	Models with 5 and 18 mm pitch	Thin aluminium housing	Teachable sensitivity	Type 2, type 4 or application specific	Fulfills EN81-70
Max. sensing distance	60 m	1.3 m	15 m	5 m	4 m	50 m	5 m
Max. detection height	n. a.	4 m	2.1 m	1.8 m	70 mm	2.4 m	1.8 m
Page	189	241	239	240	241	486	240

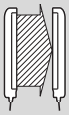
Type	Measuring lightcurtains		
			
Model	**F3EM2**	**E32 area**	**ZX-GT**
Key features	cm accuracy	mm accuracy	µm accuracy
Max. sensing distance	15 m	4 m	0.5 m
Max. measurement height	2.1 m	70 mm	28 mm
Page	242	241	427

Lightcurtain in robust aluminium housing

The F3ET2 lightcurtains provide a reliable area monitoring in a robust housing. The optical synchronisation between emitter and receiver allow a fast and simple installation without special requirements.

- Optical synchronisation for reliable operation without additional wiring
- Robust aluminium housing
- NPN/PNP and light on/dark on selectable

Ordering information

Sensor type	Detection area (mm)	Pitch	Sensing distance	Channels	Connection method				Output	Order code*1
										
Through-beam 	150	5 mm	3 m	30	–	5 pin	–	–	PNP/NPN	F3ET2-005-150
		18 mm	15 m	8	–		–	–		F3ET2-018-150
	300	5 mm	3 m	60	–		–	–		F3ET2-005-300
		18 mm	15 m	16	–		–	–		F3ET2-018-300
	450	5 mm	3 m	90	–		–	–		F3ET2-005-450
		18 mm	15 m	24	–		–	–		F3ET2-018-450
	600	5 mm	3 m	120	–		–	–		F3ET2-005-600
		18 mm	15 m	32	–		–	–		F3ET2-018-600
	900	5 mm	3 m	180	–		–	–		F3ET2-005-900
		18 mm	15 m	48	–		–	–		F3ET2-018-900
	1200	5 mm	3 m	240	–		–	–		F3ET2-005-1200
		18 mm	15 m	64	–		–	–		F3ET2-018-1200
	1500	5 mm	3 m	300	–		–	–		F3ET2-005-1500
		18 mm	15 m	80	–		–	–		F3ET2-018-1500
	1800	5 mm	3 m	360	–		–	–		F3ET2-005-1800
		18 mm	15 m	96	–		–	–		F3ET2-018-1800
	2100	18 mm	15 m	112	–		–	–		F3ET2-018-2100

*1 Light-ON / Dark-ON selectable

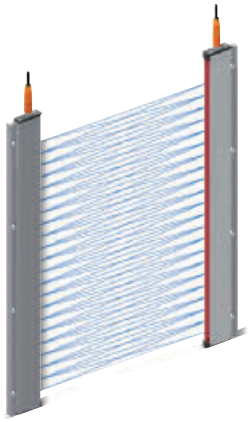
Connector cables

Type	Features	Material		Order code	
		Nut	Cable	Straight	Angled
M12	5 wires	CuZn	PVC 2 m	XS2F-M12PVC5S2M	XS2F-M12PVC5A2M
			PUR 2 m	XS2F-M12PUR5S2M	XS2F-M12PUR5A2M
			PVC 5 m	XS2F-M12PVC5S5M	XS2F-M12PVC5A5M
			PUR 5 m	XS2F-M12PUR5S5M	XS2F-M12PUR5A5M

Specifications

Item		Through-beam	
		F3ET2-005_	F3ET2-018_
Sensing distance		0 to 3 m	0 to 15 m
Vertical detection area		0 to Max_M mm; Max_M: 150, 300, 450, 600, 900, 1200, 1500, 1800*1	0 to Max_M mm; Max_M: 150, 300, 450, 600, 900, 1200, 1500, 1800, 2100
Minimum detectable object size		10 mm	30 mm
Pitch		5 mm	18 mm
Response time		4 ms + 80 µs × number of beams	
Light source (wave length)		Infrared LED (880 nm)	
Power supply voltage		24 VDC ±20%	
Operating temperature		–10° to +55°C	
Degree of protection		IEC 60529 IP65	
Material	Case	Aluminium	

*1 Models with different detection ranges are available in 150 mm intervals. Please contact your OMRON representative.

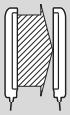


Lightcurtain in thin aluminium housing

The crossing of the multiple sensor beams provides a reliable area monitoring in a thin, easy to install housing. The thin housing makes the light curtain ideal for the installation where space is crucial.

- Thin 9 mm shape for easy design-in in elevator constructions
- High ambient light immunity
- Robust aluminium housing
- Fulfills requirements of EN81-70 (1800 mm models) for mounting in elevators

Ordering information

Sensor type	Detection area	Pitch	Sensing distance	Channels	Number of optical axis	Connection method				Order code[*1] Potential free output
										
Through-beam 	200 mm	40 mm	5 m	6	16	–	–	5 m	–	F3E-06-T1 5M
						■	–	–	–	F3E-06-T6
	1320 mm	120 mm		12	34	–	–	5 m	–	F3E-12-T1 5M
						■	–	–	–	F3E-12-T6
	1800 mm	120 mm		16	46	–	–	5 m	–	F3E-16-T1 5M
						■	–	–	–	F3E-16-T6
		40 mm		46	136	–	–	5 m	–	F3E-46-T1 5M
						■	–	–	–	F3E-46-T6

[*1] Light-ON/ Dark-ON settable. Common operation is Dark-ON

Specifications

Item		Through-beam			
		F3E-06-T_	F3E-12-T_	F3E-16-T_	F3E-46-T_
Number of LEDs		6	12	16	46
Number of optical axes		16	34	46	136
Pitch		40 mm	120 mm	120 mm	40 mm
Vertical detection range		20 to 200 mm	20 to 1320 mm	20 to 1820 mm	
Response time		max. 110 ms (signal interruption)			
Light source (wave length)		Infrared LED (880 nm)			
Power supply voltage		10 to 30 VDC			
Ambient temperature	Operation	-20 to +60°C			
	Storage	-40 to +70°C			
EMC conformity/standards		73/23/EWG; 89/336/EWG; 95/16/EG; EN81-1; EN81-2; EN12015; EN12016; EN61000-6-x			
Degree of protection		IEC 60529 IP54			
Dimensions		400x40.7x9 mm	1590x40.7x9 mm	2070x40.7x9 mm	2000x40.7x9 mm
Material	Case	Aluminium			

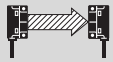
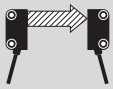
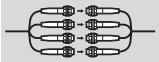
Area monitoring fiber sensor heads

When mounting space is crucial or the objects are very small, the area monitoring fibers provide a reliable object detection even when the object position varies within the monitored range.

In combination with the window monitoring function or the serial transmission of the received light level values of the fiber amplifiers, simple height comparison or measuring applications can be realized.

- Area monitoring up to 70 mm height
- Multi-beam sensor with 4 separate heads for flexible detection points
- Standard or high flex fibers

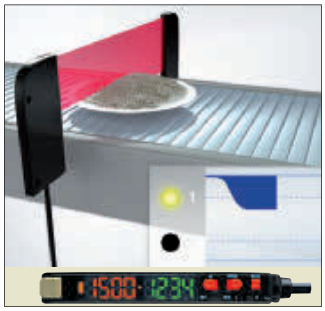
Ordering information

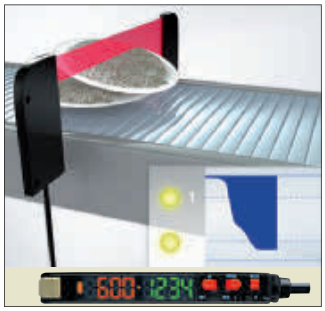
Sensor type	Sensing height (in mm)	Sensing distance (in mm)				Order code*1	
		Standard fiber		High-flex fiber		Standard fiber	High-flex fiber
		E3X-SD	E3X-DA-S	E3X-SD	E3X-DA-S		
	10	1900	4000	–	–	E32-T16	–
 *2	11	1200	2200	800	1700	E32-T16P	E32-T16PR 2M
	30	1840	3600	1380	2600	E32-T16W 2M	E32-T16WR 2M
	50	–	–	1500	3000	–	E32-ET16WR-2 2M
	70	–	–	2300	3500	–	E32-ET16WR-1 2M
	11	1040	2000	700	1500	E32-T16J 2M	E32-T16JR 2M
	4 x seperate M3 heads	600	1300	–	–	E32-M21	–
	11	–	–	150	300	–	E32-D36P1 2M

*1 Order fitting amplifier from Fiber Amplifier section
*2 Sensing area aligned to top of housing.

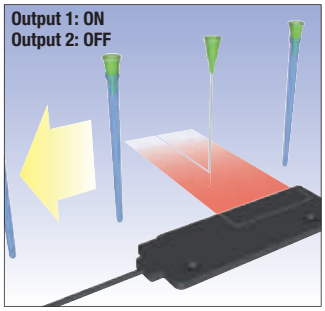
Specifications

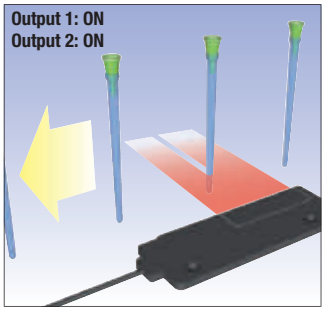
Item		Standard			High-flex		
		E32-T16	E32-M21	E32-T16J E32-T16P E32-T16W	E32-D36P1	E32-ET16WR-1 E32-ET16WR-2	E32-T16JR E32-T16PR E32-T16WR
Permissible bending radius		R25		R10	R4	R1	
Cut to length		Yes					
Ambient temperature		-40°C to 70°C					
Material	Head	ABS	Stainless steel	ABS	Brass-nickel plated	Aluminium	ABS
	Fiber	PMMA					
	Sheath	Polyethylene coating		PVC coating	Polyethylene coating		PVC coating
Degree of protection		IEC 60529 IP67		IEC 60529 IP50		IEC 60529 IP54	IEC 60529 IP50





The two outputs of the E3X-DA-S can be used to detect two different light levels





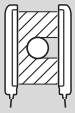
In combination with the twin output function of the E3X-DA-S amplifier, the diffuse reflective area monitoring fibers can detect very small objects (e.g. needles) and a second state (e.g cover present). The area beam compensates for position variations at high speed.

Measuring lightcurtain in robust aluminium housing

The F3EM2 provides easy to install and set up height and profile measurement. The analog output provides a simple overall height detection and the serial output models provide single beam evaluation for profile measurements.

- Robust aluminium housing
- Analog output for simple height detections
- Serial output with single beam evaluation for profile measurement
- Various output modes to adapt output data to the given application

Ordering information

Sensor type	Measurement range (mm)	Pitch*1	Sensing distance	Channels	Connection method				Order code	
									RS-232-C Serial/ analogue output models*2	Analogue output models
Through-beam (measuring) 	150	5 mm	3 m	30	–	M12 8-pin/ M12 5-pin	–	–	F3EM2-005-150	F3EM2-005-150-AV
		18 mm	15 m	8	–		–	–	F3EM2-018-150	F3EM2-018-150-AV
	300	5 mm	3 m	60	–		–	–	F3EM2-005-300	F3EM2-005-300-AV
		18 mm	15 m	16	–		–	–	F3EM2-018-300	F3EM2-018-300-AV
	450	5 mm	3 m	90	–		–	–	F3EM2-005-450	F3EM2-005-450-AV
		18 mm	15 m	24	–		–	–	F3EM2-018-450	F3EM2-018-450-AV
	600	5 mm	3 m	120	–		–	–	F3EM2-005-600	F3EM2-005-600-AV
		18 mm	15 m	32	–		–	–	F3EM2-018-600	F3EM2-018-600-AV
	900	5 mm	3 m	180	–		–	–	F3EM2-005-900	F3EM2-005-900-AV
		18 mm	15 m	48	–		–	–	F3EM2-018-900	F3EM2-018-900-AV
	1200	5 mm	3 m	240	–		–	–	F3EM2-005-1200	F3EM2-005-1200-AV
		18 mm	15 m	64	–		–	–	F3EM2-018-1200	F3EM2-018-1200-AV
	1500	5 mm	3 m	300	–		–	–	F3EM2-005-1500	F3EM2-005-1500-AV
		18 mm	15 m	80	–		–	–	F3EM2-018-1500	F3EM2-018-1500-AV
	1800	5 mm	3 m	360	–		–	–	F3EM2-005-1800	F3EM2-005-1800-AV
		18 mm	15 m	96	–		–	–	F3EM2-018-1800	F3EM2-018-1800-AV
	2100	18 mm	15 m	112	–		–	–	F3EM2-018-2100	F3EM2-018-2100-AV

*1 Models with 7.5 mm pitch are available. Contact your OMRON representative.
*2 Models with RS-485 serial output are available. Contact your OMRON representative.

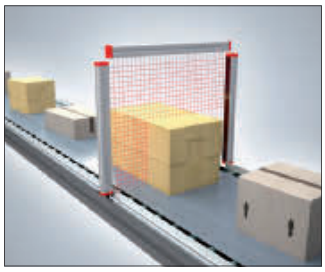
Connector cables

Type	Features	Material		Order code	
		Nut	Cable	Straight	Angled
M12	8 wires	CuZN	PUR 2 m	Y92E-M12PURSH8S2M-L	
			PUR 5 m	Y92E-M12PURSH8S5M-L	
	5 wires	CuZn	PVC 2 m	XS2F-M12PVC5S2M	XS2F-M12PVC5A2M
			PUR 2 m	XS2F-M12PUR5S2M	XS2F-M12PUR5A2M
			PVC 5 m	XS2F-M12PVC5S5M	XS2F-M12PVC5A5M
			PUR 5 m	XS2F-M12PUR5S5M	XS2F-M12PUR5A5M

Specifications

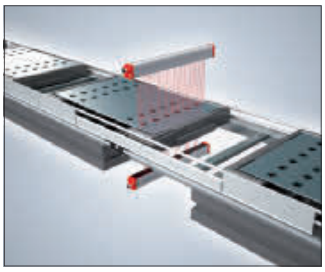
Item		Through-beam	
		F3EM2-005_	F3EM2-018_
Sensing distance		0 to 3 m	0 to 15 m
Vertical measurement range		0 to Max_M mm; Max_M: 150, 300, 450, 600, 900, 1200, 1500, 1800*1	0 to Max_M mm; Max_M: 150, 300, 450, 600, 900, 1200, 1500, 1800*1
Minimum detectable object size		10 mm	30 mm
Pitch		5 mm	18 mm
Response time		4 ms + 80 µs × number of beams (+ transmitting time for serial operation)	
Light source (wave length)		Infrared LED (880 nm)	
Power supply voltage		24 VDC ±20%	
Ambient temperature		–10° to +55°C	
Degree of protection		IEC 60529 IP65	
Material	Case	Aluminium	

*1 Models with different measurement ranges are available in 150 mm intervals. Please contact your OMRON representative.

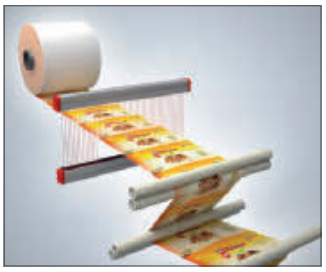


Volume measurement

Profile scan



Hole detection



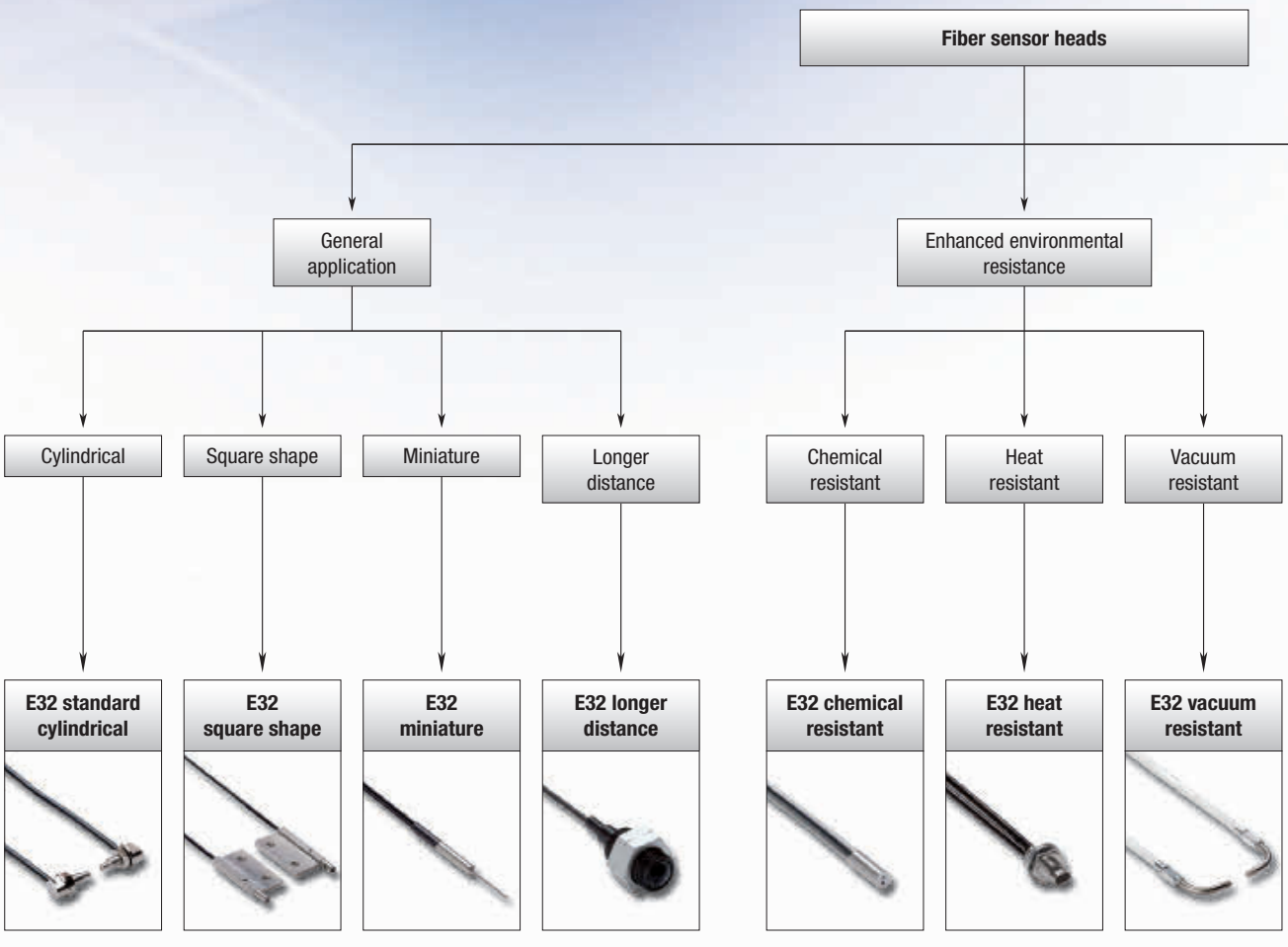
Position control

HIGH PRECISION IN SMALL SPACES

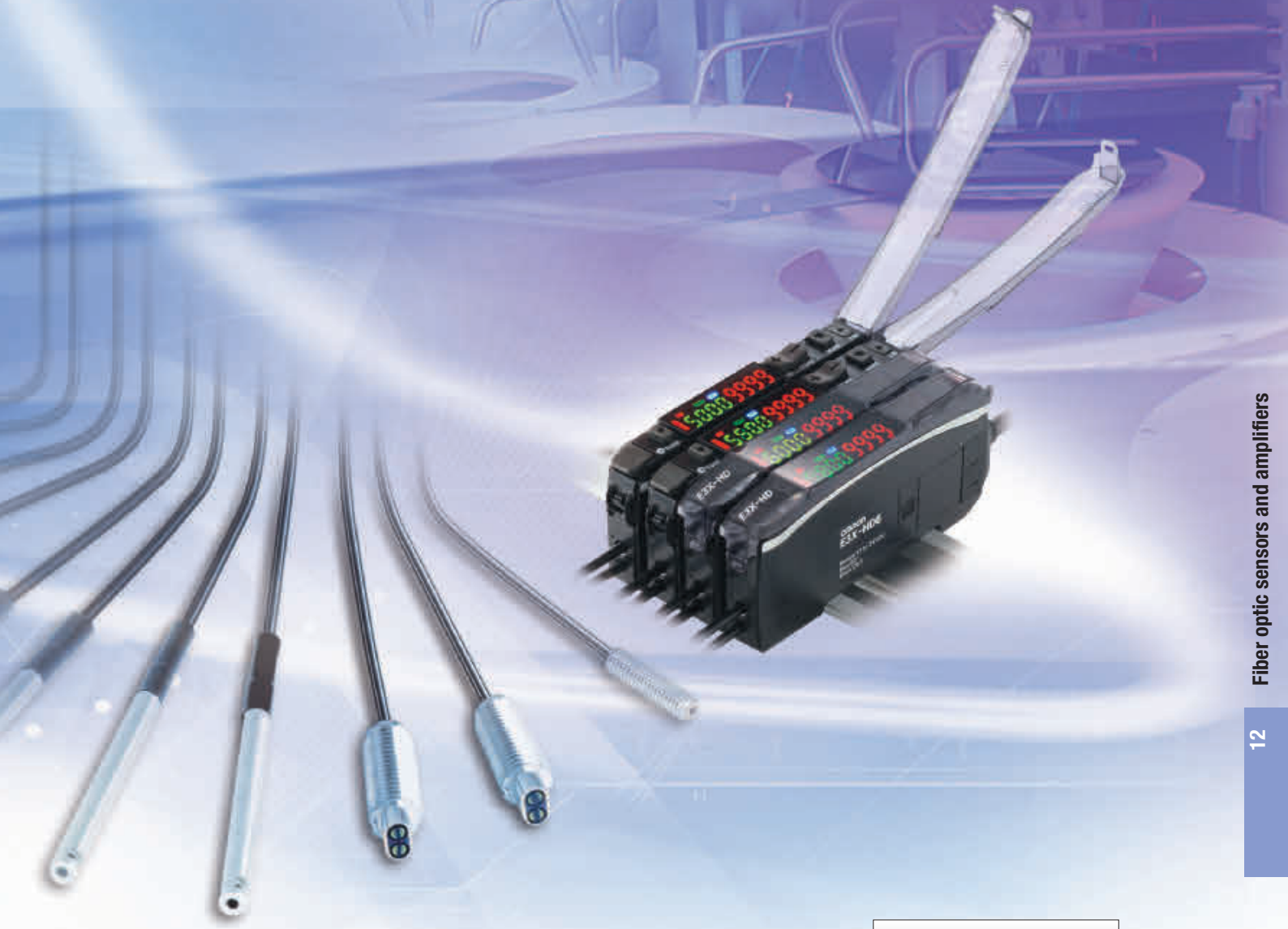
Precision and performance you can rely on

The requirements for fiber optic solutions can be very demanding particularly for applications with extreme temperatures and aggressive chemicals or for applications requiring highest precision with limited mounting space.
With the wide range of E32 fiber heads and the easy-usage amplifiers, the best performance fit for your application can be provided. The highest quality control procedures in design and manufacturing ensure that you get the precision and long service life that you can rely on.

- Long operational life
- Easy to install and adjust
- Wide portfolio range for best performance fit



Page 248 Page 250 Page 252 Page 254 Page 255 Page 256 Page 258



Fiber amplifiers

- **Special objects or installations**
  - Robot applications → **E32 robot** — Page 260
  - Precision detection → **E32 precision detection** — Page 261
  - Area monitoring → **E32 area monitoring** — Page 241
  - Special applications → **E32 special** — Page 263
- **Easy usage**
  - Easy-teach → **E3X-HD/E3X-SD** — Page 265/268
  - Potentiometer adjuster → **E3X-NA** — Page 269
- **Advanced functionality**
  - High functionality E3NX-FA
  - High speed E3X-NA-F
  - Double amplifier E3X-MDA
  - Colour detection E3X-DAC-S

E3NX-FA	Page 271
E3X-NA_F	Page 275
E3X-MDA	Page 274
E3X-DAC-S	Page 232

Selection table

Fiber sensor heads

Type	Cylindrical	Square shape	Miniature	Longer distance	Chemical resistant
					
Model	**E32 standard cylindrical**	**E32 square shape**	**E32 miniature**	**E32 longer distance**	**E32 chemical resistant**
Key features	• Standard and high-flex fibers • Sizes M3 to M6	• 3 or 4 mm thin housing • Models in X,Y or Z-axis • Direct mounting without bracket	• Sizes from dia 500 µm to 3 mm • Bendable sleeves	• Built in focal lenses	• Fluoroplastic cover or coating
Through-beam	1,550 mm	1,550 mm	1,550 mm	20 m	4 m
Retro-reflective	250 mm	–	–	1.5 m	–
Diffuse-reflective	650 mm	600 mm	600 mm	1.4 m	350 mm
Page	248	250	252	254	255

Note: All sensing distances measured with E3X-DA-SE-S. Longer sensing distances up to 80% can be achieved with E3X-DA-S.

Fiber amplifiers

Type	Easy teach/double display	Easy teach/single display	Potentiometer adjuster	High performance	Double amplifier
					
Model	**E3X-HD**	**E3X-SD**	**E3X-NA**	**E3NX-FA**	**E3X-MDA**
361°	PRO	LITE	LITE	PRO^{plus}	n.a.
Key features	• Easy operation by smart tuning • Dynamic power control • Fieldbus connectivity	• 1 button object teaching • Auto teach during operation	• Easy adjustment by potentiometer	• High functionality signal processing (timer, counter, dynamic power control, etc. • High signal resolution • Increased sensing distance • Double output/external input • Fieldbus connectivity	• 2 inputs and AND, OR signal comparison
Response time (min.)	1 ms (50 µs in super-high-speed mode)	1 ms	200 µs	1 ms (30 µs in super-high-speed mode)	1 ms (130 µs in high speed mode)
Page	265	268	269	271	274

Heat resistant	Vacuum resistant	Robot applications	Precision detection	Area monitoring	Special application
					
E32 heat resistant	**E32 vacuum resistant**	**E32 robot**	**E32 precision detection**	**E32 area monitoring**	**E32 special**
• Heat resistant up to 400°C	• Leakage rate of 1×10^{-10} Pa*m^3/s max	• Free moving multicore fibers for >1 Mio bending cycles	• Detection accuracy up to 100 µm • Coaxial fibers • Adjustable focal points	• Area monitoring up to 70 mm	• Detection of special objects (wafer, liquid level, flat glass, print mark ...)
3 m	950 mm	1,350 mm	3.8 m	4 m	3.8 m
–	–	–	–	–	–
500 mm	–	350 mm	600 mm	300 mm	20 mm
256	258	260	261	241	263

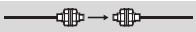
High speed	Colour/print mark detection	Infrared LED
		
E3X-NA-F	**E3X-DAC-S**	**E3X-DAH-S**
n.a.	n.a.	n.a.
• Short turn on time of 20 µs	• White LED and RGB ratio comparison	• Infrared LED
20 µs	1 ms (60 µs in super high speed mode)	1ms (55µs in super high speed mode)
275	232	276

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.

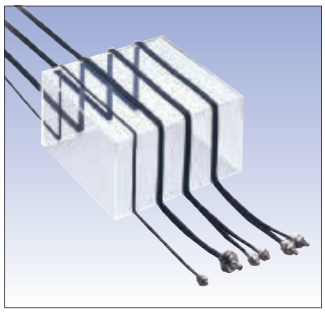
- High-flex fibers and 90° cable exit for fiber breakage prevention
- Models with hexagonal back for simplified one-nut mounting
- Sizes M3 to M6

Ordering information

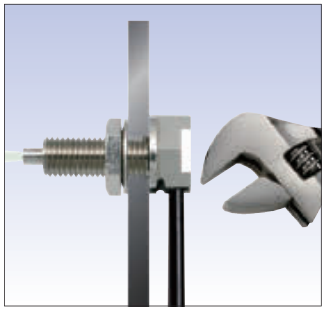
Sensor type	Size	Sensing distance (in mm)				Order code	
		Standard fiber		High-flex fiber		Standard fiber	High-flex fiber
		E3X-SD	E3X-HD	E3X-SD	E3X-HD		
	M4	800	1550	1100	1400	E32-TC200 2M	E32-ET11R 2M
	M3	200	450	50	130	E32-TC200E 2M	E32-ET21R 2M
	dia 4 mm	1100	1500	–		E32-ETC220 2M	–
	M4	–		530	1000	–	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
	M6	–		170	350	–	E32-D11N 2M
	dia 6 mm	80	220	35	100	E32-D14L 2M	E32-D14LR 2M

Specifications

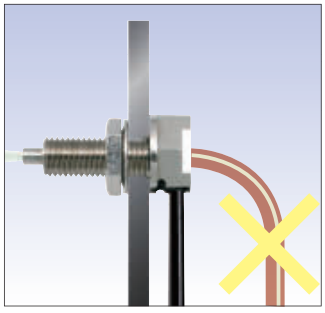
Item		Standard					High Flex			
		E32-_C200 E32-_C220	E32-D14L	E32-_C200E	E32-D211	E32-R21	E32-E_R	E32-D14LR	E32-D211R	E32-_11N
Permissible bending radius		R25		R10			R1			
Cut to length		Yes								
Ambient temperature		–40°C to 70°C								
Material	Head	Brass-nickel plated	Stainless steel	Brass-nickel 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



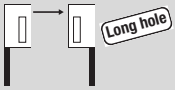
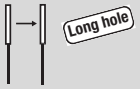
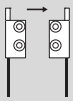
Cable exit shifted by 90° for preventing fiber breakage

Square shape fiber sensor heads

The fiber heads in square shaped housing provide fast and easy installation on flat surfaces.

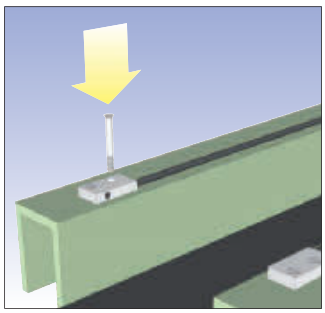
- Models with sensing direction in X, Y or Z axis
- 3 or 4mm thick housings for minimal height requirement
- Standard or high-flex fibers

Ordering information

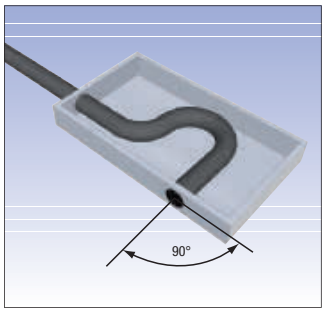
Sensor type	Size in mm (standard / high-flex)	Sensing distance (in mm)				Order code	
		Standard fiber		High-flex fiber		Standard fiber	High-flex fiber
		E3X-SD	E3X-HD	E3X-SD	E3X-HD		
	15×8×3 / 15×10×4	800	1550	1100	1400	E32-T15X 2M	E32-ETS10R 2M
	15×8×3	480	950	220	450	E32-T15Y 2M	E32-T15YR 2M
	15×8×3 / 15×9×4	480	950	1000	1300	E32-T15Z 2M	E32-ETS14R 2M
	13×9×4	–		1000	1300	–	E32-ET15YR 2M
		–		1000	1300	–	E32-ET15ZR 2M
	15×10×3	300	600	180	350	E32-D15X 2M	E32-D15XR 2M
	15×10×3	100	200	40	100	E32-D15Y 2M	E32-D15YR 2M
	15×10×3 / 13×6×2.3	100	200	25	120	E32-D15Z 2M	E32-EDS24R 2M
	24.5×10×3	–		890	1780	–	E32-A03-1 2M
	21×9×2	–		340	680	–	E32-A04-1 2M

Specifications

Item		Standard			High flex	
		E32-_15	E32-A03_	E32-A04_	E32-E	E32-_15_R
Permissible bending radius		R25	R10		R1	
Cut to length		Yes				
Ambient temperature		–40°C to 70°C				
Material	Head	Aluminium	Brass-nickel plated	Stainless steel	Aluminium	
	Fiber	PMMA				
	Sheath	Polyethylene coating				PVC coating
Degree of protection		IEC 60529 IP67	IEC 60529 IP50		IEC 60529 IP67	



Space saving and fast mounting without additional brackets



Precise positioning during manufacturing for 90° optics to achieve minimal tolerance variations in optical output axis angle

Miniature fiber sensor heads

The miniature fiber heads provide high accuracy in smallest spaces and reliable detection of minute objects.

- Sizes from dia 500 µm to 3 mm
- Side view models with precision axis alignment for highest accuracy
- Bendable sleeves for precision positioning

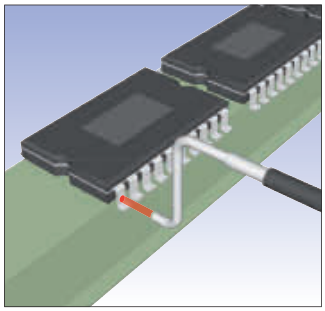
Ordering information

Sensor type	Size	Sensing distance (in mm)				Order code	
		Standard fiber		High-flex fiber		Standard fiber	High-flex fiber
		E3X-SD	E3X-HD	E3X-SD	E3X-HD		
	dia 3 mm	800	1550	560	1000	E32-T12 2M	E32-T12R 2M
	dia 2 mm	200	450	120	250	E32-T22 2M	E32-T22R 2M
	dia 1.5 mm	200	450	200	450	E32-T222 2M	E32-T222R 2M
	dia 1 mm	–		120	250	–	E32-T223R 2M
	dia 3 mm	480	950	220	450	E32-T14L 2M	E32-T14LR 2M
	dia 2 mm	340	680	–		E32-A04 2M	–
	dia 1 mm	180	250	60	100	E32-T24	E32-T24R 2M
Bendable sleeve	dia 1.2 mm	800	1550	560	1000	E32-TC200B[*1]	E32-TC200BR[*1]
	dia 0.9 mm	200	450	120	250	E32-TC200F[*1]	E32-TC200FR[*1]
	dia 3 mm	70	160	30	60	E32-D22 2M	E32-D22R 2M
	dia 2 mm	80	150	40	80	E32-D32 2M	E32-D32R 2M
	dia 1.5 mm	–		30	60	–	E32-D22B 2M
	dia 2 mm	30	60	15	30	E32-D24	E32-D24R 2M
	dia 2.5 mm	300	600	180	350	E32-DC200B 2M[*1 *2]	E32-DC200BR [*1 *2]
Bendable sleeve	dia 1.2 mm	70	160	30	60	E32-DC200F[*1]	E32-DC200FR[*1]
	dia 0.8 mm	–	–	20	30	–	E32-D33 2M
	dia 0.5 mm	–	–	3	6	–	E32-D331 2M

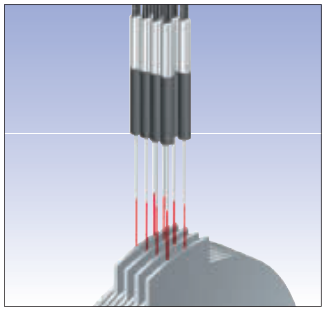
[*1] Models with 40 mm sleeve instead of 90 mm sleeve are available by adding '4' to the order code at the end, e.g. E32-TC200B4
[*2] Sleeve cannot be bent

Specifications

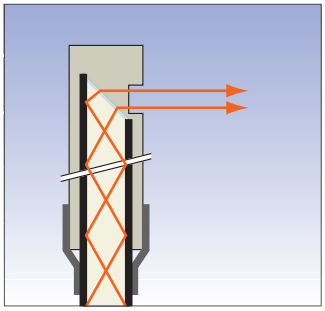
Item		Standard						High-flex				
		E32-DC200B E32-T12 E32-TC200B	E32-T14L	E32-D32	E32-D22 E32-T222 E32-TC200F	E32-D24 E32-DC200F E32-T22 E32-T24	E32-A04	E32-D32R E32-D33 E32-D331	E32-D22B	E32-DC200BR E32-T12R E32-TC200BR	E32-D22R E32-T222R E32-TC200FR	E32-D24R E32-DC200FR E32-T14LR E32-T22R E32-T223R E32-T24R
Permissible bending radius		R25			R10			R4		R1		
Cut to length		Yes										
Ambient temperature		–40°C to 70°C										
Material	Head	Brass-nickel plated	Stainless steel		Brass-nickel plated	Stainless steel				Brass-nickel plated		Stainless steel
	Fiber	PMMA										
	Sheath	Polyethylene coating		PVC and polyethylene	Polyethylene coating			PVC and polyethylene	PVC coating		Polyethylene coating	
Degree of protection		IEC 60529 IP67					IEC 60529 IP50	IEC 60529 IP67				



Bendable metal sleeves for precision positioning of sensors after installation



0.5 mm diameter (diffuse reflective) or 1 mm diameter (through beam) when mounting space is crucial



High precision fiber surface cutting and positioning during manufacturing to achieve minimal deviation of optical output axis angle

Longer distance fiber sensor heads

With built-in focal lenses the longer distance fiber heads provide enhanced operational stability in dusty environments or long distance applications

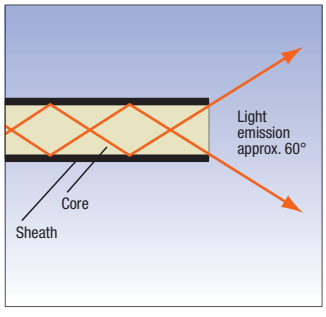
- Sensing distance up to 20 m
- Built-in focal lens
- Sizes from dia 2 mm to M14
- Easy installation - no need to attach auxiliary lenses

Ordering information

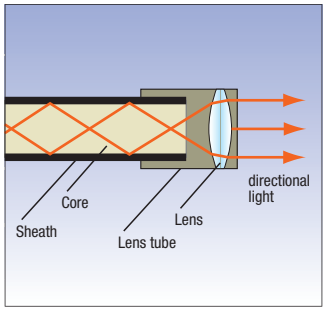
Sensor type	Size	Sensing distance (in mm)				Order code	
		Standard fiber		High-flex fiber		Standard fiber	High-flex fiber
		E3X-SD	E3X-HD	E3X-SD	E3X-HD		
	M14	14000	20000	–	–	E32-T17L	–
	25.2 × 10.5 × 8 mm	1800	4000	–	–	E32-T14	–
	M4	2100	4000	1800	3500	E32-LT11 2M	E32-LT11R 2M
	M3	720	1350	–	–	E32-TC200A 2M	–
	dia 3 mm	1400	2600	–	–	E32-T12L 2M	–
	dia 2 mm	400	850	–	–	E32-T22L 2M	–
Reflector	21.5 × 27 × 10 mm	1500	1500	–	–	E32-R16 2M	–
	22 × 17.5 × 9 mm	700	1400	–	–	E32-D16 2M	–
	M6	190	360	180	350	E32-LD11 2M	E32-LD11R 2M
	M4	100	260	–	–	E32-D21L 2M	–
	dia 3 mm	240	450	–	–	E32-D12 2M	–

Specifications

Item		Through-beam						Retro-reflective	Diffuse-reflective				
		E32-T17L/ E32-T14	E32-LT11	E32-T12L	E32TC200A	E32-LT11R	E32-T22L	E32-R16	E32-D16	E32-LD11	E32-LD11R	E32-D21L	E32-D12
Permissible bending radius		R25				R1	R10	R25	R4	R25	R10	R10	R25
Cut to length		Yes											
Ambient temperature		–40°C to 70°C											
Material	Head	ABS	Brass-nickel plated				Stainless steel	ABS	Aluminium	Brass-nickel plated			Stainless steel
	Fiber	PMMA											
	Sheath	Polyethylene coating							PVC coating	Polyethylene coating			
Degree of protection		IP67	IP50	IP67		IP50	IP67		IP40	IP50		IP67	



Light emission of conventional fibers



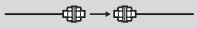
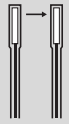
With built-in focal lenses, longer sensing distances can be achieved up to 5 times longer compared to conventional sensors

Chemical resistant fiber sensor heads

The chemical resistant fibers provide long sensor lifetime in areas with frequent cleaning, usage of chemicals and higher temperatures.

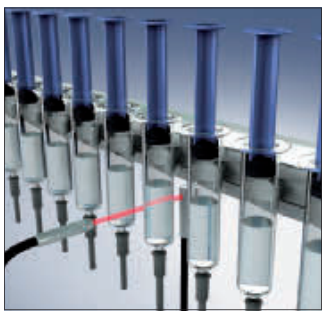
- fluoroplastic cover for highest chemical resistance
- temperature resistance up to 200°C

Ordering information

Sensor type	Size	Sensing distance (in mm)		Key feature	Order code
		E3X-SD	E3X-HD		
	M4	720	1350	Fluororesin coating	E32-T11U 2M
	dia 5 mm	2500	3200	Fluororesin cover	E32-ET11F 2M
		1600	4000		E32-T12F
		400	800		E32-T14F 2M
	M6	180	350	Fluororesin coating	E32-D11U 2M
	dia 7 mm	150	300	Fluororesin cover	E32-ED11F 2M
	dia 6 mm	100	190		E32-D12F
		40	80		E32-D14F 2M
		700	1400	Fluororesin cover Heat resistant to 200°C	E32-T81F-S 2M
	dia 5 mm	1400	2800	Fluororesin cover Heat resistant to 150°C	E32-T51F 2M

Specifications

Item		Fluororesin coating		Full fluororesin cover		Full fluororesin cover and heat resistance	
		E32-T11U	E32-D11U	E32-E_11F	E32-_12F/E32-_14F	E32-T51F	E32-T81F-S
Permissible bending radius (in mm)		R1	R4	R75	R40		R10
Cut to length		yes					no
Ambient temperature		–40°C to 70°C				–40°C to 150°C	–40°C to 200°C
Material	Head	Brass-nickel plated		Fluororesin			
	Fiber	PMMA					Glass
	Sheath	Fluororesin coating		Fluororesin cover			
Degree of protection		IEC60529 IP67					



The fluororesin cover provides highest chemical resistance for longest lifetime in frequently cleaned environments like aseptic filling in pharmaceutical applications

Enhanced temperature resistant models

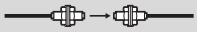
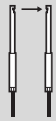
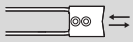
Highest chemical resistance

Heat resistant fiber sensor heads

The wide range of heat resistant fibers provides long sensor lifetime with highest protection in demanding environments

- heat resistant up to 400°C
- sizes from dia 2 mm to M6
- models for long distances or high detection accuracy

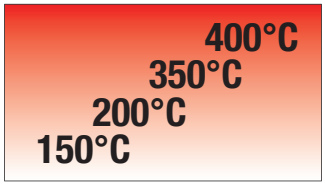
Ordering information

Sensor type	Size	Sensing distance (in mm		Key feature	Order code	
		E3X-SD	E3X-HD		For E3X-SD and E3X-HD teachable amplifiers	For E3X-NA amplifier with potentiometer adjustment
	M4	1800	3000	–40°C to 150°C	E32-ET51 2M	
		400	800	–40°C to 100°C[*1], high-flex	E32-T51R 2M	
		360	550	–40°C to 200°C	E32-T81R-S 2M	
		600	900	–60°C to 350°C	E32-T61-S 2M	
	dia 2 mm	260	450	–40°C to 150°C	E32-T54 2M	
	dia 3 mm	1400	2600	–40°C to 200°C	E32-T84S-S 2M	
	M6	400	500	–40°C to 150°C	E32-ED51 2M	
		140	280	–40°C to 100°C[*1], high-flex	E32-D51R 2M	
		90	180	–40°C to 200°C	E32-D81R-S 2M	E32-D81R 2M
		90	180	–60°C to 350°C	E32-D61-S 2M	E32-D61
	M4	60	120	–40°C to 400°C	E32-D73-S 2M	E32-D73
	23×20×9 mm	15–38		–40°C to 150°C	E32-A09H 2M	
	30×24×9 mm	20–30		–40°C to 300°C	E32-A09H2 2M	
	25×18×5 mm	1–5		–40°C to 300°C	E32-L64 2M	
	36×18×5 mm	5–18			E32-L66 2M	

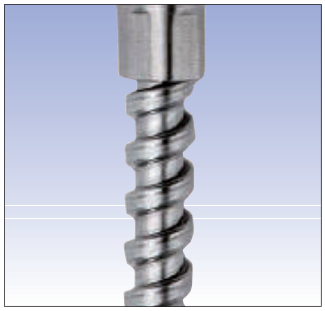
[*1] Short term resistance. For continuous operation –40°C to 90°C

Specifications

Item		–40°C to 150°C	–40°C to 100°C	–40°C to 150°C		–40°C to 200°C		–40°C to 300°C		–60°C to 350°C	–40°C to 400°C
		E32-E_51	E32-D51R/ T51R	E32-T54	E32-A09H	E32-_81_	E32-T84_	E32-A09H2	E32-L6_	E32-_61_	E32-D73_
Permissible bending radius (in mm)		R35	R2	R35		R10	R25				
Cut to length		Yes				No					
Material	Head	Brass-nickel plated	Stainless steel		Aluminium	Stainless steel					
	Fiber	PMMA	Acrylate resin	PMMA		Glass					
	Sheath	Fluoro resin	Polyurethane resin	Fluoro resin			Stainless steel spiral coating	Stainless steel tube	Stainless steel spiral coating		Stainless steel tube
Degree of protection		IEC 60529 IP67	IEC 60529 IP50	IEC 60529 IP67					IEC 60529 IP40	IEC 60529 IP67	



The temperature range optimised material selection provides best application fit and value - performance ratio.



Stainless steel spiral coating for flexibility with highest mechanical protection.

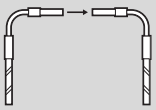
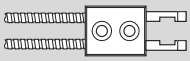
Vacuum resistant fiber sensor heads

For applications in cleanest and hot environments the vacuum resistant fibers and connecting flanges provide long operational lifetime and vacuum integrity.

- Leakage rate of 1×10^{-10} Pa*m^3/s max
- Heat resistance up to 200°C
- Detergent resistant fluororesin or stainless steel fiber sheath

Ordering information

Sensor

Sensor type	Size	Sensing distance (in mm)		Temperature range	Order code
		E3X-SD	E3X-HD		
	M4	200	400	–40°C to 120°C	E32-T51V 1M
	dia 3	130	250	–40°C to 120°C	E32-T54V 1M
	dia 3	500	950	–60°C to 200°C	E32-T84SV 1M
	33 × 18 × 5.5 mm	5		–40°C to 70°C	E32-G86V-1 3M

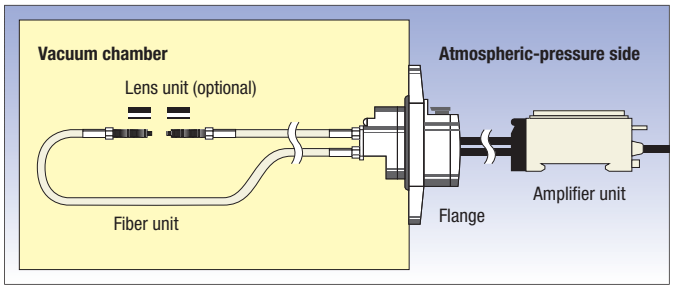
Flange

Type	Size	Order code
4 channel flange	80 × 80 × 49 mm	E32-VF4
1 channel flange	96 × dia 30 mm max.	E32-VF1
Flange-to-amplifier connection fiber	2 m length	E32-T10V 2M

Specifications

Item		Fiber sensor heads				Flange-to-amplifier fiber
		E32-T51V	E32-T54V	E32-T84SV	E32-G86V-1	E32-T10V
Permissible bending radius		R30		R25		
Cut to length		No				Yes
Material	Head	Aluminium	Stainless steel			–
	Fiber	Glass				PMMA
	Sheath	Fluororesin coating		Stainless steel spiral coating		Polyethylene coating
Degree of protection		–				

Item		Flange	
		E32-VF1	E32-VF4
Leakage rate		1×10^{-10} Pa*m³/s max	
Ambient temperature		–25°C to 55°C	
Material	Flange	Aluminium and stainless steel	Aluminium
	Seal	Fluorocarbon rubber (viton)	



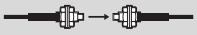
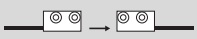
The vacuum resistant fiber heads and flanges are sealed to prevent gas leakage into vacuum areas

Robot application fiber sensor heads

For applications on frequently or fast moving parts, the robot fibers reduce the risk of fiber breakage with a guaranteed operational life of more than 1 million bending cycles

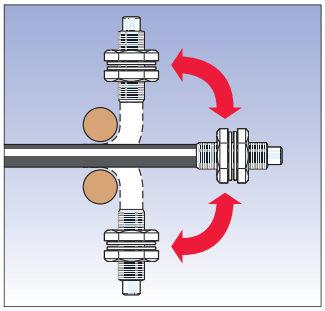
- Free moving multicore fibers for > 1 mio bending cycles
- Square shapes for easy surface installation
- Cylindrical sizes from dia 1.5 mm to M6

Ordering information

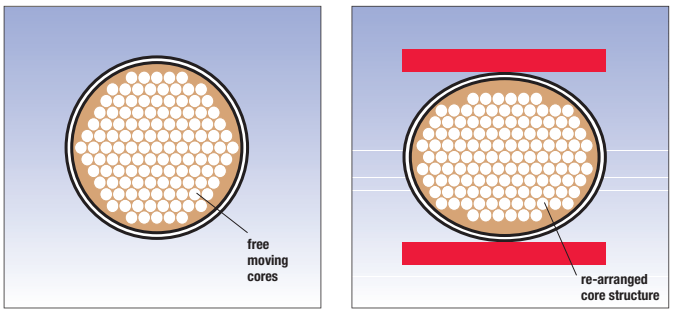
Sensor type	Size	Sensing distance (in mm)		Order code
		E3X-SD	E3X-HD	
	M4	720	1350	E32-T11 2M
	M3	200	400	E32-T21 2M
	dia 3 mm	720	1350	E32-T12B
	dia 2 mm	200	400	E32-T221B
	dia 1.5 mm	200	400	E32-T22B
	15 × 18 × 3 mm	720	1350	E32-T15XB 2M
	M6	180	350	E32-D11 2M
	M4	70	140	E32-D21B 2M
	M3	30	60	E32-D21 2M
	dia 1.5 mm	30	60	E32-D22B 2M
	15 × 10 × 3 mm	180	350	E32-D15XB 2M

Specifications

Item		Square	Cylindrical			
		E32-D15XB E32-T15XB	E32-T21	E32-D11 E32-T11	E32-D21 E32-T12B E32-T22B	E32-D21B E32-D22B E32-T221B
Permissible bending radius		R4				
Cut to length		Yes				
Ambient temperature		–40°C to 70°C				
Material	Head	Aluminium	Brass-nickel plated			Stainless steel
	Fiber	PMMA				
	Sheath	PVC coating	Polyethylene coating	PVC coating		
Degree of protection		IEC 60529 IP67				



Guaranteed more than 1 mio bending operations



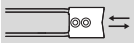
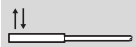
Free moving fiber cores prevent fiber breakage and light intensity loss when the fiber is bent.

Precision detection fiber sensor heads

Highest precision in design and manufacturing of the fibers and focal lenses ensure highest beam and spot accuracy allowing the detection of smallest objects and height differences of less than 100 µm.

- Coaxial fibers with focal lenses for spot diamters of 100 µm
- Through-beam models with highly focused beam and precise optical axis alignment
- Limited reflective models for height difference detection of less than 100 µm

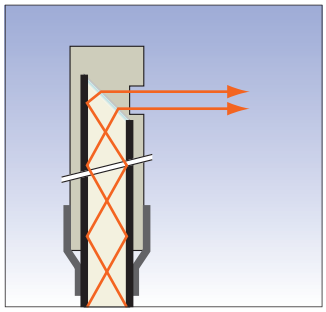
Ordering information

Sensor type	Preferred usage	Size	Key feature	Sensing distance (in mm)		Order code
				E3X-SD	E3X-HD	
	Precise thin object detection / accurate positioning	dia 3 mm	- High precision optical axis adjustment - Very focused beam	2000	3800	E32-T22S
				890	1780	E32-A03 2M
		dia 2 mm		340	680	E32-A04 2M
	Very small object detection	M6	–	300	600	E32-CC200 2M*1
		M3	Spot dia 0.5 mm	100	120	E32-EC31 2M
			Spot dia 0.2 mm	17		E32-EC41 1M + E39-F3B
			Spot dia 0.1 mm	7		E32-EC41 1M + E39-F3A-5
		dia 3 mm	–	160	300	E32-D32L
		dia 2 mm	–	80	150	E32-D32 2M*1
		M6	- 90° cable exit - Hexagonal back	170	350	E32-C11N 2M
		M3		25	50	E32-C31N 2M
			Spot dia 0.5 to 3mm	8 - 25 adjustable		E32-EC31 2M + E39-EF51
		dia 2 mm*2	Spot dia 0.5 to 1 mm	6 - 15 adjustable		E32-D32 2M + E39-F3A
			Spot dia 0.1 to 0.6 mm	6 - 15 adjustable		E32-C42 1M + E39-F3A
	Precision height difference detection / flat surface detection Object detection in front of background	23 × 20 × 9 mm	–	26.5±11.5		E32-A09 2M
		16 × 18 × 4 mm	–	7.2±1.8		E32-L25L*1
		20 × 20 × 5 mm	–	3.3		E32-L25
		18 × 20 × 4 mm	Precise spot e.g. for detection of a flat / reflective surface	4±2		E32-L24L*1
		34 × 25 × 8 mm	High precision (detection accuracy 100 µm)	2.4		E32-EL24-1 2M
		20.5 × 14 × 3.8 mm	Limited reflective wide beam e.g. for object detection on a flat surface	15		E32-L16-N 2M

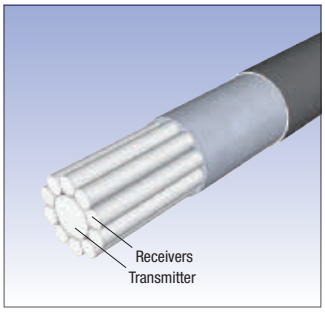
*1 A high flex cable version is available. Add 'R' to the order code, e.g. E32-CC200R
*2 Outer diameter of the fiber. Outer diameter of the focal lens is dia 4mm (front part)

Specifications

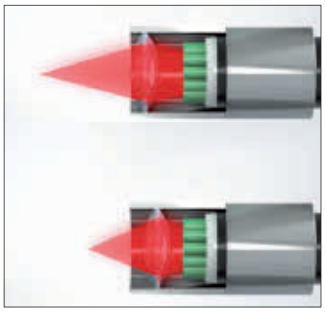
Item		Through-beam			Diffuse reflective (coaxial)			Limited reflective				
		E32-T22S	E32-A03	E32-A04	E32-C11N E32-C31N	E32-CC200	E32-C42 E32-D32/-D32L E32-EC31/-EC41	E32-EL24-1	E32-L24L E32-L25L	E32-L25	E32-L16	E32-A09
Permissable bending radius		R10	R1	R10	R4	R25		R10		R25		
Cut to length		Yes										
Ambient temperature		–40°C to 70°C										
Material	Head	Brass-nickel plated		Stainless steel	Brass-nickel plated		Brass nickel plated	Brass-nickel plated and aluminium	Polycarbonate	ABS		Aluminium
	Fiber	PMMA										
	Sheath	PVC coating	Polyethylene coating		PVC coating	PVC, polyethylene and polyolefin coating		Polyethylene coating				
Degree of protection		IEC 60529 IP67	IEC 60529 IP50		IEC 60529 IP67			IEC 60529 IP50		IEC 60529 IP40		

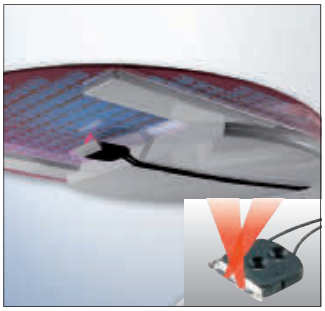


Focused and high precision beam alignment during manufacturing. Models available with typical deviation of 0.1° for very precise detections



Coaxial fibers provide an enhanced positioning and detection accuracy and allow the easy adjustment of the focal point using adjustable focal lenses





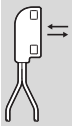
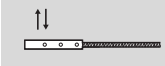
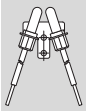
Limited reflective fibers utilize the total reflection on shiny surfaces to detect height differences or objects at a pre-defined distance.

Special application fiber sensor heads

For a wide range of special applications, the task optimised fiber heads provide best fitting sensing performance and adaption to environmental requirements.

- Detection of special objects (liquids, labels on foils, etc.)
- Fiber heads optimised for special tasks (wafer mapping, flat glass, etc.)

Ordering information

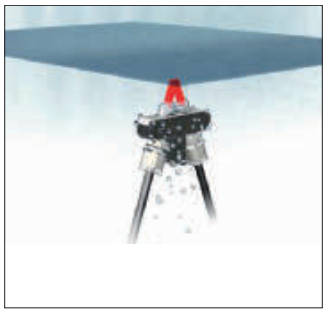
Sensor type		Size	Sensing distance (in mm)		Comment	Order code
			E3X-SD	E3X-HD		
	Fork shape	36 × 24 × 8 mm	10		–	E32-G14
	Wafer mapping	dia 3 mm	2000	3800	–	E32-T22S
		dia 3 mm	1400	2600	–	E32-T24S
		dia 3 mm	890	1780	–	E32-A03 2M
		dia 2 mm	340	680	–	E32-A04 2M
	Liquid level sensor	dia 6 mm	liquid contact		Liquid level contact	E32-D82F1 4M
		15 × 23.5 × 5 mm	tube contact		Liquid level detection through transparent tube or container	E32-D36T 2M
	Glass detection	21 × 16.5 × 4 mm	8		Metal housing	E32-A10 2M
		20.5 × 14 × 3.8 mm	15		Plastic housing	E32-L16-N 2M
	Glass detection in hot environment	25 × 18 × 5 mm	1–5		Heat resistant up to 300°C	E32-L64 2M
		36 × 18 × 5.5 mm	5–18			E32-L66 2M
	Glass detection in wet processes	38.5 × 39 × 17.5 mm	8 to 20 (recommended: 11)		- Heat resistant up to 85°C - Recommended usage with 'tough mode' of E3X-DA-S	E32-L11FS 2M
	Label detection	20 × 20 × 5 mm	7.2±1.8		–	E32-L25L
		18 × 20 × 4 mm	4±2		–	E32-L24L
		34 × 25 × 8 mm	2.4		Very precise spot (detection accuracy 100 µm)	E32-EL24-1 2M

E32 Special application

Specifications

Item		E32-D82F1 E32-L11FS	E32-G14	E32-A10	E32-L16-N	E32-L66	E32-L64	
Permissable bending radius		R40	R25					
Cut to length		Yes				No		
Ambient temperature		–40°C to 70°C				–40°C to 300°C		
Material	Head	PFA	ABS	ABS	PVC	Stainless steel		
	Fiber	PMMA				Glass		
	Sheath	Polyethylene coating				Stainless steel spiral coating		
Degree of protection		IEC 60529 IP67		IEC 60529 IP30	IEC 60529 IP40	IEC 60529 IP40	IEC 60529 IP50	

Item		E32-EL24-1	E32-T24S	E32-L24L E32-L25L	E32-A04	E32-D36T	E32-A03	E32-T22S
Permissable bending radius		R10				R4	R1	
Cut to length		Yes						
Ambient temperature		–40°C to 70°C						
Material	Head	Brass-nickel plated and aluminium	Stainless steel	Brass-nickel plated	Stainless steel	ABS	Brass-nickel plated	
	Fiber	PMMA						
	Sheath	Polyethylene coating	PVC coating	Polyethylene coating		PVC coating	Polyethylene coating	PVC coating
Degree of protection		IEC 60529 IP67		IEC 60529 IP50		IEC 60529 IP67	IEC 60529 IP50	IEC 60529 IP67



The limited reflective fiber heads for glass detection provide a stable detection of flat glass in standard, hot or wet environment. The shapes and materials are optimized to provide the best value - performance ratio depending on the requirements.

For the detection of very small height differences like labels on foils in applications where space is crucial, the small sized limited reflective sensors provide accurate detection up to 100µm resolution.

Easy-teach digital fiber amplifier

The E3X-HD with 1-button Smart tune set-up provides fast and simple teaching. Dual digital display and advanced features make the E3X-HD ideal even for demanding applications.

- Easy teaching by Smart tuning within a few seconds
- Dynamic Power Control (DPC) for highest operational stability for changing environmental conditions or challenging objects
- M8 connector models
- EtherCAT and CompoNet Communication units for high-speed field bus connectivity

Ordering information

Item	Order code		
	Transistor output models		Communication unit model*1
	NPN output	PNP output	
Pre-wired	E3X-HD11 2M	E3X-HD41 2M	–
Fiber amplifier connector	E3X-HD6	E3X-HD8	E3X-HD0
M8 connector (4pin)	E3X-HD14	E3X-HD44	–

*1 For field bus connection please chose Communication unit E3X-ECT for EtherCAT or E3X-CRT for CompoNet.

Fiber amplifier connectors

Shape	Type	Comment	Order code
	Fiber amplifier connector	2 m PVC cable	E3X-CN11
		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

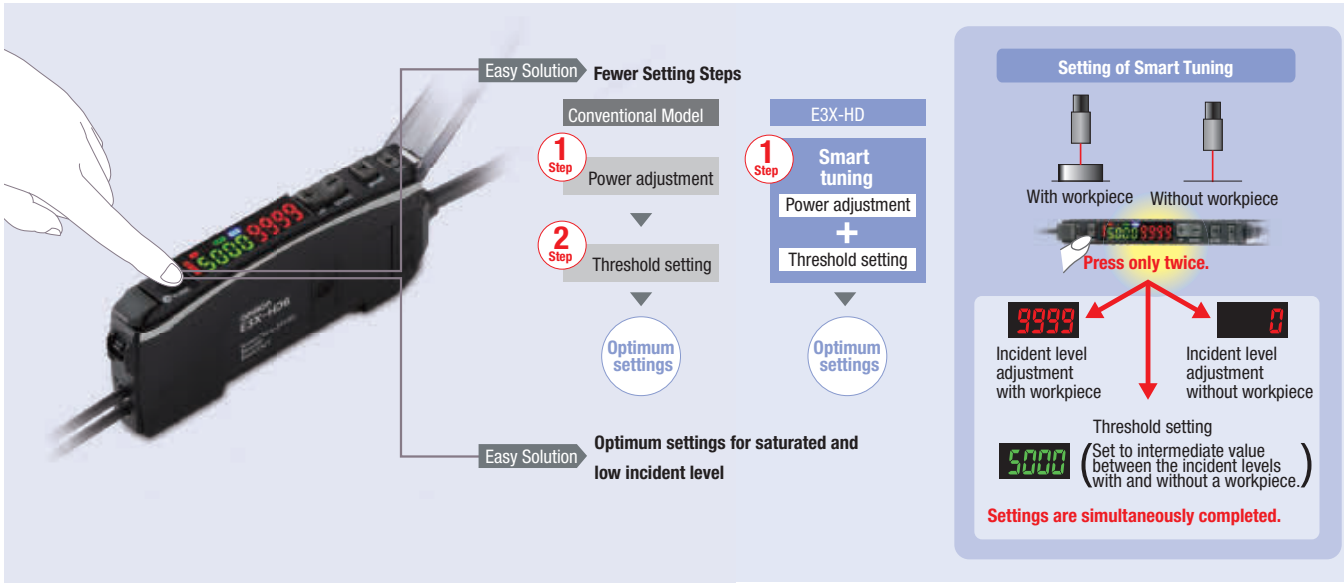
Communication units

Shape	Communications method	Applicable Fiber Amplifier Units	Order code
	CompoNet	E3X-HD0 E3X-MDA0 E3X-DA0-S	E3X-CRT
	EtherCAT		E3X-ECT

Specifications

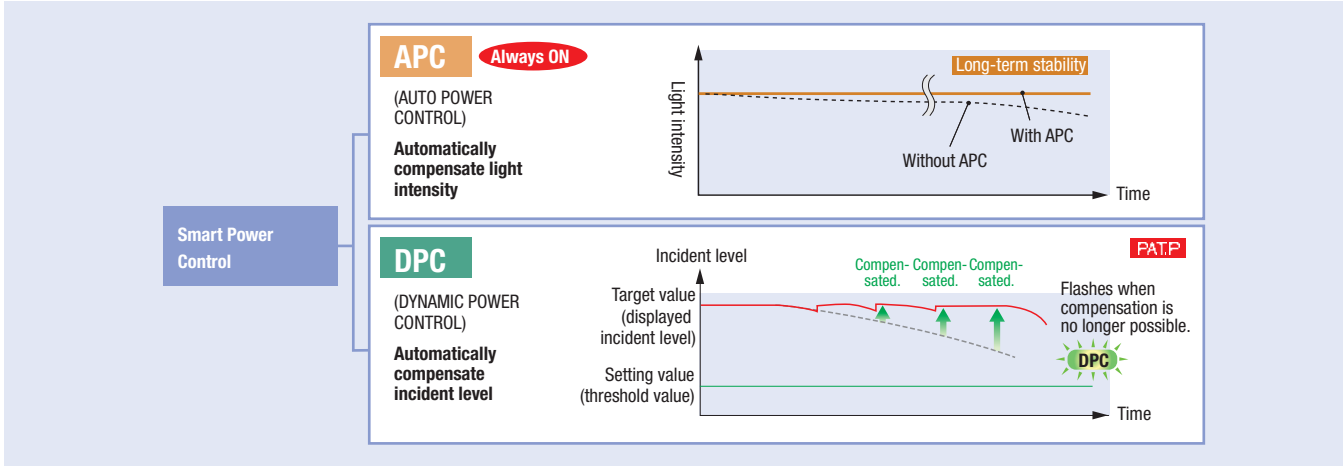
Item								
	Type	Standard models						For Communications Unit
	Model	E3X-HD11	E3X-HD41	E3X-HD6	E3X-HD8	E3X-HD14	E3X-HD44	E3X-HD0
	Connection method	Pre-wired		Wire-saving connector		M8-4pin connector		Communications unit connector
	Control output	NPN output	PNP output	NPN output	PNP output	NPN output	PNP output	–
Light source (wavelength)		Red, 4-element LED (625 nm)						
Power supply voltage		12 to 24 VDC±10%, ripple (p-p) 10% max.						
Power consumption		Normal Mode: 720 mW max. (Current consumption: 30 mA max. at 24 VDC, 60 mA max. at 12 VDC.) Power Saving Eco Mode: 530 mW max. (Current consumption: 22 mA max. at 24 VDC, 44 mA max. at 12 VDC.)						
Control output		Load power supply voltage: 26.4 VDC max., open-collector output (Varies with the model depending on output is PNP or NPN.)Load current: 50 mA max. (residual voltage: 2 V max.), OFF current: 0.5 mA max.						–
Response time	Super-high-speed Mode (SHS)	Operate or reset: 50 µs (NPN models) or 55 µs (PNP models)						
	High-speed Mode (HS)	Operate or reset: 250 µs						
	Standard Mode (STND)	Operate or reset: 1 ms						
	Giga-power Mode (GIGA)	Operate or reset: 1 ms						
Mutual interference prevention		Possible for up to 10 units						
Maximum connectable Units		16 units						with E3X-CRT: 16 units with E3X-ECT: 30 units

Easy One-Button-Teaching/Smart Tuning



Easy setting of optimum power and threshold by pushing tune button twice.

Smart power control



Enhanced signal stability control for compensating power reductions caused by temperature drift, dust or aging of LED.

Field bus connectivity

Field bus communication allows control by an external device to simplify setup and reduce wiring effort.

Single display digital fiber amplifier

E3X-SD allows easy one button setting and provide the best value performance ratio for standard applications.

- Auto-teaching during machine operation
- 2-point teaching within a few seconds
- Simple threshold adjustment with up/down keys

Ordering information

Item	Order code	
	NPN output	PNP output
Pre-wired	E3X-SD21 2M	E3X-SD51 2M
Fiber amplifier connector*1	E3X-SD7	E3X-SD9

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

Fiber amplifier connectors

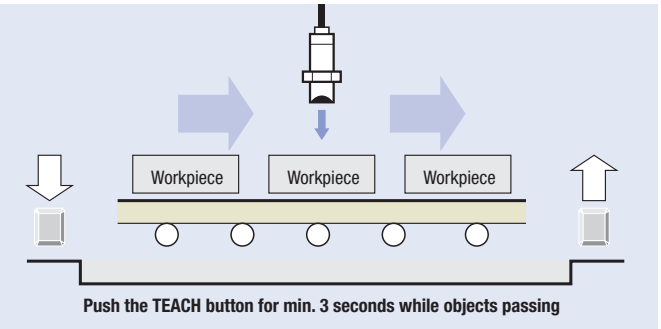
Shape	Type	Comment	Order code
	Fiber amplifier connector	2 m PVC cable	E3X-CN11
		30 cm PVC cable with M12 plug connector (4 pin)	E3X-CN21-M1J 0.3M
		30 cm PVC cable with M8 plug connector (4 pin)	E3X-CN21-M3J-2 0.3M

Specifications

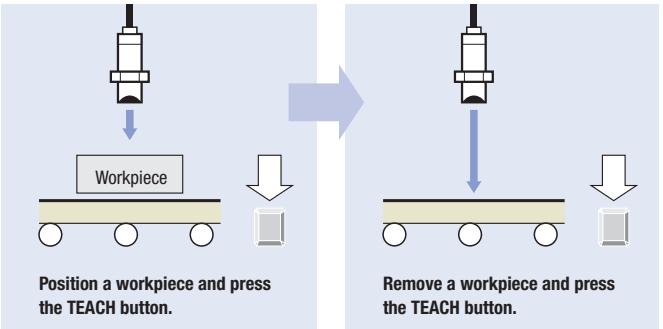
Item		E3X-SD
Light source (wave length)		Red, 4-element LED (625 nm)
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p): 10% max.
Protective circuits		Power supply reverse polarity protection, output short-circuit protection, mutual interference prevention
Response time		Operation or reset: 200 µs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

Easy operation by ergonomic buttons

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

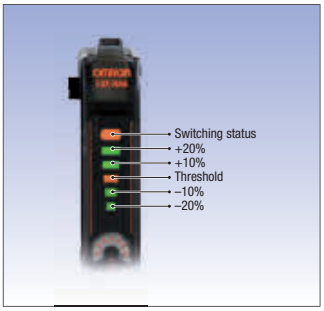
*1 Order connector separately.

Fiber amplifier connectors

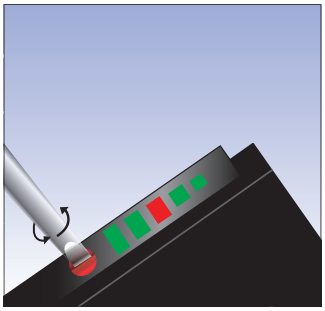
Shape	Type	Comment	Order code
	Fiber amplifier connector	2 m PVC cable	E3X-CN21
		30 cm PVC cable with M12 plug connector (4 pin)	E3X-CN21-M1J 0.3M
		30 cm PVC cable with M8 plug connector (4 pin)	E3X-CN21-M3J-2 0.3M

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

High-performance digital fiber amplifier

The E3NX-FA amplifier is best choice for most challenging fiber applications in terms of long sensing distance, minute object detection or high speed processes.

- Easy teaching by Smart tuning within a few seconds
- New N-Smart technology provides significant improvement for sensing distance, minimum object detection and speed
- Easy and transparent information about sensor status by Solution Viewer and Change Finder function
- EtherCAT Communication unit for high-speed field bus connectivity

Ordering information

Item	Connection	Inputs/Outputs	Order code	
			NPN output	PNP output
Standard models	Pre-wired	1 output	E3NX-FA11 2M	E3NX-FA41 2M
	Fiber amplifier connector		E3NX-FA6	E3NX-FA8
Advanced models	Pre-wired	2 outputs + 1 input	E3NX-FA21 2M	E3NX-FA51 2M
	Fiber amplifier connector	1 output + 1 input	E3NX-FA7	E3NX-FA9
		2 outputs	E3NX-FA7TW	E3NX-FA9TW
	M8 connector	1 output + 1 input	E3NX-FA24	E3NX-FA54
		2 output	–	E3NX-FA54TW
Networking model*1	Connector for communication unit	via com. protocol	E3NX-FA0	

*1 For field bus connection please chose communication unit E3NW-ECT for EtherCAT.

Fiber amplifier connectors

Shape	Type	Comment	Order code
	Fiber amplifier connector	2 m PVC cable (4 pin)	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

Communication units

Shape	Communications method	Applicable Amplifier Units	Order code
	Sensor communication unit for EtherCAT	E3NX-FA0 E3NC-LA0 E3NC-SA0	E3NW-ECT
	Sensor dispersion (slave) unit		E3NW-DS

Specifications

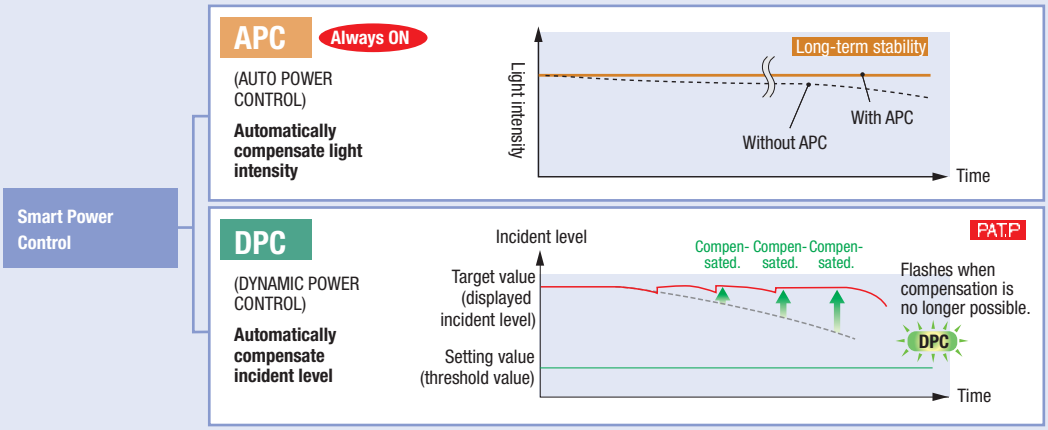
Item									
	Type	Standard models		Advanced models					Model for sensor communications unit
	NPN output	E3NX-FA11	E3NX-FA6	E3NX-FA21	E3NX-FA7	E3NX-FA7TW	E3NX-FA24	–	E3NX-FA0
	PNP output	E3NX-FA41	E3NX-FA8	E3NX-FA51	E3NX-FA9	E3NX-FA9TW	E3NX-FA54	E3NX-FA54TW	
	Connection method	Pre-wired	Wire-saving connector	Pre-wired	Wire-saving connector		M8 connector		Connector for sensor communications unit
Inputs/ outputs	Outputs	1 output		2 outputs	1 output	2 outputs	1 output	2 outputs	via com. protocol
	External inputs	–		1 input	1 input	–	1 input	–	–
Light source (wavelength)		Red, 4-element LED (625 nm)							
Power supply voltage		10 to 30 VDC, including 10% ripple (p-p)							
Power consumption		At power supply voltage of 24 VDC Standard model or model for sensor communications unit: Normal mode: 960 mW max. (current consumption: 40 mA max.), Power saving eco mode: 840 mW max. (current consumption: 35 mA max.) Advanced model: Normal mode: 1,080 mW max. (current consumption: 45 mA max.), Power saving eco mode: 930 mW max. (current consumption: 40 mA max.)							
Control output		Load power supply voltage: 30 VDC max., open-collector output Load current: groups of 1 to 3 amplifires: 100 mA max., groups of 4 to 30 amplifires: 20 mA max. Residual voltage: at load current of less than 10 mA: 1 V max. at load current of 10 to 100 mA: 2 V max. OFF current: 0.1 mA max.							–
Response time	Super-high-speed Mode (SHS)*1	Operate or reset for model with 1 output: 30 µs, with 2 outputs: 32 µs							
	High-speed Mode (HS)	Operate or reset: 250 µs							
	Standard Mode (Stnd)	Operate or reset: 1 ms							
	Giga-power Mode (GIGA)	Operate or reset: 16 ms							
No. of units for mutual interference prevention	Super-high-speed Mode (SHS)*1	0							
	High-speed Mode (HS)	10							
	Standard Mode (Stnd)	10							
	Giga-power Mode (GIGA)	10							
Functions		Auto power control (APC), dynamic power control (DPC), timer, zero reset, resetting settings, eco mode, bank switching, power tuning, and hysteresis width							
Maximum connectable units		30							

*1 The mutual interference prevention function is disabled if the detection mode is set to super-high-speed mode.

Easy One-Button-Teaching/Smart Tuning

Easy setting of optimum power and threshold by pushing tune button twice.

Smart power control



Enhanced signal stability control for compensating power reductions caused by temperature drift, dust or aging of LED. Alarm output added for predictive maintenance.

N-Smart platform

The N-Smart platform provides wide portfolio of advanced sensors – all with the same intuitive operation concept and field bus connectivity.

2-in-1 Digital fiber amplifier

E3X-MDA incorporates 2 digital fiber amplifiers in one slimline housing. For applications requiring the detection of two objects simultanously the E3X-MDA provides an easy to use operation saving space and set-up time.

- Two digital amplifiers in one slimline housing
- Twin output models – on/off or area (between two threshold values)
- Signal comparison functions (AND, OR, etc.)

Ordering information

Item	Functions	Order code	
		NPN output	PNP output
Pre-wired	AND/OR output	E3X-MDA11	E3X-MDA41
Fiber amplifier connector*1	AND/OR output	E3X-MDA6	E3X-MDA8

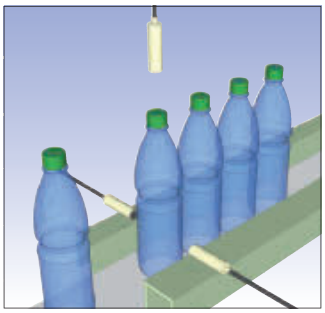
*1 Order connector separately.

Fiber amplifier connectors

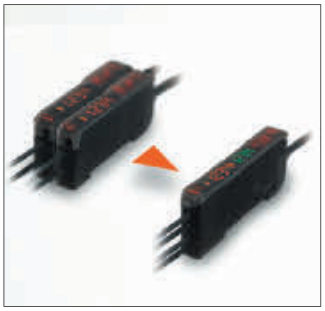
Shape	Type	Comment	Order code
	Fiber amplifier connector	2 m PVC cable	E3X-CN21
		30 cm PVC cable with M12 plug connector (4 pin)	E3X-CN21-M1J 0.3M
		30 cm PVC cable with M8 plug connector (4 pin)	E3X-CN21-M3J-2 0.3M

Specifications

Item		E3X-MDA
Light source (wave length)		Red LED (650 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	Super-high-speed mode	130 µs for operation and reset respectively
	Standard mode	1 ms for operation and reset respectively
	High-resolution mode	4 ms for operation and reset respectively
Sensitivity setting		Teaching and digital up/down keys
Functions	Power tuning	Light emission power and reception gain, digital control method
	Timer function	Select from OFF-delay, ON-delay, or one-shot timer. 1 ms to 5 s (1 to 20 ms set in 1-ms increments, 20 to 200 ms set in 10-ms increments, 200 ms to 1 s set in 100-ms increments, and 1 to 5 s set in 1 s-increments)
	I/O settings	Output setting (select from channel 2 output, AND, OR, leading edge sync, falling edge sync, or differential output)
Digital displays		Select from the following: Incident level for channel 1 + incident level for channel 2, Incident level + threshold, incident level percentage + threshold, incident light peak level + no incident light bottom level, minimum incident light peak level + maximum no incident light bottom level, long bar display, incident level + peak hold, incident level + channel
Degree of protection		IEC 60529 IP50 (with protective cover attached)



The AND and OR functionality for the two fiber channels allows simple signal processing without the need for a PLC.
This allows the addition of sensor checks to machines without reprogramming the PLC.



The 2 in 1 amplifier replaces two standard amplifiers reducing space requirements and hardware cost.

Fast response digital amplifier with potentiometer

The E3X-NA_F provides a very fast response time and is the ideal amplifier for high speed detection applications.

- Short turn on time of only 20 µs
- Easy adjustment with potentiometer

Ordering information

Item	Order code	
	NPN output	PNP output
Pre-wired	E3X-NA11F	E3X-NA41F
M8 connector (4 pin)	-*1	E3X-NA44FV

*1 Contact your OMRON representative

Specifications

Item			
	NPN output	E3X-NA11F	-
	PNP output	E3X-NA41F	E3X-NA44FV
Light source (wave length)		Red LED (680 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: 20 µs max. Reset: 30 µs max.	
Sensitivity adjustment		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)

Note: For teachable fast response fiber amplifiers with a digital display contact your OMRON representative.

Digital fiber amplifier with infrared LED

The digital fiber amplifiers with infrared LED are ideal for water detection applications or where visible light is not desired.

- Infrared LED
- LED power control and signal processing function

Ordering information

Pre-wired

Item	Order code (for pre-wired types with 2 m cable length)	
	NPN output	PNP output
Infrared light	E3X-DAH11-S 2M	E3X-DAH41-S 2M

Connector version

Item	Order code	
	NPN output	PNP output
Infrared light (fiber amplifier connector)*1	E3X-DAH6-S	E3X-DAH8-S

*1 Order connector separately

Fiber amplifier connectors

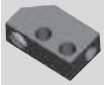
Shape	Type	Comment	Order code
	Fiber amplifier connector	2 m PVC cable	E3X-CN21
		30 cm PVC cable with M12 plug connector (4 pin)	E3X-CN21-M1J 0.3M
		30 cm PVC cable with M8 plug connector (4 pin)	E3X-CN21-M3J-2 0.3M

Specifications

Amplifier units with cables

Item			
		NPN output	E3X-DAH11-S, E3X-DAH6-S
		PNP output	E3X-DAH41-S, E3X-DAH8-S
Light source (wave length)			Infrared LED
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
Responce time	Super-high-speed mode	NPN	48 µs for operation and 50 µs for reset
		PNP	53 µs for operation and 55 µs for reset
	Standard mode		1 ms for operation and reset respectively
	High-resolution mode		4 ms for operation and reset respectively
Sensitivity setting			Teaching and digital up/down keys
Functions	Power tuning		Light emission power and reception gain, digital control method
	Timer function		Select from OFF-delay, ON-delay, or one-shot timer. 1 ms to 5 s (1 to 20 ms set in 1-ms increments, 20 to 200 ms set in 10-ms increments, 200 ms to 1 s set in 100-ms increments, and 1 to 5 s set in 1 s-increments)
Digital displays			Incident level + threshold or user specific
Degree of protection			IEC 60529 IP50 (with protective cover attached)

Accessories

Shape	Type	Comment	Order code
	Focal lens	- Extends sensing distance by more than 500% - For M4 Through beam fibers E32-TC200, E32-ET11R, E32-T11 (fits M2.6 thread) - 2 pcs per set	E39-F1
	Focal lens (side view)	- For M4 through beam fibers E32-TC200, E32-ET11R, E32-T11, E32-T61-S, E32-T81R-S (fits M2.6 thread) - Temperature range -40°C to +200°C - 2 pcs per set	E39-F2
	Focal lens (variable)	- For precision detection with E32-D32, E32-EC41	E39-F3A
	Focal lens	- For precision detection with E32-EC41	E39-F3A-5
		- For precision detection with E32-EC41	E39-F3B
		- For precision detection with M6 coaxial diffuse reflective fibers (e.g. E32-CC200)	E39-F18
	Focal lens (side view, variable)	- For precision detection with E32-EC31	E39-EF51
	Focal lens (heat resistant)	- Extends sensing distance by more than 500% - For M4 through beam fibers E32-ET51, E32-T61, E32-T61-S, E32-T81R, E32-T81R-S (fits M4 thread) - Temperature range -60°C to +350°C - 2 pcs per set	E39-EF1-37-2 E39-F16
	Focal lens (vacuum resistant, heat resistant)	- Fits E32-T51V and E32-T54V (fits M2.6 thread) - 2 units per set - Heat resistant up to 120°C	E39-F1V
	Fiber cutter	- Included in applicable fiber	E39-F4
	Thin fiber attachment	- Amplifier adapter for thin fibers - Included in applicable fiber (2 sets)	E39-F9
	Sleeve bender	- For E32-TC200B(4) - For E32-TC200F(4) - For E32-DC200F(4)	E39-F11
	Single fiber extension connector	- Fiber extension connector for 2.2 mm dia standard fibers - One unit	E39-F10
	Dual fiber extension connector	- For fibers with dia 2.2	E39-F13
		- For fiber with dia 1.0	E39-F14
		- For fibers with dia between 1.0 and 2.2	E39-F15
	Protective spiral tube *1	- For M3 diffuse type sensors - Length 1 m	E39-F32A
		- For M3 through beam type sensors - Length 1 m	E39-F32B
		- For M4 through beam type sensors - Length 1 m	E39-F32C
		- For M6 diffuse type sensors - Length 1 m	E39-F32D
	Fiber on roll *2	- Dia 2.2 mm - Standard monocore, 10 mm bending radius - -40°C to 80°C	E32-E01 100M
		- Dia 1.1 mm - Standard monocore, 15 mm bending radius - -40°C to 80°C	E32-E02 100M
		- Dia 2.2 mm - High flex multicore, 1 mm bending radius - -40°C to 80°C	E32-E01R 100M
		- Dia 1.1 mm - High flex multicore, 1 mm bending radius - -40°C to 80°C	E32-E02R 100M
		- Dia 2.2 mm - High temperature monocore, 20 mm bending radius - -60°C to 150°C	E32-E05 100M

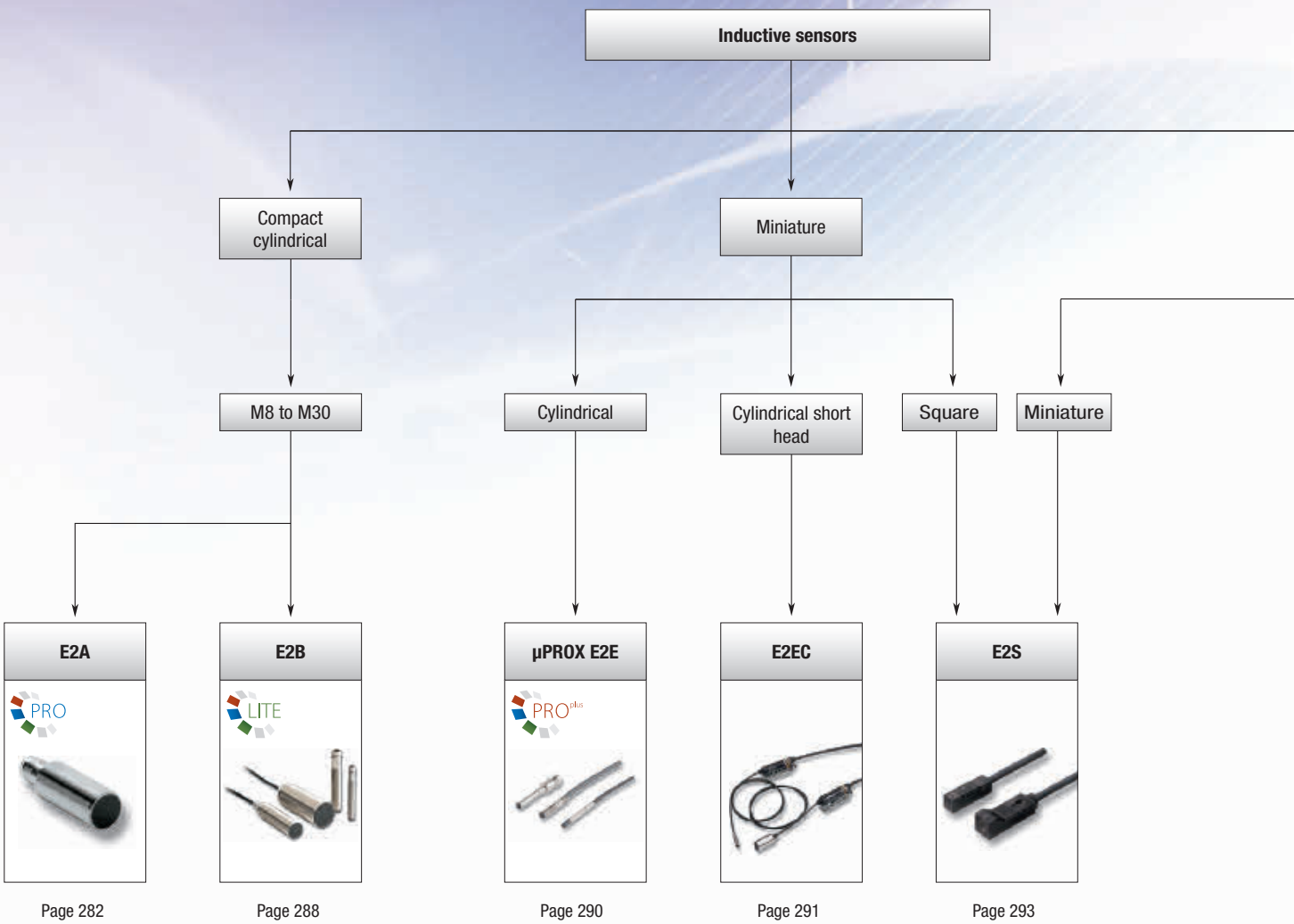
*1 Protective spiral tubes with 0.5 m length are available. Add '5' to order code…e.g. E39-F32A5
*2 Fiber length 100 m on a roll - cut to length

ZERO TOLERANCE ON FAILURE

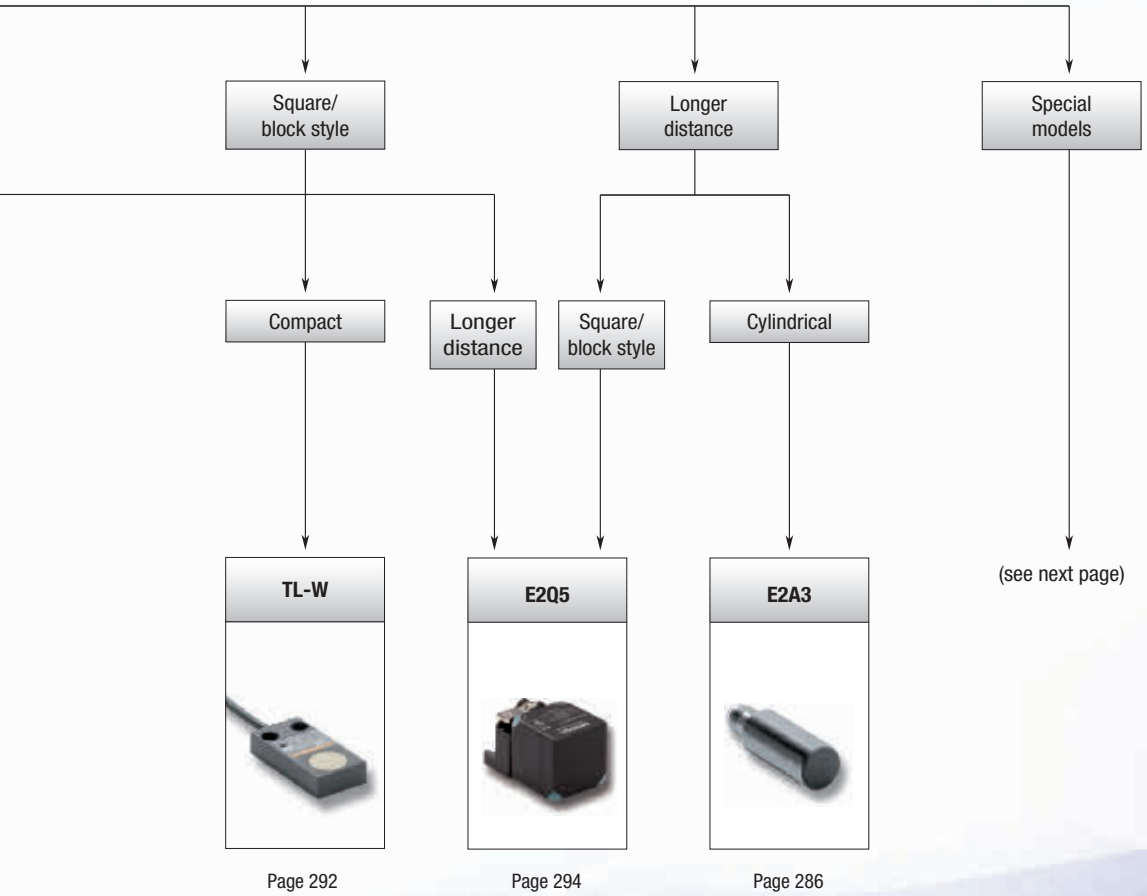
Tested reliability for demanding conditions

Our inductive sensors are designed and tested to ensure a long service life and to achieve maximum machine availability even in the harshest environments.
This trusted reliability makes the E2A one of the world's most popular and successful inductive proximity sensors with more than one million units sold every year.

- Wide portfolio and application range
- Highest reliability even in demanding environments
- Designed for flexibility - modular housing design for best performance fit



Page 282 Page 288 Page 290 Page 291 Page 293


Square/ block style
Longer distance
Special models
Compact
Longer distance
Square/ block style
Cylindrical
TL-W
E2Q5
E2A3
(see next page)
Page 292
Page 294
Page 286

Selection table

		Cylindrical				
						
Model		**E2A**	**E2A DC 2-wire/4-wire**	**E2A3**	**E2A-S**	**E2B**
361° product line		PRO	PRO	PRO^{plus}	PRO	LITE
Type		Compact	Compact	Long distance	Compact	Compact
Material		Brass, SUS	Brass, SUS	Brass	Stainless steel	Stainless steel
Max. sensing distance	**dia 3**	–	–	–	–	–
	dia 4	–	–	–	–	–
	M5	–	–	–	–	–
	dia 6.5	–	–	–	–	–
	M8	2/4 mm	2/4 mm	3mm / –	2/4 mm	2/4 mm
	M12	4/8 mm	4/8 mm	6mm / –	4/8 mm	4/8 mm
	M18	8/16 mm	8/16 mm	11mm / –	8/16 mm	8/16 mm
	M30	15/30 mm	15/30 mm	20mm / –	15/20 mm	15/30 mm
	19 × 6 × 6	–	–	–	–	–
	22 × 8 × 6	–	–	–	–	–
	31 × 18 × 10	–	–	–	–	–
	53 × 40 × 23	–	–	–	–	–
	67 × 40 × 40	–	–	–	–	–
Mount.	**Shielded**	■	■	■	■	■
	Non-shielded	■	■	–	■	■
Oper. mode	**NO**	■	■	■	■	■
	NC	■	■	■	■	■
	NO + NC	–	■	–	–	–
Wiring	**DC 2-wire**	–	■	–	–	–
	DC 3-wire	■	–	■	■	■
	DC 4-wire	–	■	–	–	–
	AC 2-wire	–	□	–	–	–
Voltage	**10 to 30 VDC**	■	■	■	■	■
	12 to 240 VAC	–	□	–	–	–
IP rating	**IP67**	■	■	■	■	■
	IP69K	■	■	■	■	–
	Page	282	284	286	285	288

Special models

Type	**Vehicle usage certified**	**Detergent and heat resistant**	**Chemical resistant**	**Small diameter**	
					
Model	**E2AU**	**E2EH**	**E2FQ**	**µPROX E2E**	**E2EC**
361° product line	PRO^{plus}	PRO^{plus}	PRO^{plus}	PRO^{plus}	PRO^{plus}
Key features	• e1 type approval (according to automotive directive 2005/83/EC) • E1 (according to vehicle regulation ECE-R10)	• stainless steel housing • 120°C heat resistance	• PTFE housing	• High frequency of 5 kHz: suitable for high-speed counting • All sizes are also available as non-shielded types	• Small diameter housing with short body length
dia 3	–	–	–	0.8 to 2 mm	0.6 mm
dia 4				1.2 to 3 mm	–
dia 6.5	–	–	–	2 to 4 mm	–
M5				1.2 to 3 mm	–
M8	–	–	–	–	–
M12	■	■	■	–	2 mm
M18	■	■	■	–	7 mm
M30	■	■	■	–	–
Page	297	295	296	290	291

Format		Square		
				
Model		TL-W	E2S	E2Q5
Type		Compact	Miniature	Long distance
Material		ABS	Polyarylate	PBT
Max. sensing distance	dia 3	–	–	–
	dia 4	–	–	–
	M5	–	–	–
	dia 5.4	–	–	–
	M8	–	–	–
	M12	–	–	–
	M18	–	–	–
	M30	–	–	–
	19 × 6 × 6	–	1.6 mm	–
	22 × 8 × 6	3 mm	2.5 mm	–
	31 × 18 × 10	5 mm	–	–
	53 × 40 × 23	20 mm	–	–
	67 × 40 × 40	–	–	40 mm
Mount.	Shielded	■	–	■
	Non-shielded	■	■	■
Oper. mode	NO	■	■	■
	NC	■	■	–
	NO + NC	–	–	■
Wiring	DC 2-wire	■	■	–
	DC 3-wire	■	■	■
	DC 4-wire	–	–	■
	AC 2-wire	–	–	–
Voltage	10 to 30 VDC	■	■	■
	12 to 240 VAC	–	–	–
IP rating	IP67	■	■	■
	IP69K	–	–	■
	Page	292	293	294

Special models

Type		Full metal face	Oil resistant	High precision positioning
				
Model		E2FM	E2E	E2C-EDA
361° product line		PRO^{plus}	PRO^{plus}	PRO^{plus}
Key features		• immune to aluminium and cast iron chips on sensing surface • oil resistant	• tested oil resistance on commonly used lubricants	• distance teaching up to µm accuracy
	dia 3	–	–	■
	dia 4	–	–	–
	dia 6.5	–	–	–
	M5	–	–	–
	M8	■	■	–
	M12	■	■	■
	M18	■	■	■
	M30	■	■	–
	Page	299	298	301

■ Standard ☐ Available – No/not available

Extended sensing range inductive sensor in cylindrical brass housing

The high quality and the long-life design of the E2A extended sensing distance provide high operational reliability, accurate performance and long sensor lifetime for a wide range of applications.

- Extended (double) sensing distance
- IP67 and IP69k for highest water protection
- DC 3-wire (NO, NC)
- Wide temperature range –40 to 70°C
- 200 mA max load current
- Wide installation and connectivity range through modular concept

Ordering information

Pre-wired

Size			Sensing distance	Thread length (overall length)	Output configuration	Order code (for pre-wired types with 2 m PVC cable)	
						Operation mode NO	Operation mode NC
M8	■	–	2.0 mm	27 (40) mm	PNP*1	E2A-S08KS02-WP-B1 2M*2	E2A-S08KS02-WP-B2 2M*2
	–	■	4.0 mm	21 (40) mm	PNP*1	E2A-S08KN04-WP-B1 2M*2	E2A-S08KN04-WP-B2 2M*2
M12	■	–	4.0 mm	34 (50) mm	PNP*1	E2A-M12KS04-WP-B1 2M	E2A-M12KS04-WP-B2 2M
	–	■	8.0 mm	27 (50) mm	PNP*1	E2A-M12KN08-WP-B1 2M	E2A-M12KN08-WP-B2 2M
M18	■	–	8.0 mm	39 (59) mm	PNP*1	E2A-M18KS08-WP-B1 2M	E2A-M18KS08-WP-B2 2M
	–	■	16.0 mm	29 (59) mm	PNP*1	E2A-M18KN16-WP-B1 2M	E2A-M18KN16-WP-B2 2M
M30	■	–	15.0 mm	44 (64) mm	PNP*1	E2A-M30KS15-WP-B1 2M	E2A-M30KS15-WP-B2 2M
	–	■	20.0 mm*3	29 (64) mm	PNP*1	E2A-M30KN20-WP-B1 2M	E2A-M30KN20-WP-B2 2M

Connector types (M12)

Size			Sensing distance	Thread length (overall length)	Output configuration	Order code (for M12 connector types)	
						Operation mode NO	Operation mode NC
M8	■	–	2.0 mm	27 (43) mm	PNP*1	E2A-S08KS02-M1-B1*2	E2A-S08KS02-M1-B2*2
	–	■	4.0 mm	21 (43) mm	PNP*1	E2A-S08KN04-M1-B1*2	E2A-S08KN04-M1-B2*2
M12	■	–	4.0 mm	24 (48) mm	PNP*1	E2A-M12KS04-M1-B1	E2A-M12KS04-M1-B2
	–	■	8.0 mm	27 (48) mm	PNP*1	E2A-M12KN08-M1-B1	E2A-M12KN08-M1-B2
M18	■	–	8.0 mm	39 (53) mm	PNP*1	E2A-M18KS08-M1-B1	E2A-M18KS08-M1-B2
	–	■	16.0 mm	29 (53) mm	PNP*1	E2A-M18KN16-M1-B1	E2A-M18KN16-M1-B2
M30	■	–	15.0 mm	44 (58) mm	PNP*1	E2A-M30KS15-M1-B1	E2A-M30KS15-M1-B2
	–	■	20.0 mm*3	29 (58) mm	PNP*1	E2A-M30KN20-M1-B1	E2A-M30KN20-M1-B2

*1 NPN models are available. For ordering replace "-B1" or "-B2" by "-C1" or "-C2".
*2 M8 sized housings are only available in stainless steel (SUS 303).
*3 Models with longer sensing distances of 30 mm and 35 mm are available.

Optional features
Refer to complete datasheet or contact your OMRON representative for the below optional features

Sensing module and body
– single sensing distance (ideal for compatibility with previous machine generations)
– Long body (ideal for mounting through thicker constructions)

Connection
– M8 4-pin (for ordering replace -M1 by -M3 e.g. E2A-S08KS02-M3-B1)
– M8 3-pin (for ordering replace -M1 by -M5 e.g. E2A-S08KS02-M5-B1)
– PUR cable
– Pigtails with M8 or M12 plugs

Output
– 400 mA max. load current (ideal for switching higher load currents directly)
– DC 2-wire (ideal for reduced wiring; leakage current can be used to detect cable breakage)
– DC 4-wire (NO+NC output – ideal for reduced stock for spare parts; antivalent signal can be used to detect cable breakage)
(For DC 2-wire and DC 4-wire see also page 284)

Specifications

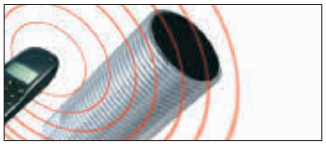
(Exemplary for shielded versions.)

Item		M8	M12	M18	M30
		E2A-S08KS	E2A-M12KS	E2A-M18KS	E2A-M30KS
Sensing distance		2 mm±10%	4 mm±10%	8 mm±10%	15 mm±10%
Response frequency		1,500 Hz	1,000 Hz	500 Hz	250 Hz
Power supply voltage (operating voltage)		12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)			
Protective circuits		Power supply reverse polarity protection, surge suppressor, short-circuit protection	Output reverse polarity protection, power supply reverse polarity protection, surge suppressor, short-circuit protection		
Ambient temperature	Operating	–40 to 70°C			
	Storage	–40 to 85°C (with no icing or condensation)			
Degree of protection		IP67 after IEC 60529; IP69K after DIN 40050 part 9			
Material	Case	Stainless steel	Brass-nickel plated		
	Sensing surface	PBT			

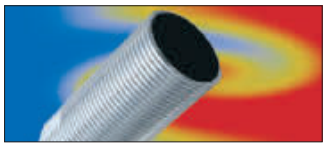
High water resistance

Cable breakage protection

High mechanical resistance



High electro-magnetic noise immunity



High resistance against temperature change

High vibration resistance

DC 2-wire or DC 4-wire inductive sensor in cylindrical brass housing

The performance and operational reliability of the E2A family is also available for DC 2-wire or DC 4-wire output.

- DC 2-wire (ideal for reduced wiring; leakage current can be used to detect cable breakage)
- DC 4-wire (NO+NC output – ideal for reduced stock for spare parts; antivalent signal can be used to detect cable breakage)

Ordering information

Pre-wired

(For different cable materials and lengths, special housing length or special connectors, please refer to complete datasheet.)

Size			Sensing distance	Thread length (overall length)	Order code (for pre-wired types with 2 m PVC cable)	
					DC 2-wire (NO)*1	DC 4-wire (NO+NC-PNP models)*2
M8	■	–	2.0 mm	27 (40) mm	E2A-S08KS02-WP-D1 2M	E2A-S08LS02-WP-B3 2M*3
	–	■	4.0 mm	21 (40) mm	E2A-S08KN04-WP-D1 2M	E2A-S08LN04-WP-B3 2M*3
M12	■	–	4.0 mm	34 (50) mm	E2A-M12KS04-WP-D1 2M	E2A-M12KS04-WP-B3 2M
	–	■	8.0 mm	27 (50) mm	E2A-M12KN08-WP-D1 2M	E2A-M12KN08-WP-B3 2M
M18	■	–	8.0 mm	39 (59) mm	E2A-M18KS08-WP-D1 2M	E2A-M18KS08-WP-B3 2M
	–	■	16.0 mm	29 (59) mm	E2A-M18KN16-WP-D1 2M	E2A-M18KN16-WP-B3 2M
M30	■	–	15.0 mm	44 (64) mm	E2A-M30KS15-WP-D1 2M	E2A-M30KS15-WP-B3 2M
	–	■	20.0 mm	29 (64) mm	E2A-M30KN20-WP-D1 2M	E2A-M30KN20-WP-B3 2M

Connector types (M12)

Size			Sensing distance	Thread length (overall length)	Order code (for M12 connector types)	
					DC 2-wire (NO)*1	DC 4-wire (NO+NC-PNP models)*2
M8	■	–	2.0 mm	27 (43) mm	E2A-S08KS02-M1G-D1	E2A-S08LS02-M3-B3*4
	–	■	4.0 mm	21 (43) mm	E2A-S08KN04-M1G-D1	E2A-S08LN04-M3-B3*4
M12	■	–	4.0 mm	34 (48) mm	E2A-M12KS04-M1G-D1	E2A-M12KS04-M1-B3
	–	■	8.0 mm	27 (48) mm	E2A-M12KN08-M1G-D1	E2A-M12KN08-M1-B3
M18	■	–	8.0 mm	39 (53) mm	E2A-M18KS08-M1G-D1	E2A-M18KS08-M1-B3
	–	■	16.0 mm	29 (53) mm	E2A-M18KN16-M1G-D1	E2A-M18KN16-M1-B3
M30	■	–	15.0 mm	44 (58) mm	E2A-M30KS15-M1G-D1	E2A-M30KS15-M1-B3
	–	■	20.0 mm	29 (58) mm	E2A-M30KN20-M1G-D1	E2A-M30KN20-M1-B3

*1. NC models are available. For ordering replace "-D1" by "-D2".
*2. NPN models are available. For ordering replace "-B3" by "-C3".
*3. Longer housing with thread length 49 mm and overall length 62 mm.
*4. Models with M8 4-pin connector and thread length 49 mm and overall length 61 mm.

Specifications

(Exemplary for shielded versions)

Item		M8	M12	M18	M30
		E2A-S08KS	E2A-M12KS	E2A-M18KS	E2A-M30KS
Sensing distance		2 mm±10%	4 mm±10%	8 mm±10%	15 mm±10%
Response frequency		1,500 Hz	1,000 Hz	500 Hz	250 Hz
Power supply voltage (operating voltage)		12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)			
Protective circuits		Surge suppressor, short-circuit protection (for DC 2-wire; DC 4-wire models have same protective circuits as DC 3-wire models [see page 282])			
Ambient temperature	Operating	–40 to 70°C			
	Storage	–40 to 85°C (with no icing or condensation)			
Degree of protection		IP67 after IEC 60529; IP69K after DIN 40050 part 9			
Material	Case	Stainless steel	Brass-nickel plated		
	Sensing surface	PBT			

Extended sensing range inductive sensor in cylindrical stainless steel housing

The performance and operational reliability of the E2A family is also available in stainless steel housing.

- stainless steel housing (SUS 303)

Ordering information

Pre-wired

Size	■	–	Sensing distance	Thread length (overall length)	Output configuration	Order code (for pre-wired types with 2 m PVC cable)	
						Operation mode NO	Operation mode NC
M8	■	–	2.0 mm	27 (40) mm	PNP*1	E2A-S08KS02-WP-B1 2M	E2A-S08KS02-WP-B2 2M
	–	■	4.0 mm	21 (40) mm	PNP*1	E2A-S08KN04-WP-B1 2M	E2A-S08KN04-WP-B2 2M
M12	■	–	4.0 mm	34 (50) mm	PNP*1	E2A-S12KS04-WP-B1 2M	E2A-S12KS04-WP-B2 2M
	–	■	8.0 mm	27 (50) mm	PNP*1	E2A-S12KN08-WP-B1 2M	E2A-S12KN08-WP-B2 2M
M18	■	–	8.0 mm	39 (59) mm	PNP*1	E2A-S18KS08-WP-B1 2M	E2A-S18KS08-WP-B2 2M
	–	■	16.0 mm	29 (59) mm	PNP*1	E2A-S18KN16-WP-B1 2M	E2A-S18KN16-WP-B2 2M
M30	■	–	15.0 mm	44 (64) mm	PNP*1	E2A-S30KS15-WP-B1 2M	E2A-S30KS15-WP-B2 2M
	–	■	20.0 mm*2	29 (64) mm	PNP*1	E2A-S30KN20-WP-B1 2M	E2A-S30KN20-WP-B2 2M

Connector types (M12)

Size	■	–	Sensing distance	Thread length (overall length)	Output configuration	Order code (for M12 connector types)	
						Operation mode NO	Operation mode NC
M8	■	–	2.0 mm	27 (43) mm	PNP*1	E2A-S08KS02-M1-B1	E2A-S08KS02-M1-B2
	–	■	4.0 mm	21 (43) mm	PNP*1	E2A-S08KN04-M1-B1	E2A-S08KN04-M1-B2
M12	■	–	4.0 mm	24 (48) mm	PNP*1	E2A-S12KS04-M1-B1	E2A-S12KS04-M1-B2
	–	■	8.0 mm	27 (48) mm	PNP*1	E2A-S12KN08-M1-B1	E2A-S12KN08-M1-B2
M18	■	–	8.0 mm	39 (53) mm	PNP*1	E2A-S18KS08-M1-B1	E2A-S18KS08-M1-B2
	–	■	16.0 mm	29 (53) mm	PNP*1	E2A-S18KN16-M1-B1	E2A-S18KN16-M1-B2
M30	■	–	15.0 mm	44 (58) mm	PNP*1	E2A-S30KS15-M1-B1	E2A-S30KS15-M1-B2
	–	■	20.0 mm*2	29 (58) mm	PNP*1	E2A-S30KN20-M1-B1	E2A-S30KN20-M1-B2

*1 NPN models are available. For ordering replace "-B1" or "-B2" by "-C1" or "-C2".
*2 Models with longer sensing distances of 30 mm and 35 mm are available.

Specifications

(Exemplary for shielded versions)

Item		M8	M12	M18	M30
		E2A-S08KS	E2A-M12KS	E2A-M18KS	E2A-M30KS
Sensing distance		2 mm±10%	4 mm±10%	8 mm±10%	15 mm±10%
Response frequency		1,500 Hz	1,000 Hz	500 Hz	250 Hz
Power supply voltage (operating voltage)		12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)			
Protective circuits		Power supply reverse polarity protection, surge suppressor, short-circuit protection	Output reverse polarity protection, power supply reverse polarity protection, surge suppressor, short-circuit protection		
Ambient temperature	Operating	–40 to 70°C			
	Storage	–40 to 85°C (with no icing or condensation)			
Degree of protection		IP67 after IEC 60529; IP69K after DIN 40050 part 9			
Material	Case	Stainless steel (SUS 303)			
	Sensing surface	PBT			

Long (triple) distance inductive sensor in cylindrical brass housing

The E2A3 family features an optimised sensing performance to achieve triple sensing distance for quasi flush mounting requirements.

- Triple distance for enhanced sensor protection from mechanical damage
- IP67 and IP69k

Ordering information

Pre-wired

(For different cable materials and lengths, special housing length or special connectors, please refer to complete datasheet.)

Size			Sensing distance	Thread length (overall length)	Output configuration	Order code (for pre-wired types with 2 m PVC cable)	
						Operation mode: NO	Operation mode: NC
M8	■	–	3.0 mm	27 (40) mm	PNP	E2A3-S08KS03-WP-B1 2M	E2A3-S08KS03-WP-B2 2M
					NPN	E2A3-S08KS03-WP-C1 2M	E2A3-S08KS03-WP-C2 2M
M12	■	–	6.0 mm	34 (50) mm	PNP	E2A3-M12KS06-WP-B1 2M	E2A3-M12KS06-WP-B2 2M
					NPN	E2A3-M12KS06-WP-C1 2M	E2A3-M12KS06-WP-C2 2M
M18	■	–	11.0 mm	39 (60) mm	PNP	E2A3-M18KS11-WP-B1 2M	E2A3-M18KS11-WP-B2 2M
					NPN	E2A3-M18KS11-WP-C1 2M	E2A3-M18KS11-WP-C2 2M
M30	■	–	20.0 mm	44 (65) mm	PNP	E2A3-M30KS20-WP-B1 2M	E2A3-M30KS20-WP-B2 2M
					NPN	E2A3-M30KS20-WP-C1 2M	E2A3-M30KS20-WP-C2 2M

Connector types (M12)

Size			Sensing distance	Thread length (overall length)	Output configuration	Order code (for M12 connector types)	
						Operation mode: NO	Operation mode: NC
M8	■	–	3.0 mm	27 (44) mm	PNP	E2A3-S08KS03-M1-B1	E2A3-S08KS03-M1-B2
					NPN	E2A3-S08KS03-M1-C1	E2A3-S08KS03-M1-C2
M12	■	–	6.0 mm	34 (49) mm	PNP	E2A3-M12KS06-M1-B1	E2A3-M12KS06-M1-B2
					NPN	E2A3-M12KS06-M1-C1	E2A3-M12KS06-M1-C2
M18	■	–	11.0 mm	39 (54) mm	PNP	E2A3-M18KS11-M1-B1	E2A3-M18KS11-M1-B2
					NPN	E2A3-M18KS11-M1-C1	E2A3-M18KS11-M1-C2
M30	■	–	20.0 mm	44 (59) mm	PNP	E2A3-M30KS20-M1-B1	E2A3-M30KS20-M1-B2
					NPN	E2A3-M30KS20-M1-C1	E2A3-M30KS20-M1-C2

Specifications

Item		M8	M12	M18	M30
		E2A3-S08KS03	E2A3-M12KS06-	E2A3-M18KS11	E2A3-M30KS20
Sensing distance		3 mm±10%	6 mm±10%	11 mm±10%	20 mm±10%
Response frequency		700 Hz	350 Hz	250 Hz	80 Hz
Power supply voltage (operating voltage)		12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)			
Protective circuits		Power supply reverse polarity protection, surge suppressor, short-circuit protection	Output reverse polarity protection, power supply reverse polarity protection, surge suppressor, short-circuit protection		
Ambient temperature	Operating	–25 to 70°C			
	Storage				
Degree of protection		IP67 after IEC 60529; IP69K after DIN 40050 part 9			
Material	Case	Stainless steel	Brass-nickel plated		
	Sensing surface	PBT			

Inductive proximity sensor with gold-plated pins

Inductive proximity sensor E2A-4 was created and tested for applications in the harsh environment and at tough vibration conditions. Gold-plated contact pins provide increased protection against corrosion in high humidity and vibration.

- Gold-plated contact pins
- Connector type M8 and M12 models
- PNP/NPN NO

Ordering information

Size	Sensing distance	Connection	Body material	Thread length (overall length)	Output configuration	Operation mode	Order code
M8	2 mm	Connector M8 3 pin: gold-plated	Stainless steel	27 (40) mm	NPN	NO	E2A-S08KS02-M5-C1-4
				49 (62) mm			E2A-S08LS02-M5-C1-4
M12	4 mm	Connector M12 4 pin: gold-plated	Brass-nickel plated	34 (48) mm	PNP		E2A-M12KS04-M1-B1-4
	8 mm						E2A-M12KN08-M1-B1-4

Specifications

Size		M8		M12	
Model		E2A-S08KS02-M5-C1-4	E2A-S08LS02-M5-C1-4	E2A-M12KS04-M1-B1-4	E2A-M12KN08-M1-B1-4
Sensing mode		High-frequency oscillation			
Output		DC-3 wire			
Output type		NPN open collector		PNP open collector	
Sensing surface		Shielded			Non-shielded
Operation mode		NO			
Indicator operation		Yellow LED			
Output		Output DC-3 wire, 3 pins		Output DC-3 wire, 4 pins	
Degree of protection		IEC60529 IP67			
Materials Case		Stainless steel		Brass-nickel plated	
Sensing surface		PBT			
PIN		Bronze(C5441) / Gold-plated contacts			
Power supply voltage		12 to 24 VDC; Ripple (p-p) 10% max.			
Operating voltage range		10 to 32 VDC			
Current consumption		10 mA max.			
Sensing distance (Standard target: mild steel ST37 8×8×1 mm)		2 mm±10%		4 mm±10%	8 mm±10%
Target		Ferrous metal (The sensing distance decreases with non-ferrous metal)			
Differential travel/Hysteresis		10% max.of sensing distance			
Response frequency		1,500 Hz		1,000 Hz	800 Hz
Control output	Load current	200 mA max. (32 VDC max.)			
	Residual voltage	2 V max.			
Power reset time		100 ms max.			
Temperature influence		±10% max. of sensing distance at 23°C within temperature range of –25 to 70°C			
		±15% max. of sensing distance at 23°C within temperature range of –40 to 70°C			
Voltage influence		±1% max. of sensing distance in rated voltage range ±15%			
Insulation resistance		50 MΩ min. (at 500 VDC) between current carry parts and case			
Dielectric strength		1,000 VAC at 50/60Hz for 1 min between current carry parts and case			
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y and Z directions			
Shock resistance		500 m/s², 10 times each in X, Y and Z directions			
Standard testing environment	Ambient air temperature	23°C			
	Ambient air humidity	65% RH			
Storage	Ambient air temperature	–40 to 85°C (with no icing or condensation)			
	Ambient air humidity	35% to 95% RH			
Operating environment	Ambient air temperature	–40 to 70°C (with no icing or condensation)			
	Ambient air humidity	35% to 95% RH			

The ideal solution for standard industrial conditions

Thanks to the simple construction and Omron's innovative "hot melt" production process, the E2B sensors embody two characteristics: value-for-money and high reliability.

- All-round-visible indicator
- The laser printed part number
- Vibration shock resistance: IEC 60947-5-2 (10 to 55 Hz)
- Operating temperature: –25 to 70°C
- Water resistance: IP67

Ordering information

Pre-wired

Size			Sensing distance	Output configuration	Order code (for pre-wired types with 2 m PVC cable)	
					Operation mode NO	Operation mode NC
M8	■	–	2.0 mm	PNP*1	E2B-S08KS02-WP-B1 2M*2	E2B-S08KS02-WP-B2 2M*2
	–	■	4.0 mm	PNP*1	E2B-S08KN04-WP-B1 2M*2	E2B-S08KN04-WP-B2 2M*2
M12	■	–	4.0 mm	PNP*1	E2B-M12KS04-WP-B1 2M	E2B-M12KS04-WP-B2 2M
	–	■	8.0 mm	PNP*1	E2B-M12KN08-WP-B1 2M	E2B-M12KN08-WP-B2 2M
M18	■	–	8.0 mm	PNP*1	E2B-M18KS08-WP-B1 2M	E2B-M18KS08-WP-B2 2M
	–	■	16.0 mm	PNP*1	E2B-M18KN16-WP-B1 2M	E2B-M18KN16-WP-B2 2M
M30	■	–	15.0 mm	PNP*1	E2B-M30KS15-WP-B1 2M	E2B-M30KS15-WP-B2 2M
	–	■	30.0 mm	PNP*1	E2B-M30LN30-WP-B1 2M	E2B-M30LN30-WP-B2 2M

Connector types

Size			Sensing distance	Output configuration	Order code	
					Operation mode NO	Operation mode NC
M8	■	–	2.0 mm	PNP*1	E2B-S08KS02-MC-B1*2	E2B-S08KS02-MC-B2*2
	–	■	4.0 mm	PNP*1	E2B-S08KN04-MC-B1*2	E2B-S08KN04-MC-B2*2
M12	■	–	4.0 mm	PNP*1	E2B-M12KS04-M1-B1	E2B-M12KS04-M1-B2
	–	■	8.0 mm	PNP*1	E2B-M12KN08-M1-B1	E2B-M12KN08-M1-B2
M18	■	–	8.0 mm	PNP*1	E2B-M18KS08-M1-B1	E2B-M18KS08-M1-B2
	–	■	16.0 mm	PNP*1	E2B-M18KN16-M1-B1	E2B-M18KN16-M1-B2
M30	■	–	15.0 mm	PNP*1	E2B-M30KS15-M1-B1	E2B-M30KS15-M1-B2
	–	■	30.0 mm	PNP*1	E2A-M30LN30-M1-B1	E2B-M30LN30-M1-B2

*1 NPN models are available. For ordering replace "-B1" or "-B2" by "-C1" or "-C2".
*2 M8 sized housings are only available in stainless steel (SUS 303).

Optional features
Refer to complete datasheet or contact your OMRON representative for the below optional features

Sensing module and body
– single sensing distance (ideal for compatibility with previous machine generations)
– Long body (ideal for mounting through thicker constructions)

Connection
– M8 3-pin -MC e.g. E2B-S08KS02-MC-B1

Output
– 200 mA max. load current

Specifications

(Exemplary for shielded versions.)

Item		M8	M12	M18	M30
		E2B-S08KS	E2B-M12KS	E2B-M18KS	E2B-M30KS
Sensing distance		2 mm±10%	4 mm±10%	8 mm±10%	15 mm±10%
Response frequency		1,500 Hz	1,000 Hz	500 Hz	250 Hz
Power supply voltage (operating voltage)		12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)			
Protective circuits		Output reverse polarity protection, Power source circuit reverse polarity protection			
Ambient temperature	Operating and storage	–25 to 70°C			
Degree of protection		IP67 after IEC 60529			
Material	Case	Stainless steel	Brass-nickel plated		
	Sensing surface	PBT			

High-visibility ring LED indicator

Laser printing part number

Small diameter proximity sensors for high precision detection

Omron's latest inductive technology has now been applied to a new range of small diameter inductive sensors. The new µPROX E2E provides precision detection and allows installation in even the most confined spaces. The portfolio has been extended to include non-shielded types and versions with pig-tail connector leads.

- Miniature size: 3, 4, 6.5 mm and M4, M5 diameters
- High frequency of 5 kHz: suitable for high-speed counting
- All sizes are also available as non-shielded types
- IP67 water ingress protection
- Highly visible indicators for easy operation confirmation

Ordering information

Size			Sensing distance	Connection	Output configuration	Order code	
						Operation mode NO	Operation mode NC
dia 3 mm	■		0.8 mm	PW	PNP	E2E-C03SR8-WC-B1 2M OMS	E2E-C03SR8-WC-B2 2M OMS
					NPN	E2E-C03SR8-WC-C1 2M OMS	E2E-C03SR8-WC-C2 2M OMS
		■	2 mm	PW	PNP	E2E-C03N02-WC-B1 2M OMS	E2E-C03N02-WC-B2 2M OMS
					NPN	E2E-C03N02-WC-C1 2M OMS	E2E-C03N02-WC-C2 2M OMS
M4	■		0.8 mm	PW	PNP	E2E-S04SR8-WC-B1 2M OMS	E2E-S04SR8-WC-B2 2M OMS
					NPN	E2E-S04SR8-WC-C1 2M OMS	E2E-S04SR8-WC-C2 2M OMS
		■	2 mm	PW	PNP	E2E-S04N02-WC-B1 2M OMS	E2E-S04N02-WC-B2 2M OMS
					NPN	E2E-S04N02-WC-C1 2M OMS	E2E-S04N02-WC-C2 2M OMS
dia 4 mm	■		1.2 mm	PW	PNP	E2E-C04S12-WC-B1 2M OMS	E2E-C04S12-WC-B2 2M OMS
					NPN	E2E-C04S12-WC-C1 2M OMS	E2E-C04S12-WC-C2 2M OMS
		■	3 mm	PW	PNP	E2E-C04N03-WC-B1 2M OMS	E2E-C04N03-WC-B2 2M OMS
					NPN	E2E-C04N03-WC-C1 2M OMS	E2E-C04N03-WC-C2 2M OMS
M5	■		1.2 mm	PW	PNP	E2E-S05S12-WC-B1 2M OMS	E2E-S05S12-WC-B2 2M OMS
					NPN	E2E-S05S12-WC-C1 2M OMS	E2E-S05S12-WC-C2 2M OMS
		■	3 mm	PW	PNP	E2E-S05N03-WC-B1 2M OMS	E2E-S05N03-WC-B2 2M OMS
					NPN	E2E-S05N03-WC-C1 2M OMS	E2E-S05N03-WC-C2 2M OMS
dia 6.5 mm	■		2 mm	PW	PNP	E2E-C06S02-WC-B1 2M OMS	E2E-C06S02-WC-B2 2M OMS
					NPN	E2E-C06S02-WC-C1 2M OMS	E2E-C06S02-WC-C2 2M OMS
				M8(3P)	PNP	E2E-C06S02-MC-B1 OMS	E2E-C06S02-MC-B2 OMS
					NPN	E2E-C06S02-MC-C1 OMS	E2E-C06S02-MC-C2 OMS
		■	4 mm	PW	PNP	E2E-C06N04-WC-B1 2M OMS	E2E-C06N04-WC-B2 2M OMS
					NPN	E2E-C06N04-WC-C1 2M OMS	E2E-C06N04-WC-C2 2M OMS
				M8(3P)	PNP	E2E-C06N04-MC-B1 OMS	E2E-C06N04-MC-B2 OMS
					NPN	E2E-C06N04-MC-C1 OMS	E2E-C06N04-MC-C2 OMS

Specifications

Item		φ3/M4		Φ4/M5		Φ6.5	
		E2E-C03S/-S04S	E2E-C03N/-S04N	E2E-C04S/-S05S	E2E-C04N/-S05N	E2E-C06S	E2E-C06N
Sensing distance		0.8 mm±10%	2.0 mm±10%	1.2 mm±10%	3.0 mm±10%	2.0 mm±10%	4 mm±10.%
Setting distance		0 to 0.56mm	0 to 1.4mm	0 to 0.84mm	0 to 2.1mm	0 to 1.4mm	0 to 2.8mm
Response frequency		5 kHz	3 kHz	4 kHz	2 kHz	3 kHz	4 kHz
Supply voltage		10 to 30 VDC					
Current consumption		≤10 mA					
Max. control output		≤50 mA		≤100 mA		≤200 mA	
Residual output voltage		≤2 V					
Ambient temperature range		–25 to 70°C					
Ambient temperature fluctuation		≤15%					
Degree of protection		IEC 60529 IP67					
Material	Case	Stainless steel (SUS303)					
	Sensing surface	Heat-resistant ABS					

Miniature short head inductive sensor for demanding mounting conditions with remote amplifier

The E2EC family features the smallest sensor heads for reliable sensing in areas where mounting space is crucial. The miniature sizes of the sensing heads are achieved by separating the sensing part from the amplifier. In contrast to standard separate amplifier models the E2EC family simplifies the installation as the amplifier is built into the cable.

- 3 mm diameter sensing head for smallest spaces
- 18 mm long ultra short M12 size housing
- Full metal housing model for highest resistance in demanding environments

Ordering information

Standard (plastic sensing surface) DC 2-wire

Size			Order code (pre-wired types with 2 m cable length)*1	
			Operation mode NO	Operation mode NC
3-mm dia.	■	–	E2EC-CR8D1	E2EC-CR8D2
5.4-mm dia.			E2EC-C1R5D1	E2EC-C1R5D2
8-mm dia.			E2EC-C3D1	E2EC-C3D2
M12			E2EC-X4D1	E2EC-X4D2

*1 Cable length from sensor head to remote amplifier is 0.4 m

High protection (all metal face) DC 3-wire and DC 2-wire

Size			Order code (pre-wired types with 2 m cable length)*1	
			DC 3-wire Operation mode NO	DC 2-wire Operation mode NO
8-mm dia.	■	–	E2EC-MC2B1	E2EC-MC2D1
				E2EC-QC2D1-M1GJ-T*2 (fluoroplastic coating)

*1 Cable length from sensor head to remote amplifier is 0.4 m
*2 The remote amplifier is equipped with a M12 plug with 30 cm cable. Cable length from sensor head to remote amplifier is 0.5 m

Specifications

Item		dia 3	dia 5.4	dia 8		M12
		E2EC-CR8D_	E2EC-C1R5D_	E2EC-MC E2EC-QC	E2EC-C3D_	E2EC-X4D_
Sensing distance		0.8 mm±15%	1.5 mm±10%	2 mm±10%	3 mm±10%	4 mm±10%
Response frequency		1.5 kHz		100 Hz	1 kHz	
Power supply voltage (Operating voltage)		12 to 24 VDC (10 to 30 VDC) ripple (p-p): 10% max.				
Protective circuits		Surge absorber, short-circuit protection				
Ambient temperature	Operating	–25 to 70°C (with no icing or condensation)				
	Storage					
Degree of protection		IEC60529 IP67				
Material	Case	Brass		Stainless steel (SUS303)	Brass	
	Sensing surface	ABS		Stainless steel (SUS303)	ABS	

Flat shape inductive sensor in compact plastic housing

The TL-W family offers a wide range of block style inductive sensors for simple mounting on flat surfaces. With sensing distances from 1.5 mm to 20 mm the TL-W is the ideal solution for all standard applications.

- IP67
- DC 2-wire and DC 3-wire models
- Sensing distances from 1.5 mm to 20 mm
- Side facing sensing face

Ordering information

DC 2-wire

Size in mm (H × W × D)			Sensing distance	Order code (for pre-wired types with 2 m PVC cable)	
				Operation mode normally open (NO)	Operation mode normally closed (NC)
31 × 18 × 10	–	■	5 mm	TL-W5MD1	TL-W5MD2

DC 3-wire

Size in mm (H × W × D)			Sensing distance	Order code (for pre-wired types with 2 m PVC cable)			
				PNP-NO	PNP-NC	NPN-NO	NPN-NC
25 × 8 × 5	–	■	1.5 mm	TL-W1R5MB1	–	TL-W1R5MC1	–
22 × 8 × 6			3 mm	TL-W3MB1	TL-W3MB2	TL-W3MC1	TL-W3MC2
31 × 18 × 10			5 mm	TL-W5MB1	TL-W5MB2	TL-W5MC1	TL-W5MC2
53 × 40 × 23			20 mm	–	–	TL-W20ME1	TL-W20ME2
31 × 18 × 10	■	–	5 mm	TL-W5F1	TL-W5F2	TL-W5E1	TL-W5E2

Specifications

Item		TL-W5MD_	TL-W1R5M_1	TL-W3M_ _	TL-W5M_ _	TL-W5E_/F_	TL-W20ME_
Sensing distance		5 mm±10%	1.5 mm±10%	3 mm±10%	5 mm±10%		20 mm±10%
Response frequency		500 Hz	1 kHz min.	600 Hz min.	500 Hz min.	300 Hz min.	40 Hz min.
Power supply voltage (operating voltage)		12 to 24 VDC (10 to 30 VDC) ripple (p-p): 10% max.				10 to 30 VDC with a ripple (p-p) of 20% max.	12 to 24 VDC (10 to 30 VDC) ripple (p-p): 10% max.
Protective circuits		Surge absorber; short-circuit protection	Surge suppressor; power supply reverse polarity protection				
Ambient temperature	Operating	–25 to 70°C (with no icing or condensation)					
	Storage						
Degree of protection		IEC60529 IP67					
Material	Case	Heat-resistant ABS resin				Diecast aluminum	Heat-resistant ABS resin
	Sensing surface	Heat-resistant ABS resin					

Miniature square inductive sensor in plastic housing

The E2S family features miniature block style plastic housings for simple mounting on flat surfaces. The durable plastic housing with front or side facing sensing surfaces, provide best value-performance ratio for machine part movement detection.

- Miniature housing
- Front and side facing sensing faces
- Models with simple one-screw mounting
- IP67

Ordering information

DC 2-wire

Size in mm (H × W × D)			Sensing distance	Sensing face		Order code (pre-wired types with 1 m cable length)	
				↑	←	Operation mode NO	Operation mode NC
19 × 6 × 6	–	■	1.6 mm	■	–	E2S-W11 1M	E2S-W12 1M
				–	■	E2S-Q11 1M	E2S-Q12 1M
23 × 8 × 8			2.5 mm	■	–	E2S-W21 1M	E2S-W22 1M
				–	■	E2S-Q21 1M	E2S-Q22 1M

DC 3-wire

Size in mm (H × W × D)			Sensing distance	Sensing face		Output specifications	Order code (pre-wired types with 1m cable length)	
				↑	←		Operation mode NO	Operation mode NC
19 × 6 × 6	–	■	1.6 mm	■	–	NPN	E2S-W13 1M	E2S-W14 1M
				–	■		E2S-Q13 1M	E2S-Q14 1M
27 × 8 × 8			2.5 mm	■	–		E2S-W23 1M	E2S-W24 1M
				–	■		E2S-Q23 1M	E2S-Q24 1M
19 × 6 × 6			1.6 mm	■	–	PNP	E2S-W15 1M	E2S-W16 1M
				–	■		E2S-Q15 1M	E2S-Q16 1M
23 × 8 × 8			2.5 mm	■	–		E2S-W25 1M	E2S-W26 1M
				–	■		E2S-Q25 1M	E2S-Q26 1M

Specifications

Item		E2S-W1 E2S-Q1	E2S-W2 E2S-Q2
Sensing distance		1.6 mm±10%	2.5 mm±15%
Response frequency		1 kHz min.	
Power supply voltage (operating voltage)		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.	
Protective circuits		Surge suppressor; power supply reverse polarity protection	
Ambient temperature	Operating	–25 to 70°C	
	Storage	–40 to 85°C (with no icing or condensation)	
Degree of protection		IEC60529 IP67	
Material	Case	Polyarylate	

Long distance inductive proximity sensor in plastic housing

The long sensing distance and simple installation on flat surfaces make the E2Q5 ideal for the detection of large metal objects for example in automotive assembly lines.

- M12 Plug-in connection
- Integrated short circuit and reverse polarity protection
- Sensing face positioning: Y-axis 15°, X-axis 90° increments

Ordering information

Connector types (M12)

Size in mm (H × W × D)			Sensing distance	Sensing face	Output configuration	Order code (for M12 connector types)	
						Operation mode NO	Operation mode NO + NC
67 × 40 × 40	■	–	20 mm	Changeable	NPN	E2Q5-N20E1-M1	E2Q5-N20E3-M1
					PNP	E2Q5-N20F1-M1	E2Q5-N20F3-M1
	–	■	40 mm		NPN	E2Q5-N40ME1-M1	E2Q5-N40ME3-M1
					PNP	E2Q5-N40MF1-M1	E2Q5-N40MF3-M1

Specifications

Item		E2Q5-N20__-M1	E2Q5-N40M_3-M1
Sensing distance		20 mm±10%	40 mm±10%
Response frequency		150 Hz	
Power supply voltage		10 to 30 VDC	
Protective circuits		Output reverse polarity protection, short-circuit protection	
Ambient temperature	Operating	–25 to 85°C	
Degree of protection		IEC 60529 IP 67; IP69k after DIN 40050 part 9	
Material	Case	PBT	
	Sensing face	PBT	

Heat and detergent resistant inductive sensor in cylindrical stainless steel housing

The heat and detergent resistant inductive sensors allow reliable metal object or machine part detection in demanding environments such as food processing.

- Temperature resistant up to 120°C
- SUS316L housing with heat resistant plastic sensing face
- IP69k for highest water resistance
- ECOLAB tested and certified detergent resistance

Ordering information

Pre-wired

Size			Sensing distance	Output configuration	Order code (for pre-wired types with 2 m heat resistant PVC cable)	
					Operation mode NO	Operation mode NC
M12	■	–	3 mm	PNP	E2EH-X3B1 2M	E2EH-X3B2 2M
				NPN	E2EH-X3C1 2M	E2EH-X3C2 2M
				DC 2-wire	E2EH-X3D1 2M	E2EH-X3D2 2M
M18			7 mm	PNP	E2EH-X7B1 2M	E2EH-X7B2 2M
				NPN	E2EH-X7C1 2M	E2EH-X7C2 2M
				DC 2-wire	E2EH-X7D1 2M	E2EH-X7D2 2M
M30			12 mm	PNP	E2EH-X12B1 2M	E2EH-X12B2 2M
				NPN	E2EH-X12C1 2M	E2EH-X12C2 2M
				DC 2-wire	E2EH-X12D1 2M	E2EH-X12D2 2M

Connector types (M12)

Size			Sensing distance	Output	Order code (for M12 connector types)	
					Operation mode NO	Operation mode NC
M12	■	–	3 mm	PNP	E2EH-X3B1-M1	E2EH-X3B2-M1
				NPN	E2EH-X3C1-M1	E2EH-X3C2-M1
				DC 2-wire	E2EH-X3D1-M1G	E2EH-X3D2-M1G
M18			7 mm	PNP	E2EH-X7B1-M1	E2EH-X7B2-M1
				NPN	E2EH-X7C1-M1	E2EH-X7C2-M1
				DC 2-wire	E2EH-X7D1-M1G	E2EH-X7D2-M1G
M30			12 mm	PNP	E2EH-X12B1-M1	E2EH-X12B2-M1
				NPN	E2EH-X12C1-M1	E2EH-X12C2-M1
				DC 2-wire	E2EH-X12D1-M1G	E2EH-X12D2-M1G

Specifications

Item		M12	M18	M30
		E2EH-X3_ _	E2EH-X7_ _	E2EH-X12_ _
Sensing distance		3 mm±10%	7 mm±10%	12 mm±10%
Response frequency (average)		500 Hz	300 Hz	100 Hz
Power supply voltage (operating voltage range)		12 to 24 VDC, ripple (p-p): 10% max. (10 to 32 VDC) (24 VDC max. at 100°C or higher)		
Protective circuits		Surge suppression, short circuit protection, power supply reverse polarity protection, output reverse polarity protection		
Ambient temperature*1		DC 3-wire models: 0 to 100°C (0 to 120°C for 1,000 hours), DC 2-wire models: 0 to 100°C (0 to 110°C for 1,000 hours)		
Degree of protection		IEC 60529 IP67, IP69k after DIN 40050-9		
Material	Case, clamping nuts	Stainless steel (SUS316L)		
	Sensing surface	PBT (polybutylene terephthalate)		
	Cable	Heat-resistant PVC		

*1 Operation with power supplied for 1,000 h has been verified at 120°C for DC 3-wire models and at 110°C for DC 2-wire models. Do not bend the cable repeatedly at 100°C or higher.

Enhanced temperature resistance


Enhanced detergent resistance

Chemical resistant inductive sensor in cylindrical PTFE housing

The E2FQ features a full-body fluoro plastic housing for chemical resistance (e.g. against cleaning agents used in the semiconductor industry).

- Full body fluoro plastic housing for chemical resistance
- DC 2-wire and DC 3-wire models

Ordering information

DC 2-wire (pre-wired)

Size			Sensing distance	Order code*1 (for pre-wired types with 2 m PVC cable)
M12	■	–	2 mm	E2FQ-X2D1
M18			5 mm	E2FQ-X5D1
M30			10 mm	E2FQ-X10D1

DC 3-wire (pre-wired)

Size			Sensing distance	Order code*1 (for pre-wired types with 2 m PVC cable)	
				PNP	NPN
M12	■	–	2 mm	E2FQ-X2F1	E2FQ-X2E1
M18			5 mm	E2FQ-X5F1	E2FQ-X5E1
M30			10 mm	E2FQ-X10F1	E2FQ-X10E1

*1 Operation mode normally open (NO)

Specifications

Item		M12	M18	M30
		E2FQ-X2_	E2FQ-X5_	E2FQ-X10_
Sensing distance		2 mm±10%	5 mm±10%	10 mm±10%
Response frequency		E1, F1 models: 1.5 kHz D1 models: 800 Hz	E1, F1 models: 600 Hz, D1 models: 500 Hz	E1, F1 models: 400 Hz, D1 models: 300 Hz
Power supply voltage (Operating voltage)		E1, F1 models: 12 to 24 VDC, ripple (p-p): 10% max., (10 to 30 VDC) D1 models: 12 to 24 VDC, ripple (p-p): 20% max., (10 to 36 VDC)		
Protective circuits		D1 models: surge suppressor E1, F1 models: power supply, reverse polarity protection, short circuit protection, surge suppressor		
Ambient temperature	Operating	–25 to 70°C (with no icing or condensation)		
	Storage			
Degree of protection		IEC60529 IP67		
Material	Case	PTFE		
	Sensing surface	PTFE		

High chemical resistance

Inductive sensor for mobile usage in cylindrical brass housing

Designed and tested to keep your mobile machines moving.

- IP69k tested and certified for highest water resistance
- e1 type approval (according to Automotive Directive 2005/83/EC)
- E1 type approval (according to vehicle regulation ECE-R10)
- Cable or connector breakage protection

Ordering information

Pre-wired

Size	■	–	Sensing distance	Thread length (overall length)	Output configuration	Order code (for pre-wired types with 2 m PVC cable)*1	
						Operation mode: NO	Operation mode: NC
M12	■	–	4.0 mm	34 mm (50 mm)	PNP	E2AU-M12KS04-WP-B1 2M	E2AU-M12KS04-WP-B2 2M
				56 mm (72 mm)	PNP	E2AU-M12LS04-WP-B1 2M	E2AU-M12LS04-WP-B2 2M
M18	■	–	8.0 mm	39 mm (59 mm)	PNP	E2AU-M18KS08-WP-B1 2M	E2AU-M18KS08-WP-B2 2M
				61 mm (81 mm)	PNP	E2AU-M18LS08-WP-B1 2M	E2AU-M18LS08-WP-B2 2M
M30	■	–	15.0 mm	44 mm (64 mm)	PNP	E2AU-M30KS15-WP-B1 2M	E2AU-M30KS15-WP-B2 2M
				66 mm (86 mm)	PNP	E2AU-M30LS15-WP-B1 2M	E2AU-M30LS15-WP-B2 2M

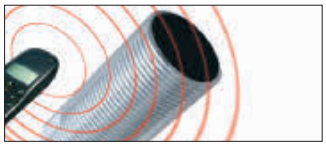
*1 NPN types and pre-wired types with PUR cable are available. Contact your OMRON representative

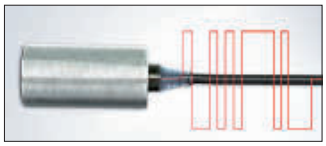
Connector types (M12)

Size	■	–	Sensing distance	Thread length (overall length)	Output configuration	Order code (for M12 connector types)	
						Operation mode: NO	Operation mode: NC
M12	■	–	4.0 mm	34 mm (48 mm)	PNP	E2AU-M12KS04-M1-B1	E2AU-M12KS04-M1-B2
				56 mm (70 mm)	PNP	E2AU-M12LS04-M1-B1	E2AU-M12LS04-M1-B2
M18	■	–	8.0 mm	39 mm (53 mm)	PNP	E2AU-M18KS08-M1-B1	E2AU-M18KS08-M1-B2
				61 mm (75 mm)	PNP	E2AU-M18LS08-M1-B1	E2AU-M18LS08-M1-B2
M30	■	–	15.0 mm	44 mm (58 mm)	PNP	E2AU-M30KS15-M1-B1	E2AU-M30KS15-M1-B2
				66 mm (80 mm)	PNP	E2AU-M30LS15-M1-B1	E2AU-M30LS15-M1-B2

Specifications

Item		M12	M18	M30
		E2AU-M12_	E2AU-M18_	E2AU-M30_
Sensing distance		4 mm±10%	8 mm±10%	15 mm±10%
Response frequency		1,000 Hz	500 Hz	250 Hz
Power supply voltage (operating voltage)		12 to 24 VDC. Ripple (p-p): 10% max.(10 to 32 VDC)		
Protective circuits		Output reverse polarity protection, power supply reverse polarity protection, surge suppressor, short-circuit protection		
Ambient temperature	Operating	–40 to 70°C		
	Storage	–40 to 85°C (with no icing or condensation)		
Degree of protection		IP67 after IEC 60529, IP69K after DIN 40050 part 9		
Material	Case	Brass-nickel plated		
	Sensing surface	PBT		





High electro-magnetic noise immunity (fields and cable induced)

e1 type approval after 2005/83/EC

E1 type approval after ECE-R10

Oil resistant inductive sensor in cylindrical brass housing

The E2E-_-U offers tested oil resistance on commonly used oils in the automotive industry for reliable long-life operation in automotive assembly lines.

- Oil resistant PUR cable
- M8, M12, M18 and M30 standard sizes
- IP67g (water and oil resistance)

Ordering information

DC 2-wire (pre-wired)

Size			Sensing distance	Order code (for pre-wired types with 2 m PUR cable)	
				Operation mode NO	Operation mode NC
M8	■	–	2 mm	E2E-X2D1-U	E2E-X2D2-U
M12			3 mm	E2E-X3D1-U	E2E-X3D2-U
M18			7 mm	E2E-X7D1-U	E2E-X7D2-U
M30			10 mm	E2E-X10D1-U	E2E-X10D2-U

DC 2-wire (pre-wired with M12) 

Size			Sensing distance	Order code (for pre-wired types with 30 cm PUR cable and M12 plug))	
				Operation mode NO	Operation mode NC
M8	■	–	2 mm	E2E-X2D1-M1TGJ-U 0.3M	E2E-X2D2-M1TGJ-U 0.3M
M12			3 mm	E2E-X3D1-M1TGJ-U 0.3M	E2E-X3D2-M1TGJ-U 0.3M
M18			7 mm	E2E-X7D1-M1TGJ-U 0.3M	E2E-X7D2-M1TGJ-U 0.3M
M30			10 mm	E2E-X10D1-M1TGJ-U 0.3M	E2E-X10D2-M1TGJ-U 0.3M

Specifications

Item		M8	M12	M18	M30
		E2E-X2D_	E2E-X3D_	E2E-X7D_	E2E-X10D_
Sensing distance		2 mm±10%	3 mm±10%	7 mm±10%	10 mm±10%
Response frequency		1.5 kHz	1.0 kHz	0.5 kHz	0.4 kHz
Power supply voltage (operating voltage)		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.			
Protective circuits		Surge suppressor, output short-circuit protection (for control and diagnostic output)			
Ambient temperature	Operating	–25 to 70°C			
	Storage	–40 to 85°C (with no icing or condensation)			
Degree of protection		IEC 60529 IP67 (JEM standard IP67g (waterproof and oil-proof))			
Material	Case	Stainless steel (SUS303)	Brass-nickel plated		
	Sensing surface	PBT (polybutylene terephthalate)			
	Cable	PUR for jacket, PE			

Inductive sensor in cylindrical full metal housing (case + sensing face)

The high durability stainless steel sensing face provides more than 20 times longer protection against mechanical damage than conventional sensors. The high mineral oil and coolant resistance and the immunity against small metal chips on the surface make this sensor ideal for metal cutting or drilling applications.

- Full body stainless steel housing for highest mechanical protection
- Low frequency modulation for metal chip immunity
- Flame retardant cable for high protection against welding spatter damage (pigtail models)

Ordering information

DC 2-wire (with M12 pigtail connector)

Size			Sensing distance	Order code*1 (for pre-wired types with 30 cm PVC cable and M12 plug)
M8	■	–	1.5 mm	E2FM-X1R5D1-M1TGJ
M12			2 mm	E2FM-X2D1-M1TGJ
M18			5 mm	E2FM-X5D1-M1TGJ
M30			10 mm	E2FM-X10D1-M1TGJ

DC 3-wire, M12 Connector types

Size			Sensing distance	Order code*1 (for M12 connector types)	
				PNP	NPN
M8	■	–	1.5 mm	E2FM-X1R5B1-M1	E2FM-X1R5C1-M1
M12			2 mm	E2FM-X2B1-M1	E2FM-X2C1-M1
M18			5 mm	E2FM-X5B1-M1	E2FM-X5C1-M1
M30			10 mm	E2FM-X10B1-M1	E2FM-X10C1-M1

DC 3-wire, pre-wired types

Size			Sensing distance	Order code*1 (for pre-wired types with 2 m PVC cable)	
				PNP	NPN
M8	■	–	1.5 mm	E2FM-X1R5B1 2M	E2FM-X1R5C1 2M
M12			2 mm	E2FM-X2B1 2M	E2FM-X2C1 2M
M18			5 mm	E2FM-X5B1 2M	E2FM-X5C1 2M
M30			10 mm	E2FM-X10B1 2M	E2FM-X10C1 2M

*1 Output configuration normally open (NO)

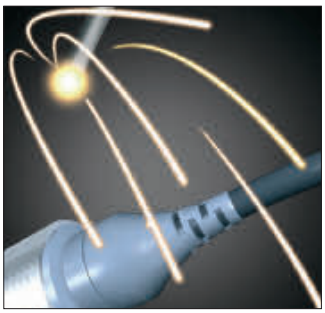
Specifications)

Item		M8	M12	M18	M30
		E2FM-X1R5	E2FM-X2	E2FM-X5	E2FM-X10
Sensing distance		1.5 mm±10%	2 mm±10%	5 mm±10%	10 mm±10%
Response frequency		200 Hz	100 Hz	100 Hz	50 Hz
Power supply voltage (operating voltage range)		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.			
Protective circuits		E2FM-_D1: Surge suppressor, output short-circuit protection E2FM-_B1/C1: Output reverse polarity protection (not E2FM-X1R5B1-M1), power supply reverse polarity protection, surge suppressor, short-circuit protection			
Ambient temperature	Operating	–25 to 70°C (with no icing or condensation)			
	Storage				
Degree of protection		IEC60529 IP67, IP69k after DIN 40050 part 9			
Material	Case	Stainless steel (SUS303)			
	Sensing surface	Stainless steel (SUS303)			
	Cable	PVC (flame retardant)			

E2FM extra strong sensing face

Conventional metal face product


No interference by small metal chips on sensing surface


Cable resistant to welding spatter

High precision positioning inductive proximity sensor with seperate amplifier

The separate amplifier inductive sensor family E2C-EDA offers high precision distance positioning and detection. The teach-in function allows simple installation, and with the window function (2 outputs) production tolerance checks can easily be set up and modified.

- Typically several hundred µm detection precision
- Precision distance teaching
- Window function (2 outputs) for production tolerance checks

Ordering information

Sensor heads

Appearance				Sensing distance	Repeat accuracy	Order code
Cylindrical 	3 dia. × 18	■	–	0.6 mm	1 µm	E2C-EDR6-F
	5.4 dia. × 18			1 mm	1 µm	E2C-ED01*1
	8 dia. × 22			2 mm	2 µm	E2C-ED02*1
Screw 	M10 × 22			2 mm	2 µm	E2C-EM02*1
Flat 	30 × 14 × 4.8			5 mm	2 µm	E2C-EV05*1
Screw 	M18 × 46.3	–	■	7 mm	5 µm	E2C-EM07M*1
Screw (heat resistant) 	M12 × 22	■	–	2 mm	2 µm	E2C-EM02H

*1 For models with cut-to-length cables add "-F" for example E2C-ED01-F
For models with protective stainless steel spiral tubes add "-S" for example E2C-ED01-S

Amplifier units with cables

Item	Functions	Order code	
		NPN output	PNP output
Twin-output models	Area output, open circuit detection, differential operation	E2C-EDA11	E2C-EDA41
External-input models	Remote setting, differential operation	E2C-EDA21	E2C-EDA51

Amplifier units with connectors*1

Item	Functions	Order code	
		NPN output	PNP output
Twin-output models	Area output, open circuit detection, differential operation	E2C-EDA6	E2C-EDA8
External-input models	Remote setting, differential operation	E2C-EDA7	E2C-EDA9

*1 Order fitting connector (E3X-CN21_) separately from accessories.

Specifications

Sensor heads

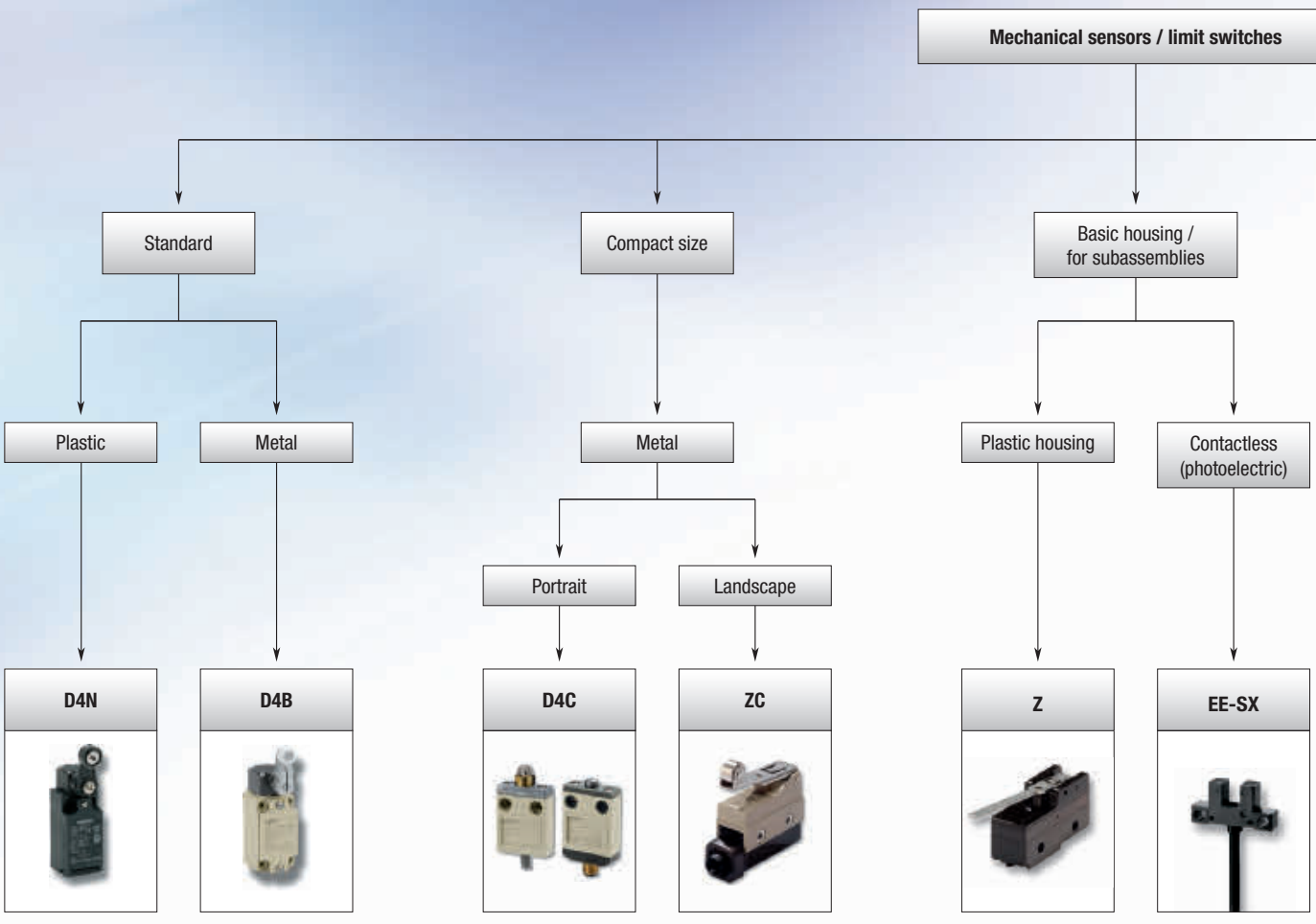
Item		3 dia.	5.4 dia.	8 dia.	M10	M18	30×14×4.8 mm	M12
		E2C-EDR6-F	E2C-ED01(-_)	E2C-ED02(-_)	E2C-EM02(-_)	E2C-EM07(-_)	E2C-EV05(-_)	E2C-EM02H
Ambient temperature	Operating	–10 to 60°C (with no icing or condensation)						–10 to 200°C
	Storage							
Degree of protection		IEC60529 IP67						IEC60529 IP60
Material	Case	Brass	Stainless steel	Brass			Zinc	Brass
	Sensing surface	Heat-resistant ABS						PEEK

Note: For amplifier specifications refer to complete datashee

THE RELIABLE AND FLEXIBLE WAY ...

... to stop your machines

For the detection of machine part movement especially for the detection of end positions, the mechanical and optical limit switches provide accurate and reliable operation with a large variety of actuation possibilities optimized for a widest range of application and usage requirements. The easy positioning and intuitive installation, the high immunity to changing environmental influences (electromagnetic fields, sunlight, temperatures, etc.) as well as the possibility to directly switch loads with up to 15 A make these sensors ideal for a wide range of conveying and handling applications.

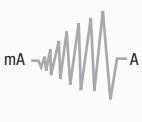


Page 306 Pages 308 Page 310 Page 312 Page 314 Page 222

Special models

Electrical load variations

D4C, D4E, X, Z, ZC



Contact your Omron representative

Mounting shape and pitch variations

D4MC, HL, WL

Connection and wiring variations

D4E, SHL, WL

Safety applications

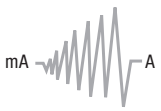
D4N-_R

Page 465

Type		Standard		Compact		Basic housing	
							
Model		D4N	D4B	D4C	ZC	Z	EE-SX
Material		plastic	metal			plastic	
Screw terminal	no conduit	–	–	–	–	■	–
	Cable dia 8.5 to 10.5	–	–	–	■	–	–
	M20	■	■	–	□	–	–
	PG13.5	□	–	–	□	–	–
	G1/2	□	□	–	□	–	–
	1/2-14NPT	□	□	–	–	–	–
Cable connector	M12	■	–	■	□	–	(Special connector)
	Prewired	–	–	■	□	–	■
Degree of protection		IP67				IP00	IP50 (IP60)
Page		306	308	310	312	314	222

Special models

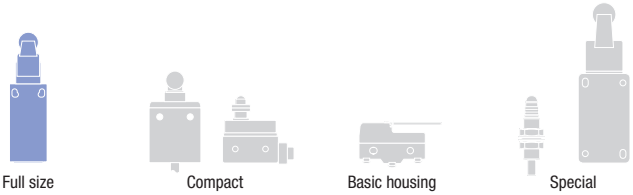
Type	Extended temperature range	High precision multi direction
		
Model	WL-_-TH	D5B
Material	metal	
Key Features	Temperature resistance from –65°c up to 400°C	– X, Y, Z action – several µm switching accuracy – M5, M8, M10 sizes
Page	316	see DVD

Type	Highest precision tactile measurement	Electrical load variations	Mounting shape and pitch variations	Connection and wiring variations	Safety limit switches
					
Model	ZX-T	D4C, D4E. X, Z, ZC	D4MC, HL, WL	D4E, SHL, WL	D4 Safety
Material	plastic	plastic and metal	metal		plastic and metal
Key Features	Measurement resolution up to 0.1µm	– Microloads (1mA - 100mA) – High current at high voltage switching (10A at 125VDC) – Double circuit switching	– mounting shapes and pitches popular in different countries in the world – mounting pitch variations (base mounting, diagonal pitches,...) – alternative actuator positions	– Screw conduit variations (PG13.5, G1/2, 1/2"14NPT – cable exit variations (pigtails, rubber snap on covers, screw on covers, with or without cable breakage protection for different cable diameters	– mechanical form lock – manual reset – door hinge switches
Page	421	Contact your OMRON representative			430

Limit switch with plastic housing

The D4N series of limit switches in plastic housing is the ideal switch for all standard mechanical position detection applications both for safety and non-safety applications.

- Direct opening mechanism and approval by notified body
- Rugged plastic housing with double insulation
- Wide range of actuators
- M12 connectors or terminal block with M20 conduit



Ordering information

Actuator type		Connection method	Order code*1			
			1NC/1NO (snap-action)	1NC/1NO (slow-action)	2NC (slow-action)	2NC/1NO (slow-action)
			Order code	Order code	Order code	Order code
	Roller lever (resin lever, resin roller)	M20	D4N-4120	D4N-4A20	D4N-4B20	D4N-4C20
		M12 connector	D4N-9120	D4N-9A20	D4N-9B20	–
	Plunger	M20	D4N-4131	D4N-4A31	D4N-4B31	–
		M12 connector	D4N-9131	D4N-9A31	D4N-9B31	–
	Roller plunger	M20	D4N-4132	D4N-4A32	D4N-4B32	D4N-4C32
		M12 connector	D4N-9132	D4N-9A32	D4N-9B32	–
	One-way roller arm lever (horizontal)	M20	D4N-4162	D4N-4A62	D4N-4B62	D4N-4C62
		M12 connector	D4N-9162	D4N-9A62	D4N-9B62	–
	One-way roller arm lever (vertical)	M20	D4N-4172	D4N-4A72	D4N-4B72	–
	Adjustable roller lever, form lock (metal lever, resin roller)	M20	D4N-412G	D4N-4A2G	D4N-4B2G	–
		M12 connector	D4N-912G	D4N-9A2G	D4N-9B2G	–
	Adjustable roller lever, form lock (metal lever, rubber roller)	M20	D4N-412H	D4N-4A2H	D4N-4B2H	–
		M12 connector	D4N-912H	D4N-9A2H	D4N-9B2H	–

Switches with MBB contacts

MBB (Make Before Break) contacts have an overlapping structure, so that before the normally closed (NC) contact opens the normally open (NO) contact closes.

Actuator type		Connection method	Order code*1	
			1NC/1NO (slow-action)	2NC/1NO (slow-action)
	Roller lever (resin lever, resin roller)	M20	D4N-4E20	D4N-4F20
		M12 connector	D4N-9E20	–
	Roller plunger	M20	D4N-4E32	D4N-4F32
		M12 connector	D4N-9E32	–
	One-way roller arm lever (horizontal)	M20	D4N-4E62	D4N-4F62
		M12 connector	D4N-9E62	–

*1 The NC contacts provide the approved direct opening mechanism.

Specifications

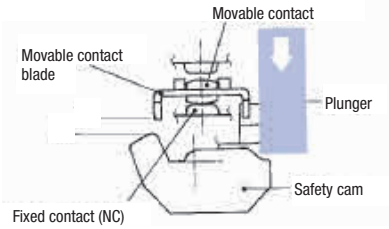
Durability[*1]	**Mechanical**	15,000,000 operations min.[*2]
	Electrical	500,000 operations min. for a resistive load of 3 A at 250 VAC 300,000 operations min. for a resistive load of 10 A at 250 VAC
Operating speed	**Roller lever**	1 mm/s to 0.5 m/s
Operating frequency		30 operations/minute max.
Minimum applicable load		Resistive load of 1 mA at 5 VDC (N-level reference value)
Protection against electric shock		Class II (double insulation)
Pollution degree (operating environment)		3 (EN60947-5-1)
Contact gap		Snap-action: 2x0.5 mm min Slow-action: 2x2 mm min
Conditional short-circuit current		100 A (EN60947-5-1)
Rated open thermal current (I_{th})		10 A (EN60947-5-1)
Ambient temperature	**Operating**	–30 to 70°C with no icing
Degree of protection		IP67 (EN60947-5-1)

[*1] The durability is acquired for an ambient temperature of 5 to 35°C and an ambient humidity of 40% to 70%.
[*2] 10,000,000 operations min. for fork lever actuator.

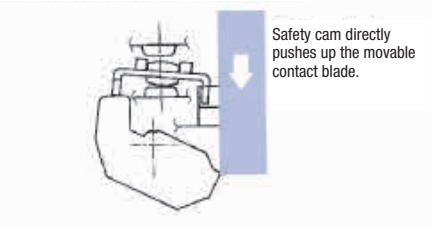
1NO/1NC Contact (Snap-action)

If metal deposition between mating contacts occurs on the NC contact side, they can be pulled apart by the shearing force and tensile force generated when part B of the safety cam or plunger engages part A of the movable contact blade. When the safety cam or plunger is moved in the direction of the arrow, the Limit Switch releases.

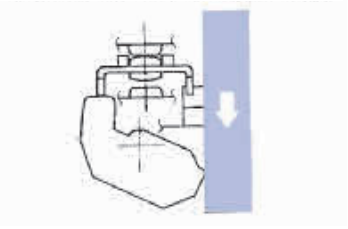
1. When metal deposition occurs.



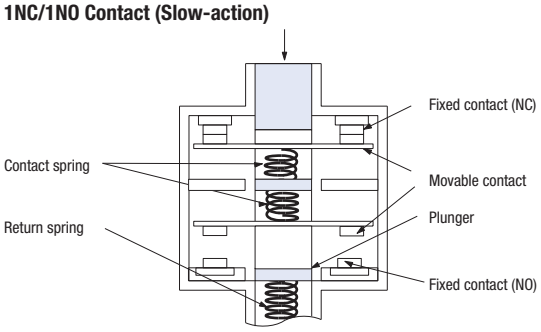
2. When contacts are being pulled apart.



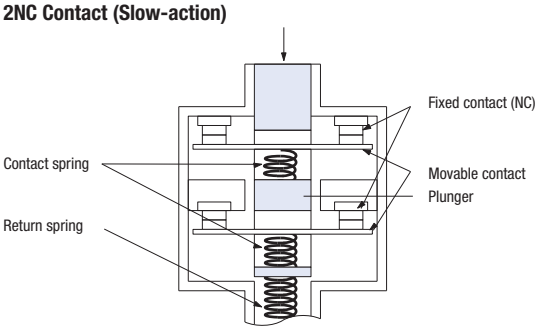
3. When contacts are completely pulled apart.



1NC/1NO Contact (Slow-action)



2NC Contact (Slow-action)



NC contacts conform to EN60947-5-1 Direct Opening

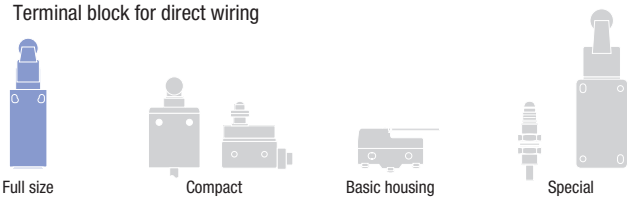
When metal deposition occurs, the contacts are separated from each other by the plunger being pushed in.

⊖ is marked on the product to indicate approval of direct opening.

Limit switch with metal housing

The D4B series of limit switches in a rugged metal housing is suitable for both safety and non-safety applications due to its direct opening mechanism and TÜV approval. Furthermore with the increased temperature range and enhanced mechanical switching lifetime, the D4B is first choice for all applications from standard to demanding environments and for highest flexibility in mounting and connectivity preferences.

- Direct opening mechanism and approval by notified body
- Rugged metal housing and extended mechanical switching lifetime (snap action models)
- Terminal block for direct wiring



Ordering information

Actuator type		Connection method	Order code*1		
			1NC/1NO (snap-action)	1NC/1NO (slow-action)	2NC (slow-action)
	Roller lever*2	Terminal block with M20 conduit*3	D4B-4111N	D4B-4511N	D4B-4A11N
	Adjustable roller lever		D4B-4116N	D4B-4516N	D4B-4A16N
	Adjustable rod lever		D4B-4117N	D4B-4517N	D4B-4A17N
	Plain		D4B-4170N	D4B-4570N	D4B-4A70N
	Roller		D4B-4171N	D4B-4571N	D4B-4A71N
	Coil spring		D4B-4181N*4	–	–
	Plastic rod		D4B-4187N*4	–	–

*1 The NC contacts provide the approved direct opening mechanism.

*2 For models with stainless steel rollers and temperature resistance of -40°C refer to WL-_-TC.
*3 Models with G1/2 or 1/2"14NPT conduit are available. For ordering refer to complete datasheet. For PG13.5 conduit models for non-safety applications contact your OMRON representative.
*4 No direct opening mechanism.

Specifications

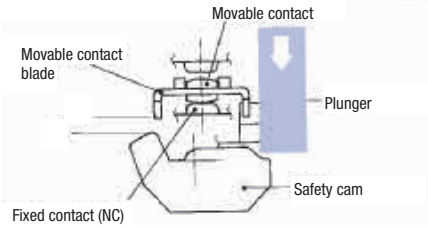
Item		Snap-action	Slow-action
Durability*1	Mechanical	30,000,000 operations min.	10,000,000 operations min.
	Electrical	500,000 operations min. (at a 250 VAC, 10 A resistive load)	
Operating speed		1 mm/s to 0.5 m/s	
Operating frequency	Mechanical	120 operations/min	
	Electrical	30 operations/min	
Rated frequency		50/60 Hz	
Contact resistance		25 mΩ max. (initial value)	
Pollution degree (operating environment)		3 (EN60947-5-1)	
Conditional short-circuit current		100 A (EN60947-5-1)	
Conventional enclosed thermal current (I_{th})		20 A (EN60947-5-1)	
Protection against electric shock		Class I (with ground terminal)	
Ambient temperature	Operating	–40 to 80°C (with no icing)*2	
Degree of protection		IP67 (EN60947-5-1)	

*1 The values are acquired for an ambient temperature of 5 to 35°C and an ambient humidity of 40 to 70%.
*2 -25 to 80°C for the flexible-rod actuator.

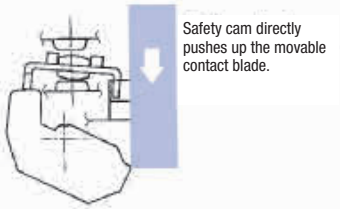
1NO/1NC Contact (Snap-action)

If metal deposition between mating contacts occurs on the NC contact side, they can be pulled apart by the shearing force and tensile force generated when part B of the safety cam or plunger engages part A of the movable contact blade. When the safety cam or plunger is moved in the direction of the arrow, the Limit Switch releases.

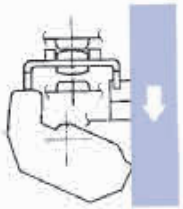
1. When metal deposition occurs.



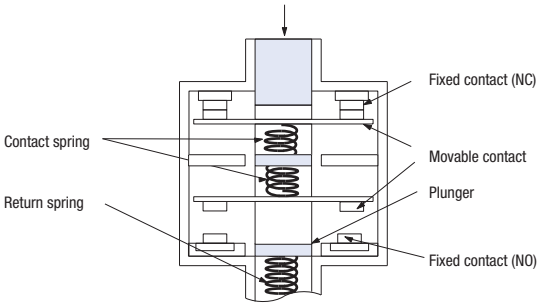
2. When contacts are being pulled apart.



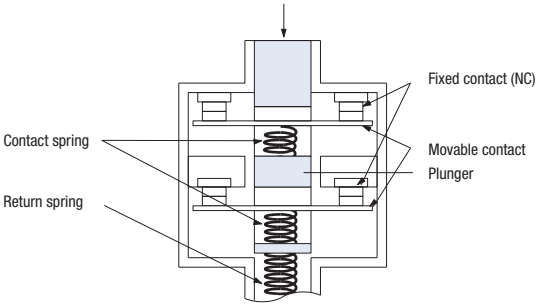
3. When contacts are completely pulled apart.



1NC/1NO Contact (Slow-action)



2NC Contact (Slow-action)



NC contacts conform to EN60947-5-1 Direct Opening

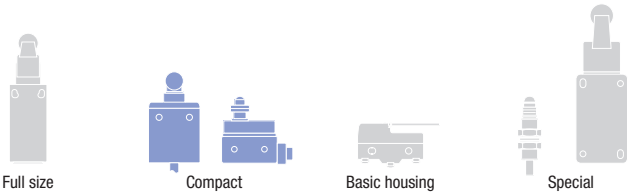
When metal deposition occurs, the contacts are separated from each other by the plunger being pushed in.

is marked on the product to indicate approval of direct opening.

Compact limit switch in metal housing

The 16 mm flat and compact size make the D4C range of limit switches very popular for all standard applications but especially where mounting space is limited or protruding housings may interfere with machine operation. The triple sealed construction, the rugged metal housing and the precisely manufactured movable parts ensure long operational life in standard or oily environments (special models).

- 16 mm flat compact size
- Rugged metal housing
- Models with M12 connector or oil resistant VCTF cable



Ordering Information

Actuator type	Load range (VDC)*1	Operation LED indicator		Connection method				Order code
	0.8 W to 60 W max	No	Yes					
Plunger	■	■	-		■		*2	D4CC-3001
						3 m		D4C-1201
		-	■		■			D4CC-4001
						3 m		D4C-3201
Sealed plunger		■	-		■			D4CC-3031
						3 m		D4C-1231
		-	■		■			D4CC-4031
						3 m		D4C-3231
Plunger with M14 mounting		■	-		■			D4CC-3041
						3 m		D4C-1241
		-	■		■			D4CC-4041
						3 m		D4C-3241
Roller plunger		■	-		■			D4CC-3002
						3 m		D4C-1202
		-	■		■			D4CC-4002
						3 m		D4C-3202
Sealed roller plunger		■	-		■			D4CC-3032
						3 m		D4C-1232
		-	■		■			D4CC-4032
						3 m		D4C-3232
Roller plunger with M14 mounting		■	-		■			D4CC-3042
						3 m		D4C-1242
		-	■		■			D4CC-4042
						3 m		D4C-3242
Crossroller plunger		■	-		■			D4CC-3003
						3 m		D4C-1203
		-	■		■			D4CC-4003
						3 m		D4C-3203
Sealed crossroller plunger		■	-		■			D4CC-3033
						3 m		D4C-1233
		-	■		■			D4CC-4033
						3 m		D4C-3233
Crossroller plunger with M14 mounting		■	-		■			D4CC-3043
						3 m		D4C-1243
		-	■		■			D4CC-4043
						3 m		D4C-3243
Roller lever		■	-		■			D4CC-3024
						3 m		D4C-1220
		-	■		■			D4CC-4024
						3 m		D4C-3220
Coil spring		■	-		■			D4CC-3050
						3 m		D4C-1250
		-	■		■			D4CC-4050
						3 m		D4C-3250

*1 See specifications for details on max. current per rated voltage and load type. Micro load models with 5mW to 0.8W are available. For ordering refer to complete datasheet.
*2 Pre-wired models with 30 cm PVC cable and M12 plug (pigtail) are available. Contact your OMRON representative.

Specifications

Voltage and current rating

Model	Rated voltage	Rated current*1	Non-inductive load				Inductive load				Inrush current		Applicable load range (5 to 30 VDC)
			Resistive load		Lamp load		Inductive load		Motor load				
			NC	NO	NC	NO	NC	NO	NC	NO	NC	NO	
D4C-1□□□	125 VAC		5 A	5 A	1.5 A	0.7 A	3 A	3 A	2.5 A	1.3 A	20 A max.	10 A max.	–
	250 VAC	2 A	5 A	5 A	1 A	0.5 A	2 A	2 A	1.5 A	0.8 A			
	8 VDC		5 A	5 A	2 A	2 A	5 A	4 A	3 A	3 A			0.8 W to 60 W
	14 VDC		5 A	5 A	2 A	2 A	4 A	4 A	3 A	3 A			
	30 VDC	2 A	4 A	4 A	2 A	2 A	3 A	3 A	3 A	3 A			
	125 VDC		0.4 A	0.4 A	0.05 A	0.05 A	0.4 A	0.4 A	0.05 A	0.05 A			–
	250 VDC		0.2 A	0.2 A	0.03 A	0.03 A	0.2 A	0.2 A	0.03 A	0.03 A			
D4C-3□□□	30 VDC	2 A	4 A	4 A	2 A	2 A	3 A	3 A	3 A	3 A			0.8 W to 60 W
D4CC-3□□□ D4CC-4□□□	30 VDC	1 A	1 A	1 A	1 A	1 A	1 A	1 A	1 A	1 A	5 A max.	2.5 A max	0.8 W to 30 W
D4C-6□□□	30 VDC	0.1 A	0.1 A	0.1 A	–		–				20 A max.	10 A max.	5 mW to 0.8 W

*1 For D4C- cable types these ratings are certified by TÜV Rheinland according to EN60947-5-1 (file no R9451333).

General specifications

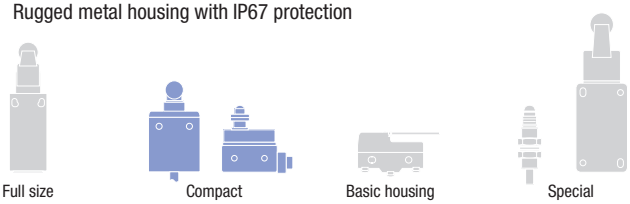
Item		D4C-_ (cable types)	D4CC-_ (connector types)
Durability*1	Mechanical	10,000,000 operations min	
	Electrical	200,000 operations min	
Operating frequency	Mechanical	120 operations/min	
	Electrical	30 operations/min	
LED indicator		D4C-3_, D4C-6_, D4CC-4_: Operation indicator (red) Operation indicator turns OFF when the switch operates.*2	
Ambient temperature	Operating	–10 to 70°C (with no icing)	
Degree of protection		IEC 60529: IP67	

*1 Values are acquired at 5 to 35°C operating temperature, 40% to 70% operating humidity.
*2 Models where operation indicator turns ON when the switch operates are available by adding "-B" to the order code. Contact your OMRON representative for availability.

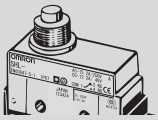
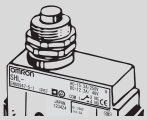
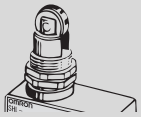
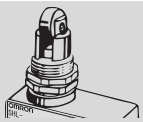
Limit switch in compact metal housing with terminal block

The compact housing size and the terminal block with side facing cable exit allow the mounting where space is crucial and self-wiring connection is preferred. The rugged and tight housing construction provides high protection while the low-force actuators make the ZC limit switch ideal for switching smaller or lighter objects.

- Terminal block for self-wiring with side facing cable exit
- Low-force actuators for switching smaller or lighter objects
- Rugged metal housing with IP67 protection



Ordering Information

Actuator type		Connection method	Order code
	Plunger	Terminal block with side facing cable exit (left/right changeable) for cables dia 8.5 to 10.5 mm *1	ZC-D55
	Plunger with M14 mounting		ZC-Q55
	Sealed roller plunger		ZC-N2255
	Roller plunger with M14 mounting		ZC-Q2255
	Sealed cross roller plunger		ZC-N2155
	Cross roller plunger with M14 mounting		ZC-Q2155
	Hinge lever - 50R		ZC-W55
	Hinge lever - 70R		ZC-W155
	Hinge roller lever - 50R		ZC-W255
	Hinge roller lever - 70R		ZC-W2155

*1 Models with M20 conduit or other connection variations are available. Refer to OPTIONAL FEATURES in complete datasheet for details.

Specifications

Voltage and current rating

Model	Rated voltage	Non-inductive load			Inductive load				Inrush current	
		Resistive load	Lamp load		Inductive load		Motor load			
		NC and NO	NC	NO	NC	NO	NC	NO	NC	NO
Standard type	125 VAC	10	3	1.5	10		5	2.5	30 A	15 A
	250 VAC		2.5	1.25			3	1.5		
	8 VDC		3	1.5	6		5	2.5		
	14 VDC									
	30 VDC	6			5					
	125 VDC	0.5	0.4	0.4	0.05					
	250 VDC	0.25	0.2	0.2	0.03					
High current at high VDC switching type*1	8 VDC	10	3	1.5	10		5	2.5		
	14 VDC									
	30 VDC									
	125 VDC				7.5	6				
	250 VDC	3	1.5	0.75	2	1.5	2	1.5		

*1 Refer to OPTIONAL FEATURES in complete datasheet for details.

General specifications

Durability	Mechanical	10.000.000 operations min
	Electrical	500.000 operations min
Operating speed	Plunger	0.05 mm/s to 0.5 m/s
Operating frequency	Mechanical	120 operations / min
	Electrical	20 operations / min
Insulation resistance		100 MΩ min (at 500VDC)
Contact resistance (initial)		15 mΩ max
Dielectric strength		1,000 VAC, 50/60 Hz for 1 min between non-continuous terminals 2,000 VAC, 50/60 Hz for 1 min between each terminal and non-current-carrying metal part
Vibration resistance	Malfunction	10 to 55 Hz, 1.5 mm double amplitude
Shock resistance	Destruction	1,000 m/s² min
	Malfunction	300 m/s² min
Ambient temperature	Operating	-10°C to 80°C (with no icing)
Ambient humidity	Operating	35% to 95% RH
Degree of protection		IEC 60529: IP67

Additional specifications after EN60947-5-1 (TÜV Rheinland File No J50041904)

Category	AC-12 10A/250 VAC
Rated insulation voltage	1,000 VAC
Short circuit protective device	10A fuse type gG (IEC60269)
Protection against electrical shock	Class II

Operating characteristics

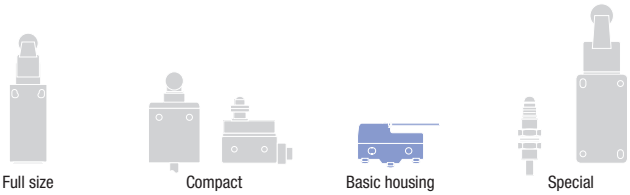
Values for OF and RF are in N and values for PT, OT, MD and OP are in mm unless otherwise specified.

	ZC-D□	ZC-Q2□	ZC-Q5□	ZC-N2□	ZC-W1□	ZC-W21□	ZC-W25□	ZC-W5□
Operating force (OF)	11.8			6.86	2.75		3.92	
Release force (RF)	4.9			1.67	0.59		0.78	
Pre-travel (PT)	1.5				–			
Overtravel (OT)	2.4	3		2.5	8.4		6	
Movement differential (MD)	0.2				1.4		1	
Operating Position (OP)	32.4±0.8	47.4±0.8	38.2±0.8	47.4±0.8	28.5±1.2	43.0±1.2		28.5±1.2

Limit switch with basic plastic housing

The Z series of basic switches in plastic housing provide the same electrical and mechanical switching capability and lifetime as standard limit switches. But with the basic plastic housing the basic switches are an ideal solution with best value for money for uncritical environments or when separately encased in subassemblies.

- Cost efficient basic plastic housing for subassemblies
- Same electrical and mechanical switching ratings as standard limit switches



Ordering information

Actuator type[*1]		Order code[*2]	
		Solder terminal	Screw terminal
	Pin plunger	Z-15G	Z-15G-B
	Short spring plunger	Z-15GD	Z-15GD-B
	Leaf spring	Z-15GL	Z-15GL-B
	Reverse hinge lever	Z-15GM	Z-15GM-B
	Reverse hinge roller lever	Z-15GM2	Z-15GM2-B
	Plunger with M12 mounting	Z-15GQ	Z-15GQ-B
	Hinge lever	Z-15GW	Z-15GW-B
	Hinge roller lever	Z-15GW2	Z-15GW2-B

[*1] Other actuator types are available. For the full range refer to the complete datasheet.
[*2] Contacts are directly accessible. Additional protective measures are required e.g. order covers from accessories.

Specifications

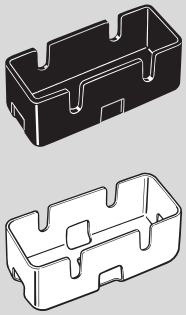
Rated voltage	Non-inductive load				Inductive load			
	Resistive load		Lamp load		Inductive load		Motor load	
	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC	15 A		3 A	1.5 A	15 A		5 A	2.5 A
250 VAC	15 A		2.5 A	1.25 A	15 A		3 A	1.5 A
8 VDC	15 A		3 A	1.5 A	15 A		5 A	2.5 A
14 VDC	15 A		3 A	1.5 A	10 A		5 A	2.5 A
30 VDC	6 A		3 A	1.5 A	5 A		5 A	2.5 A
125 VDC	0.5 A[*1]		0.5 A	0.5 A	0.05 A		0.05 A	0.05 A

[*1] For switching high currents at high voltages (e.g. 10A at 125VDC) contact your OMRON representative.

Durability	Mechanical	10,000,000 operations min.
	Electrical	500,000 operations min.
Operating speed	Plunger	0.01 mm to 1 m/s
Operating frequency	Mechanical	240 operations/min
	Electrical	20 operations/min
Ambient temperature	Operating	-25 to 80°C (with no icing)
Degree of protection		IP00

Accessories

Terminal covers (protection of electrical contacts against accidental contact of e. g. fingers)

Type		Material	Order code	
			for soldering terminal models	for screw terminal models
	Cover with 5 thinner parts (plastic type) or holes (metal type) as cable exit positions. Protective cover is fixed to basic switch with mounting screws of basic switch.	plastic	AP-A	AP-B
		metal	AP1-A	AP1-B
	Cover with bottom cable exit		AP-Z	

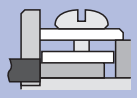
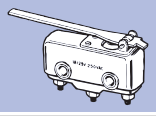
Heat and cold resistant limit and basic switches

The limit switches WL-_T provide the ruggedness, reliability and the wide actuator range of the WL family and allow a direct usage in applications with temperatures from –40 up to 120°C. For applications with even lower or higher temperatures the TZ basic switch provides reliable operation from –65 up to 400°C for sub-assemblies.

- –40 to 120°C in rugged WL limit switch housing for direct usage
- –65 to 400°C in TZ basic housing for sub-assemblies

Full size | Compact | Basic housing | Special

Ordering Information

Actuator type		Connection method	Order code		
			WL_-TCG (–40 to 40°C) 	WL_-THG (5 to 120°C) 	TZ-1G_ (–65 to 400°C) 
	Roller lever (80° overtravel)	Screw terminal (with PG 13.5 conduit)*1	WLCA2-TCG	WLCA2-THG	–
	Roller lever (side mounting and 90° overtravel)		WLCA2-2NTCG	WLCA2-2NTHG	
	Adjustable roller lever		WLCA12-TCG	WLCA12-THG	
	Adjustable roller lever (side mounting and 90° overtravel)		WLCA12-2NTCG	WLCA12-2NTHG	
	Top plunger		WLD-TCG	WLD-THG	
	Top roller plunger		WLD2-TCG	WLD2-THG	
	Top ball plunger		WLD3-TCG	WLD3-THG	
	Horizontal plunger		WLSD-TCG	WLSD-THG	
	Horizontal roller plunger		WLSD2-TCG	WLSD2-THG	
	Horizontal ball plunger		WLSD3-TCG	WLSD3-THG	
	Coil spring		WLNJ-TCG	WLNJ-THG	
	Coil spring (multi wire)		WLNJ-30TCG	WLNJ-30THG	
	Steel wire		WLNJ-S2TCG	WLNJ-S2THG	
	Pin plunger	Screw terminal*2	–	–	TZ-1G
	Hinge lever				TZ-1GV
	Hinge roller lever				TZ-1GV2

*1 Models with screw terminals with M20 conduit instead of PG13.5 are available. Contact your OMRON representative.
*2 Screw contacts are directly accessible. Additional protective measures or covers are required.

Specifications

Voltage and current rating

Model	Rated voltage	Rated current (TÜV: EN60947-5-1)	Non-inductive load			Inductive load		
			Resistive load	Lamp load (NC)	Lamp Load (NO)	Inductive load	Motor load (NC)	Motor load (NO)
WL	125 VAC	-	10 A	3 A	1.5 A	10 A	5 A	2.5 A
	250 VAC	2 A		2 A	1 A		3 A	1.5 A
	500 VAC	-		1.5 A	0.8 A	3 A	1.5 A	0.8 A
	8 VDC	-		6 A	3 A	10 A	6 A	
	14 VDC	-						
	30 VDC	-	6 A	4 A		6 A	4 A	
	48 VDC	2 A	–					
	125 VDC	-	0.8 A	0.2 A		0.8 A	0.2 A	
	250 VDC	-	0.4 A	0.1 A		0.4 A	0.1 A	
TZ	8 VDC	-	1 A	0.9 A	0.45 A	1 A	1.5 A	
	14 VDC	-						
	30 VDC	-						

General specifications[*1]

Item		WL_-TCG	WL_-THG	TZ-1G_
Durability[*1]	Mechanical	10,000,000 operations min		100,000 operations min
	Electrical	750,000 operations min		50,000 operations min
Operating speed	Pin plunger	–		0.05 mm to 1 m/s
	Roller lever	1 mm to 1 m/s		–
Operating frequency	Mechanical	120 operations / minute		60 operations / minute
	Electrical	30 operations / minute		20 operations / minute
Ambient temperature	Operating[*2]	–40 to 40°C	5 to 120°C	–65 to 400°C
Degree of protection		IEC 60529: IP67		IEC 60529: IP00

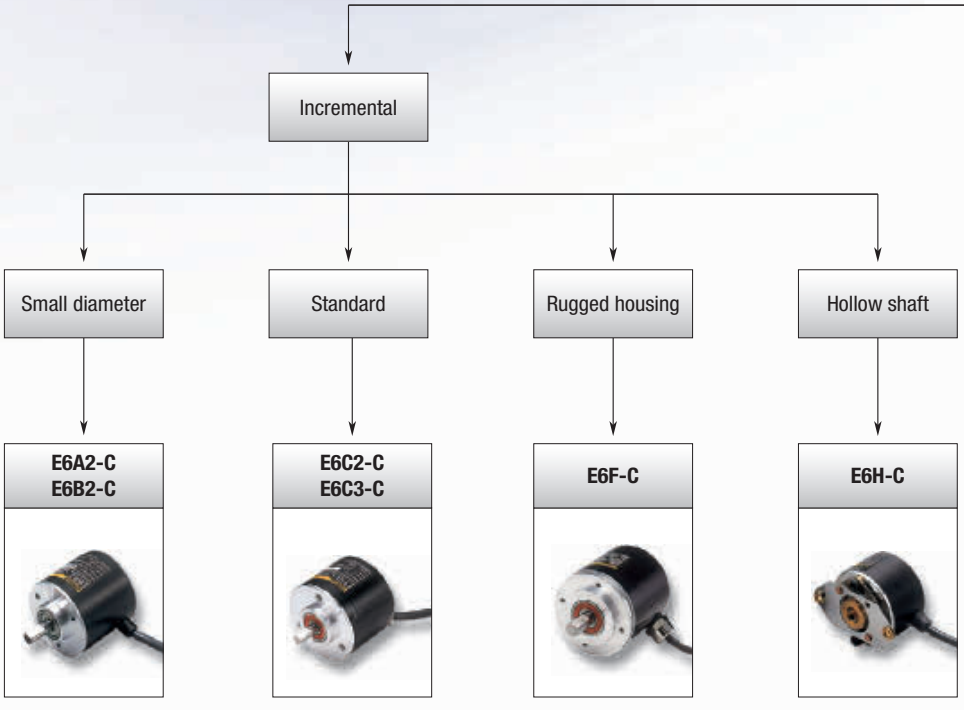
[*1] Values are acquired at 5 to 35°C operating temperature and 40% to 70% operating humidity
[*2] With no icing

ACCURACY AND ROBUSTNESS MADE RELIABLE

Close the loop – angle, position and velocity on hand

Rotary encoders create information which represent the movement of your application. To meet challenging demands, Omron offers a wide range of absolute and incremental encoders.

- Wide resolution variety
- Models with rugged housing
- Models for multi- turn applications



Page 322 Page 323 Page 323 Page 324

Rotary encoders

- Absolute
  - Standard
    - **E6C3-A**

Page 325

  - Rugged housing
    - **E6F-A**

Page 325

Output		Incremental				
						
Model		E6A2-C	E6B2-C	E6C2-C	E6C3-C	E6F-C
Type		Small diameter shaft		Standard		Rugged housing
Resolution range	Min	10			100	
	Max	500	2,000		3,600	1,000
Output	NPN	■	■	■	■	■
	PNP	–	■	■	–	–
Size dia. in mm		25	40	50	50	60
Max force	radial	10	30	50	80	120
	axial	5	20	30	50	50
IP rating	IP50	■	■	–	–	–
	IP64	–	–	■	–	–
	IP65	–	–	–	■	■
Max. rotation frequency		5,000	6,000		5,000	
Page		322		323		

Output		Incremental	Absolute			
						
Model		E6H-C	E6C3-A	E6F-A		
Type		Hollow shaft	Standard	Rugged housing		
Resolution Range	Min	300	6	256		
	Max	3,600	1,024			
Output	NPN	■	■	■		
	PNP	–	■	■		
Size dia. in mm		40 (hollow)	50	60		
Max force	radial	29.4	80	120		
	axial	4.9	50	50		
IP rating	IP50	■	–	–		
	IP64	–	–	–		
	IP65	–	■	■		
Max. rotation frequency		10,000	5,000	5,000		
Page		324	325			

■ Standard ☐ Available – No/not available

Incremental rotary encoder in miniature housing

The E6A family of rotary encoders features a small sized dia 25 mm housing.

- Small sized dia 25 mm housing

Ordering information

Size dia. in mm	Output phase	Power supply voltage	Output form	Resolution (pulse/rotation)	Order code
25	A	5 to 12 VDC	NPN voltage output	10, 20, 60, 100, 200, 300, 360, 500	E6A2-CS3E
			NPN open collector	10, 20, 60, 100, 200, 300, 360, 500	E6A2-CS3C
		12 to 24VDC			E6A2-CS5C
	A, B	5 to 12 VDC	NPN voltage output	100, 200, 360, 500	E6A2-CW3E
			NPN open collector	100, 200, 360, 500	E6A2-CW3C
		12 to 24VDC			E6A2-CW5C
	A, B, Z	5 to 12 VDC	NPN voltage output	100, 200, 360, 500	E6A2-CWZ3E
			NPN open collector	100, 200, 360, 500	E6A2-CWZ3C
		12 to 24VDC			E6A2-CWZ5C

E6B2-C

Incremental rotary encoder in compact housing

The E6B family of incremental rotary encoders features a housing size dia 40 mm.

- Line driver output models available

Ordering information

Size dia. in mm	Power supply voltage	Output form	Resolution (pulse/rotation)	Order code
40	5 to 24 VDC	NPN open collector output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500 1,800, 2,000	E6B2-CWZ6C
	12 to 24VDC	PNP open collector output	100, 200, 360, 500, 600, 1,000, 2,000	E6B2-CWZ5B
	5 to 12 VDC	NPN voltage output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 1,000, 1,200, 1,500 1,800, 2,000	E6B2-CWZ3E
	5 VDC	Line driver output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 1,000, 1,024, 1,200, 1,500 1,800, 2,000	E6B2-CWZ1X

Incremental rotary encoder with enhanced water resistant

The E6C family of dia 50 mm incremental rotary encoders features an improved water resistance compared to standard models.

- IP64f or IP65f drip-proof, oil-proof construction

Ordering information

	Size dia. in mm	Power supply voltage	Output form	Resolution (pulse/rotation)	Order code
Standard models	50	5 to 24 VDC	NPN open collector output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000	E6C2-CWZ6C
		12 to 24VDC	PNP open collector output	100, 200, 360, 500, 600, 1,000, 2,000	E6C2-CWZ5B
		5 to 12 VDC	NPN voltage output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000	E6C2-CWZ3E
		5 VDC	Line driver output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000	E6C2-CWZ1X
8 dia. tough model		12 to 24VDC	Complimentary output	100, 200, 300, 360, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000, 2,048, 2,500, 3,600	E6C3-CWZ5GH
		5 to 12 VDC	NPN voltage output	100, 200, 300, 360, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000, 2,048, 2,500, 3,600	E6C3-CWZ3EH
		5 to 12 VDC	Line driver output	100, 200, 300, 360, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000, 2,048, 2,500, 3,600	E6C3-CWZ3XH

E6F-C

Incremental rotary encoder in rugged housing

The E6F family of dia 60 mm rotary encoders features a rugged housing.

- Strong shaft for max 120 N in radial direction and max 50 N in thrust direction)
- Water- and oil-proof structure (IP65f)

Ordering information

Size dia. in mm	Power supply voltage	Output form	Resolution (pulse/rotation)	Order code
60	12 to 24VDC	Complimentary output	100, 200, 360, 500, 600, 1000	E6F-CWZ5G

Incremental rotary encoder with hollow shaft

The E6H family of incremental encoders features a dia 40 mm housing with hollow shaft.

- Wide operating voltage range from 5 to 24 VDC
- Line drive output available (100 m max.)

Ordering information

Size dia. in mm	Power supply voltage	Output form	Resolution (pulse/rotation)	Order code
40	5 to 24 VDC	Open collector output	300, 360, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000, 2,048, 2,500, 3,600	E6H-CWZ6C
	5 to 12 VDC	Voltage output	300, 360, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000, 2,048, 2,500, 3,600	E6H-CWZ3E
	5 to 12 VDC	Line drive output	300, 360, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000, 2,048, 2,500, 3,600	E6H-CWZ3X

Absolute rotary encoder with enhanced water resistance

The E6C family of dia 50 mm incremental rotary encoders features an improved water resistance compared to standard models.

- IP65f drip-proof, oil-proof construction

Ordering information

Size dia. in mm	Power supply voltage	Output form	Output code	Resolution (pulse/rotation)	Connection method	Order code
50	12 to 24VDC	NPN open collector output	Gray code	256, 360	Connector type	E6C3-AG5C-C
				256, 360, 720, 1,024	Pre-wired type	E6C3-AG5C
			Binary	32, 40		E6C3-AN5C
			BCD	6, 8, 12		E6C3-AB5C
		PNP open collector output	Gray code	256, 360, 720, 1,024		E6C3-AG5B
			Binary	32, 40		E6C3-AN5B
			BCD	6, 8, 12		E6C3-AB5B
	5 VDC	NPN voltage output	Binary	256		E6C3-AN1E
	12 VDC					E6C3-AN2E

E6F-A

Absolute rotary encoder in rugged housing

The E6F family of dia 60 mm rotary encoders features a rugged housing.

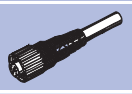
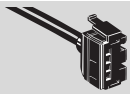
- Stronger shaft and higher durability (120 N in radial direction and 50 N in thrust direction) than previous E6F Encoders
- Drip-proof construction meets IP64F standards
- High-resolution models (1024 pulses max. per revolution)
- Faster response for high-speed control applications (grey code: 20 kHz)

Ordering information

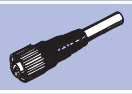
Size dia. in mm	Power supply voltage	Output form	Output code	Resolution (pulses/revolution)	Connection method	Order code
60	12 to 24 VDC	NPN open collector	BCD	360	Pre-wired	E6F-AB5C
					Connector type*1	E6F-AB5C-C
			Gray code	256, 360, 720, 1,024	Pre-wired	E6F-AG5C
		PNP open collector	BCD	360	Pre-wired	E6F-AB5B
			Gray code	256, 360, 720, 1,024	Pre-wired	E6F-AG5B

*1 For extension cables order E69-DF5 (5M) or E69-DF10 (10M).

Cable connectors

Size	Shape	Type	Features	Material		Order code	
				Nut	Cable		
M8		PRO	3 pin	Brass (CuZn)	PVC 2 m	XS3F-M8PVC3S2M-EU	XS3F-M8PVC3A2M-EU
					PUR 2 m	XS3F-M8PUR3S2M-EU	XS3F-M8PUR3A2M-EU
			4pin		PVC 2 m	XS3F-M8PVC4S2M-EU	XS3F-M8PVC4A2M-EU
					PUR 2 m	XS3F-M8PUR4S2M-EU	XS3F-M8PUR4A2M-EU
		LITE	3 pin	Brass (CuZn)	PVC 2 m	XS3F-LM8PVC3S2M	XS3F-LM8PVC3A2M
			4 pin			XS3F-LM8PVC4S2M	XS3F-LM8PVC4A2M
		PRO^{plus} Detergent resistant	4 pin	Stainless steel (SUS316L)	PVC 2 m	Y92E-S08PVC4S2M-L	Y92E-S08PVC4A2M-L
		PRO^{plus} Robotic (drag chain)	4 pin	Brass (CuZn)	Robotic PVC 2 m	XS3F-M421-402-R	XS3F-M422-402-R
					Robotic PUR 2 m	Y92E-M08PUR4S2M-L	Y92E-M08PUR4A2M-L
		High robotic (drag chain & torsion)			High robotic PUR 2 m	Y92E-M08PUR4S2M-R	Y92E-M08PUR4A2M-R
M12		PRO	3 wire	Brass (CuZn)	PVC 2 m	XS2F-M12PVC3S2M-EU	XS2F-M12PVC3A2M-EU
					PUR 2 m	XS2F-M12PUR3S2M-EU	XS2F-M12PUR3A2M-EU
			4 wire		PVC 2 m	XS2F-M12PVC4S2M-EU	XS2F-M12PVC4A2M-EU
					PUR 2 m	XS2F-M12PUR4S2M-EU	XS2F-M12PUR4A2M-EU
			5 wire		PVC 2 m	XS2F-M12PVC5S2M-EU	XS2F-M12PVC5A2M-EU
					PUR 2 m	XS2F-M12PUR5S2M-EU	XS2F-M12PUR5A2M-EU
		LITE	3 wire	Brass (CuZn)	PVC 2 m	XS2F-LM12PVC3S2M	XS2F-LM12PVC3A2M
			4 wire			XS2F-LM12PVC4S2M	XS2F-LM12PVC4A2M
		PRO^{plus} LED (power and output LED, PNP)	3 wire	Nickel plated brass	PVC 2 m	–	XS2F-M12PVC3A2MPLED
			4 wire			–	XS2F-M12PVC4A2MPLED
			3 wire		PUR 2 m	–	XS2F-M12PUR3A2MPLED
			4 wire			–	XS2F-M12PUR4A2MPLED
		PRO^{plus} Detergent resistant	4 wire	Stainless steel (SUS316L)	PVC 2 m	Y92E-S12PVC4S2M-L	Y92E-S12PVC4A2M-L
		PRO^{plus} 105°C Heat resistant	4 wire	Stainless steel (SUS316L)	Heat resistant PVC 2 m	XS2F-E421-D80-E	XS2F-E422-D80-E
		Twist & click	4 wire	Nickel plated Zinc	PVC 2 m	XS5F-D421-D80-F	XS5F-D422-D80-F
					PUR 2 m	XS5F-D421-D80-P	XS5F-D422-D80-P
		PRO^{plus} Robotic (drag chain)	4 wire	Brass (CuZn)	Robotic PVC 2 m	XS2F-D421-D80-F	XS2F-D422-D80-F
					Robotic PUR 2 m	Y92E-M12PUR4S2M-L	Y92E-M12PUR4A2M-L
		High robotic (drag chain & torsion)			High grade robotic PUR 2 m	Y92E-M12PUR4S2M-R	Y92E-M12PUR4A2M-R
		8 pin	8 wire shielded cable	Brass (CuZn)	Shielded PUR 2m	Y92E-M12PURSH8S2M-L	–
Fiber amplifier (E3X) connector		Fiber amplifier connectors	Special fiber connector - 4 wire	PBT	PVC 2 m	E3X-CN21	
			Special fiber connector + M8 plug	Plug: Zinc diecast	PVC 30 cm with M8 4-pin plug	E3X-CN21-M3J-2 0.3M	
			Special fiber connector + M12 plug		PVC 30 cm with M12 4-pin plug	E3X-CN21-M1J 0.3M	
Photomicrosensor (EE-SX) connector Cable connector		Cable connector	standard cable	Nylon	PVC 1 m	EE-1017 1M	
			robotic cable			EE-1017-R 1M	

Cable connectors

Size	Shape	Type	Features	Material		Order code	
				Nut	Cable		
M12		IDC (Insulation Displacement Contact)	Fast and easy IDC pressure-welded assembly One connector for cable diameters of 3 mm to 8 mm IP 67 for waterproof connection Smartclick connection	Brass	n.a.	XS5G-D418 XS5C-D418	
M8/M12		Confection-able	Plugs and connectors for self assembly	Brass	n.a.	XS2G, XS2C Y92E_conf	
M12		Field I/0 boxes	Direct wiring or DeviceNet communication	–		XW3B, DRT2	
M8/M12		T-connectors, covers, accessories and extended wiring portfolio	n.a.	–		XS2R, XS3R, XY2F, …	