

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.



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E3Z SENSOR, ALWAYS DOES THE JOB

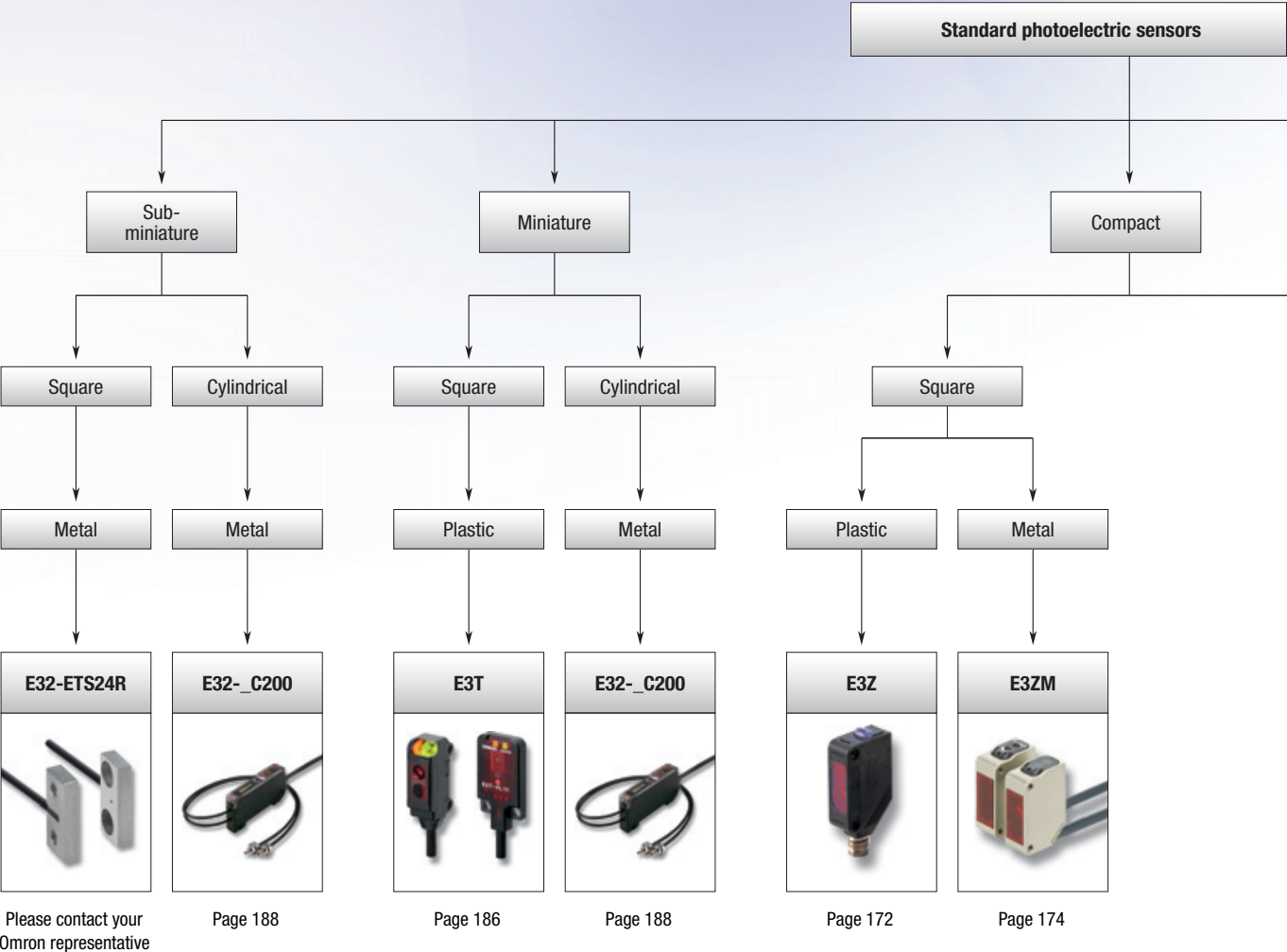
Reliability and accuracy confirmed by millions... every day

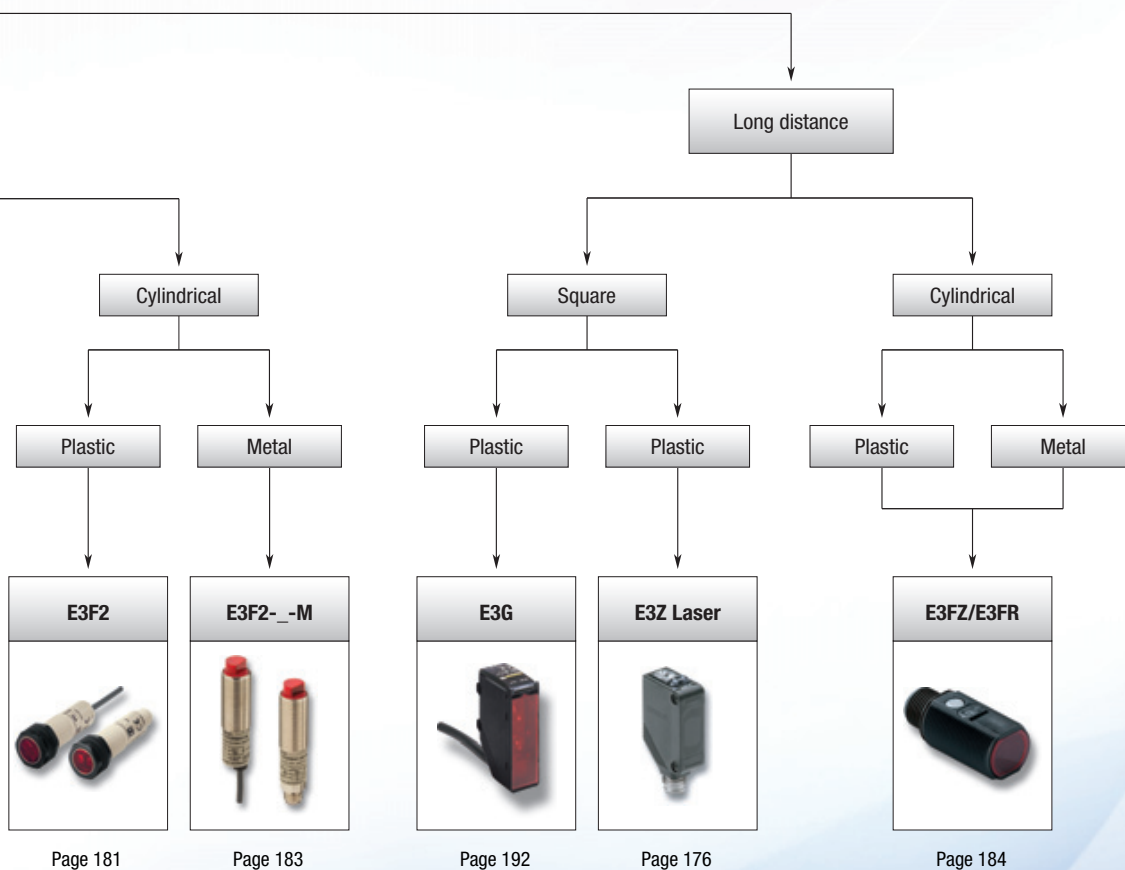
The return rate of our E3Z family is less than 20 ppm, guaranteeing low commissioning costs for new industrial installations and low maintenance costs during operational life.

- Optimal sensing performance tuned to your application
- Various housing designs fitting in your application concept
- Housing material for your operation environment



Download the brochure at:
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Selection table


Compact standard size



Standard applications	Family	E3Z		E3F		
						
	Model	E3Z	E3ZM	E3F2, E3F2-_M	E3F2, E3F2-_M	
	Type	Compact	Compact, detergent resistant	Compact M18 cylindrical	Long distance	
	Material	PBT	SUS	ABS, brass, SUS	ABS, brass	
	Through-beam	15 m, 30 m	15 m	7 m	10 m	
	Retroreflective polarizing	4 m	4 m	2 m	4 m	
	Retroreflective	–	–	2 m	–	
	Diffuse reflective (energetic)	1 m	1 m	300 mm	1 m	
	Diffuse reflective (background suppression)	200 mm	200 mm	100 mm	–	
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Special applications	Application	Precision positioning and detection	PET bottle detection	Conveying application		Building installation
						
	Model	E3Z Laser	E3Z-B	E3F2- 41		E3F2-_Z
	Type	LASER sensor	PET bottle sensor	Cylindrical sensors with 90° optics		Cylindrical AC voltage sensor
	Key features	Visible LASER light with small spot for precision detection	Optimised optical setting for clear bottle detection	Radial (90°) optics for simple installation and adjustment		24 to 240 VAC power supply voltage
	Through-beam	60 m	–	–		3 m
	Retroreflective	7 m, 15 m	0.5 m, 2 m	2 m		2 m
	Diffuse reflective	–	–	300 mm		100 mm
	Diffuse reflective (background suppression)	300 mm	–	–		–
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Enhanced functionality	Application	Object detection and sensor condition monitoring	Object detection	Speed mounting and installation		
						
	Model	E3Z- G, E3Z- _J	E3Z- H	E3FZ		
	Type	Preventive maintenance	Tampering protection	Secure-click snap mounting		
	Key features	'dirty lens' and 'signal stability' check by passive alarm or active power check	Without adjuster to prevent misalignment	24 to 240 VAC power supply voltage		
	Through-beam	15 m	15 m	15 m		
	Retroreflective	4 m	4 m	4 m		
	Diffuse reflective	1 m	1 m	1 m		
	Diffuse reflective (background suppression)	–	–	200 mm		
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	E3S-C	Miniature size	
Standard applications			
	E3S-C	E32_-C200	E3T
	–	Sub-miniature	Miniature
	Zinc diecast	Polyethylene	PBT
	30 m	3 m	1 m
	3 m	–	–
	–	–	200 mm
	2 m	150 mm	30 mm
	500 mm	–	–
	179	188	186

Long distance large size	
	
E3G	
Long distance	
PBT	
–	
10 m	
–	
2 m	
1.2 m	
192	

	Glass bottle detection	Fast response counting
Special applications		
	E3S-CR62/67	EE-SX91
	Transparent bottle sensor	Miniature fork size
	Special optical design for reliable detection of glass bottles compensating 'double-detection effect'	5 mm slot width with 15 µs response time
	–	5 mm slot
	0 to 250 mm, 1 m	–
	–	–
	–	–
	194	189

Doors and building installations	
	
E3JK/E3JM	E3G-M
Compact AC&DC voltage sensor	Long distance AC&DC voltage sensor
12 to 240 VDC or 24 to 240 VAC power supply voltage	
5 m, 10 m	–
4 m	10 m
300 mm, 700 mm	2 m
–	–
191	193

	High precision positioning
Enhanced functionality	
	E3C-LDA
	High precision LASER sensor
	Up to 10 µm accuracy
	–
	7 m
	1 m
	–
	197

PCB detection	Mark detection on laminated objects	
		
E3S-LS3	E3M-V	
Wide beam models	Mark sensor	
Wide beam for detection of structured objects (e.g. with holes)	Coaxial optical system for reliable mark detection	
–	–	
–	–	
–	10±3 mm	
35 mm, 60 mm	–	
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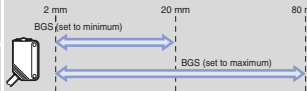
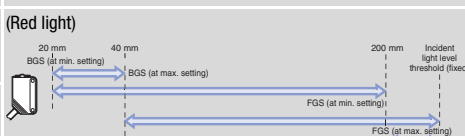


General purpose sensors in compact plastic housing

Compact housing size and high-power LED for excellent performance-size ratio and best value-performance ratio for standard applications.

- Compact housing size and high power LED for excellent performance-size ratio
- IP67 and IP69K for highest protection in wet environment
- Intensive shielding for highest noise immunity (EMC)
- Tough PBT housing for high mechanical resistance

Ordering information

Sensor type	Connection method	Sensing distance	Order code	
			NPN output	PNP output
Through-beam	Pre-wired models (2 m) ^{*1}	30 m (Infrared light)	E3Z-T62	E3Z-T82
	Connector type		E3Z-T67	E3Z-T87
	Pre-wired models (2 m) ^{*1}	10 m (Red light)	E3Z-T61A	E3Z-T81A
	Connector type		E3Z-T66A	E3Z-T86A
Retroreflective model (with M.S.R. function)	Pre-wired (2 m) ^{*1}	4 m (100 mm) ^{*2} (Red light)	E3Z-R61	E3Z-R81
	Connector type		E3Z-R66	E3Z-R86
Diffuse-reflective	Pre-wired models (2 m) ^{*1} , ^{*3}	1 m (Infrared light)	E3Z-D62	E3Z-D82
	Connector type		E3Z-D67	E3Z-D87
Distance-settable	Pre-wired (2 m)	(Red light)	E3Z-LS63	E3Z-LS83
	4-pin M8 Connector		E3Z-LS68	E3Z-LS88
	Pre-wired models (2 m) ^{*1}	(Red light)	E3Z-LS61	E3Z-LS81
	Connector type		E3Z-LS66	E3Z-LS86

^{*1} Models provided with a 0.5 m cable are available. When ordering, specify the cable length by adding the code "0.5M" to the model number (e.g., E3Z-T61 0.5M).

^{*2} The sensing distance specified is possible when the E39-R1S used. Figure in parentheses indicate the minimum required distance between the sensor and reflector.

^{*3} The connector joint type is available M12. Its model ends with -M1J. (Example: E3Z-T61-M1J)

Specifications

Output		Through-beam		Retroreflective model (with M.S.R. function)	Diffuse-reflective	Distance-settable	
Item	NPN	E3Z-T62/T67	E3Z-T61A/T66A	E3Z-R61/R66	E3Z-D62/D67	E3Z-LS61/66	E3Z-LS63/68
	PNP	E3Z-T82/T87	E3Z-T81A/T86A	E3Z-R81/R86	E3Z-D82/D87	E3Z-LS81/86	E3Z-LS83/88
Sensing distance		30 m	10 m	4 m (100 mm) ^{*1} (When using the E39-R1S)	1 m (White paper 300x300 mm)	BGS: White or black paper (100x100 mm): 20 mm to set distance FGS: White paper (100x100 mm): Set distance to 200 mm min. Black paper (100x100 mm): Set distance to 160 mm min.	2 mm to set distance (max. 80mm)
Directional angle		Both emitter and receiver: 3° to 15°		2° to 10°	—		
Light source (wave length)		Infrared LED (870 nm)	Red LED (700 nm)	Red LED (680 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.					
Control output		Load power supply voltage 26.4 VDC max., load current 100 mA max. (residual voltage 2 V max.) Open collector output type (depends on the NPN/PNP output format) Light-ON/Dark-ON switch selectable					

Output		Through-beam		Retroreflective model (with M.S.R. function)	Diffuse-reflective	Distance-settable	
Item	NPN	E3Z-T62/T67	E3Z-T61A/T66A	E3Z-R61/R66	E3Z-D62/D67	E3Z-LS61/66	E3Z-LS63/68
	PNP	E3Z-T82/T87	E3Z-T81A/T86A	E3Z-R81/R86	E3Z-D82/D87	E3Z-LS81/86	E3Z-LS83/88
Protective circuits		Reverse polarity protection, output short-circuit protection, mutual interference prevention, output reverse protection	Protection from load short-circuit and reversed power supply connection	Reverse polarity protection, output short-circuit protection, mutual interference prevention, output reverse protection		Reverse polarity protection, output short-circuit protection, mutual interference prevention	
Response time		Operation or reset: 2 ms max.	Operation or reset: 1 ms max.				
Ambient temperature		Operating: -25 to 55°C, Storage: -40 to 70°C (with no icing or condensation)					
Vibration resistance		10 to 55 Hz, 1.5 mm or 300 m/s ² double amplitude for 2 hours each in X, Y, and Z directions					
Shock resistance		Destruction: 500 m/s ² for 3 times each in X, Y, and Z directions					
Degree of protection		IEC 60529 IP67, IP69K after DIN 40050 part 9					
Connection method		Pre-wired (standard length: 2 m/500 mm)/M8 connector					
Material	Case	PBT (polybutylene terephthalate)					
	Lens	Denatured polyacrvlate resin	Methacylate resin				Denatured polyacrylate

*1 Values in parentheses indicate the minimum required distance between the sensor and reflector.



Compact photo electric sensor in rugged 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 applications.

- Detergent-resistant stainless steel housing
- IP67 and IP69k for highest water resistance

Ordering information

Sensor type	Connection method	Sensing distance	Order code	
			NPN output	PNP output
Through-beam ^{*1}	Pre-wired (2 m) ^{*2}	15 m	E3ZM-T61	E3ZM-T81
	Connector type (M8, 4 pins) ^{*3}	(Infrared LED)	E3ZM-T66	E3ZM-T86
	Pre-wired (2 m) ^{*2}	0.8 m with built-in slip	E3ZM-T63	E3ZM-T83
	Connector type (M8, 4 pins) ^{*3}	(Infrared LED)	E3ZM-T68	E3ZM-T88
Retroreflective (with M.S.R. function)	Pre-wired (2 m) ^{*2}	4 m (100 mm)	E3ZM-R61	E3ZM-R81
	Connector type (M8, 4 pins) ^{*3}	(Red LED)	E3ZM-R66	E3ZM-R86
Diffuse-reflective	Pre-wired (2 m) ^{*2}	1 m	E3ZM-D62	E3ZM-D82
	Connector type (M8, 4 pins) ^{*3}	(Infrared LED)	E3ZM-D67	E3ZM-D87
BGS reflective ^{*4} (fixed distance)	Pre-wired (2 m) ^{*2}	10 to 100 mm	E3ZM-LS61X	E3ZM-LS81X
	Connector type (M8, 4 pins) ^{*3}	(Red LED)	E3ZM-LS66X	E3ZM-LS86X
	Pre-wired (2 m) ^{*2}	10 to 150 mm	E3ZM-LS62X	E3ZM-LS82X
	Connector type (M8, 4 pins) ^{*3}	(Red LED)	E3ZM-LS67X	E3ZM-LS87X
	Pre-wired (2 m) ^{*2}	10 to 200 mm	E3ZM-LS64X	E3ZM-LS84X
	Connector type (M8, 4 pins) ^{*3}	(Red LED)	E3ZM-LS69X	E3ZM-LS89X

^{*1} Through-beam models are also available with a light emission stop function. When ordering, add "-G0" to the end of the model number (e.g., E3ZM-T61-G0).

^{*2} Pre-wired models with a 5 m cable are also available for these products. When ordering, specify the cable length by adding "5M" to the end of the model number (e.g., E3ZM-T61 5M). M12 pre-wired connector models are also available. When ordering, add "-M1J" to the end of the model number (e.g., E3ZM-R61-M1J 0.3m).

^{*3} M8 connector models are also available with three-pin connectors. When ordering, add "-M5J" to the end of the model number (e.g., E3ZM-T66-M5J).

This does not apply to BGS reflective models, however, because they require 4 pins.

^{*4} 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.

Detergent resistant cable connectors (sus nut)

Type	Appearance	Length ^{*1}	Order code
M8 4-pin	straight	2 m	Y92E-S08PVC4S2M-L
	angled (L-Shape)		Y92E-S08PVC4A2M-L

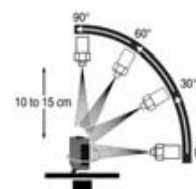
^{*1} For 5 m cable versions please order Y92E-S08_5M-L

Specifications

Output		Through-beam		Retroreflective model (with M.S.R. function)	Diffuse-reflective Models
Item	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
Sensing distance		15 m	0.8 m	4 m [100 mm] (Using E39-R1S) 3 m [100 mm] (Using E39-R1)	1 m (White paper 300 x 300 mm)
Directional angle		Emitter and Receiver: 3° to 15°		Sensor: 3° to 10° Reflector: 30°	—
Light source (wave length)		Infrared LED (870 nm)		Red LED (660 nm)	Infrared LED (860 nm)
Power supply voltage		10 to 30 VDC, including 10% ripple (p-p)			
Control output		Load power supply voltage: 30 VDC max., Load current: 100 mA max. (Residual voltage: 2 V max.) Open-collector output (NPN/PNP output depending on model) Light-ON/Dark-ON switch selectable			
Protection circuits		Reversed power supply polarity protection, Output short-circuit protection, and Reversed output polarity protection		Reversed power supply polarity protection, output short-circuit protection, mutual interference prevention, and reversed output polarity protection	
Ambient temperature range		Operating: -25°C to 55°C, storage: -40°C to 70°C (with no icing or condensation)			
Vibration resistance		Destruction: 10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions			
Shock resistance		Destruction: 500 m/s ² 3 times each in X, Y, and Z directions			
Degree of protection ^{*1}		IEC: IP67, DIN 40050-9: IP69K			

Output		Through-beam		Retroreflective model (with M.S.R. function)	Diffuse-reflective Models
Item	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
Connection method		Pre-wired cable (standard length: 2 m) Standard M8 4-pin Connector			
Materials	Case	SUS316L			
	Lens	Methacrylic resin			
	Display	PES (polyether sulfone)			
	Sensitivity adjustment and operation switch	PEEK (polyether ether ketone)			
	Seals	Fluoro rubber			

*1 IP69K degree of protection specification IP69K is a protection standard against high temperature and high-pressure water defined in the German standard DIN 40050, Part 9. The test piece is sprayed with water at 80°C at a water pressure of 80 to 100 BAR using a specified nozzle shape. The distance between the test piece and nozzle is 10 to 15 cm, and water is sprayed horizontally for 30 seconds each at 0°, 30°, 60°, and 90° while rotating the test object on a horizontal plane.



Output		BGS Reflective Models		
Item	NPN	E3ZM-LS61X E3ZM-LS66X	E3ZM-LS62X E3ZM-LS67X	E3ZM-LS64X E3ZM-LS69X
	PNP	E3ZM-LS81X E3ZM-LS86X	E3ZM-LS82X E3ZM-LS87X	E3ZM-LS84X E3ZM-LS89X
Sensing distance		10 to 100 mm (White paper 100×100 mm)	10 to 150 mm (White paper 100×100 mm)	10 to 200 mm (White paper 100×100 mm)
Black/white error		5% of sensing distance max.	10% of sensing distance max.	20% of sensing distance max.
Light source (wave length)		Red LED (650 nm)	Red LED (660 nm)	
Power supply voltage		10 to 30 VDC, including 10% ripple (p-p)		
Control output		Load power supply voltage: 30 VDC max., Load current: 100 mA max. (Residual voltage: 2 V max.) Open-collector output (NPN/PNP output depending on model) Light-ON (for Dark-ON please order E3ZM-LS_Y)		
Protection circuits		Reversed power supply polarity protection, output short-circuit protection, reversed output polarity protection, mutual interference protection		
Ambient temperature range		Operating: -25°C to 55°C, Storage: -40°C to 70°C (with no icing or condensation)		
Vibration resistance		Destruction: 10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions		
Shock resistance		Destruction: 500 m/s ² 3 times each in X, Y, and Z directions		
Degree of protection *1		IEC: IP67, DIN 40050-9: IP69K		
Connection method		Pre-wired cable (standard length: 2 m) Standard M8 4-pin connector		
Materials	Case	SUS316L		
	Lens	Methacrylic resin		
	Display	PES (polyether sulfone)		
	Sensitivity adjustment and operation switch	PEEK (polyether ether ketone)		
	Seals	Fluoro rubber		

*1 IP69K degree of protection specification.



LASER sensor in compact size 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 high functional reserve
- Class 1 LASER for high user safety

Ordering information

Sensing method	Connection method	Response time	Sensing distance	Order code	
				NPN output	PNP output
Through-beam	Pre-wired (2 m)	1 ms	60 m	E3Z-LT61	E3Z-LT81
	Standard M8 connector			E3Z-LT66	E3Z-LT86
Retroreflective with M.S.R. function (Polarizing)	Pre-wired (2 m)		0.3 to 15 m (using E39-R1)	E3Z-LR61	E3Z-LR81
	Standard M8 connector		0.2 to 7 m (using E39-R12 and R6)	E3Z-LR66	E3Z-LR86
Distance-settable (BGS-Models)	Pre-wired (2 m)	0.5 ms	20 to 40 mm (Min. distance)	E3Z-LL61	E3Z-LL81
	Standard M8 connector		20 to 300 mm (Max. distance)	E3Z-LL66	E3Z-LL86
	Pre-wired (2 m)		25 to 40 mm (Min. distance)	E3Z-LL63	E3Z-LL83
	Standard M8 connector		25 to 300 mm (Max. distance)	E3Z-LL68	E3Z-LL88

Specifications

Sensing method		Through-beam	Retro-reflective with M.S.R. function	Diffuse-reflective (distance settable)	
Response		Standard response			High-speed response
Item	Order code	NPN output	E3Z-LT61/-LT66	E3Z-LR61/-LR66	E3Z-LL61/-LL66
	PNP output	E3Z-LT81/-LT86	E3Z-LR81/-LR86	E3Z-LL81/-LL86	E3Z-LL63/-LL68
Sensing distance		60 m	0.3 to 15 m (when using E39-R1S) 0.2 to 7 m (when using E39-R12) 0.2 to 7 m (when using E39-R6)	White paper (100x100 mm) 20 to 300 mm Black paper (100x100 mm) 20 to 160 mm	White paper (100x100 mm) 25 to 300 mm Black paper (100x100 mm) 25 to 100 mm
Light source (wavelength)		Red LD (655 nm), JIS Class 1, IEC Class 1, FDA Class II			
Power supply voltage		12 to 24 VDC $\pm 10\%$, ripple (p-p): 10% max.			
Ambient temperature range		Operating: -10 to 55°C, Storage: -25 to 70°C (with no icing or condensation)			
Vibration resistance		Destruction: 10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions			
Shock resistance		Destruction: 500 m/s ² 3 times each in X, Y, and Z directions			
Degree of protection		IP67 (IEC 60529), IP69k (DIN 40050-9)			
Connection method		Pre-wired cable (standard length: 2 m):E3Z-L_1/-L_3 Standard M8 connector:E3Z-L_6/-L_8			
Material	Case	PBT (polybutylene terephthalate)			
	Lens	Modified polyacrylate resin	Methacrylic resin	Modified polyacrylate resin	

PET bottle detection photoelectric sensor

The E3Z-B features the inner view optical system for reliable PET bottle detection.

- Uses Omron's unique optical system
- Detects a wide range of bottles from 500 ml bottles to 2 l bottles, and from single bottles to sets of stocked bottles
- IP67/IP69K tested for highest water resistance







Ordering information

Sensor type	Shape	Connection method	Sensing distance	Order code	
				NPN output	PNP output
Retroreflective model (without M.S.R. function)		Pre-wired ^{*1}	80 to 500 mm ^{*2} (Red light)	E3Z-B61	E3Z-B81
		Connector type		E3Z-B66	E3Z-B86
		Pre-wired models	0.5 to 2 m ^{*2} (Red light)	E3Z-B62	E3Z-B82
		Connector type		E3Z-B67	E3Z-B87

^{*1} The cable of 0.5 m length is also available. Specify the cable length at the end of the model name. (Example: E3Z-B61 0.5M)

^{*2} The specified sensing distance is possible when the E39-R1S is used.

Specifications

Sensor type		Retroreflective model (without M.S.R. function)			
Order code	NPN output	E3Z-B61	E3Z-B66	E3Z-B62	E3Z-B67
Item	PNP output	E3Z-B81	E3Z-B86	E3Z-B82	E3Z-B87
Sensing distance		500 mm (80 mm) ^{*1} (When using the E39-R1S)		2 m (100 mm) ^{*1} (When using the E39-R1S)	
Light source (wave length)		Red LED (680 nm)			
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p) : 10% max.			
Control output		Load power supply voltage 26.4 VDC max., load current 100 mA max. (residual voltage 1 V max.) Open collector output type (depends on the NPN/PNP output format) Light-ON/Dark-ON switch selectable			
Protective circuits		Reverse polarity protection, output short-circuit protection, mutual interference prevention			
Response time		Operation or reset: 1 ms max.			
Ambient temperature		Operating: -25°C to 55°C, Storage: -40°C to 70°C (with no icing or condensation)			
Vibration resistance		10 to 55 Hz, 1.5 mm or 300 m/s ² double amplitude for 2 hours each in X, Y, and Z directions			
Shock resistance		Destruction: 500 m/s ² for 3 times each in X, Y, and Z directions			
Degree of protection		IEC 60529 IP67, IP69K (DIN 40050-9)			
Connection method		 Pre-wired type (Standard cable length 2 m/500 mm)	 M8 connector	 Pre-wired type (Standard cable length 2 m/500 mm)	 M8 connector
Indicator lamp		Operation indicator (orange)			
Material	Case	PBT (polybutylene terephthalate)			
	Lens	Methacrylate resin			

^{*1} Figures in parentheses indicate the minimum required distances between the sensors and reflectors.



Compact size photoelectric sensors for condition monitoring and preventive maintenance

The E3Z 'Preventive maintenance' family features active or passive sensor function checking capabilities detecting misalignments, dirt covers, defective sensors, jammed products, etc.

- E3Z- _J0: Self-diagnostic alarm output on instable signal
- E3Z- _G2: Light intensity switch for detection of dirt cover by power reduction
- E3Z- _G2: Detection of dirt cover by power reduction (smart alarm)

Ordering information

Sensor type	Sensing distance	Output specifications	Order code			
			Preventive maintenance function			
			Anti-tampering	Self diagnosis	Emission stop	Light intensity switching
Through-beam	15 m	NPN	E3Z-T61H	E3Z-T61-J0SHW	E3Z-T61-G0SHW	E3Z-T61-G2SHW
		PNP	E3Z-T81H	E3Z-T81-J0SHW	E3Z-T81-G0SHW	E3Z-T81-G2SHW
Retroreflective	4 m	NPN	E3Z-R61H	E3Z-R61-J0SRW	E3Z-R61-G0SRW	E3Z-R61-G2SRW
		PNP	E3Z-R81H	E3Z-R81-J0SRW	E3Z-R81-G0SRW	E3Z-R81-G2SRW
Diffuse-reflective	1 m	NPN	E3Z-D62H	—	E3Z-D62-G0SHW	E3Z-D62-G2SHW
		PNP	E3Z-D82H	E3Z-D82-J0SHW	E3Z-D82-G0SHW	E3Z-D82-G2SHW

Specifications

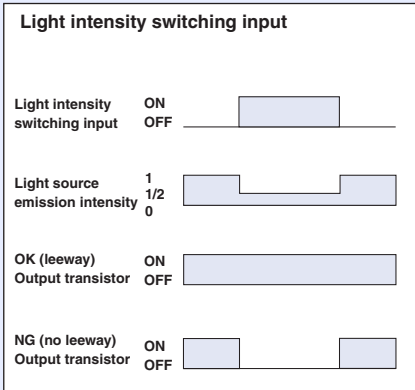
Item	E3Z-T_	E3Z-R_	E3Z-D_
Sensing distance	15 m	4 m	1 m
Light source	Infrared LED (870 nm)	Red LED (660 nm)	Infrared LED (860 nm)
Power supply voltage	12 to 24 VDC ±10%		
Ambient temperature	Operating: -25 to 55°C, Storage: -40 to 70°C (with no icing or condensation)		
Vibration resistance	10 to 55 Hz, 1.5 mm or 300 m/s ² double amplitude for 2 hours each in X, Y, and Z directions		
Degree of protection	IP67, IP69K		
Material	PBT		

Light intensity switching/Self diagnostic output

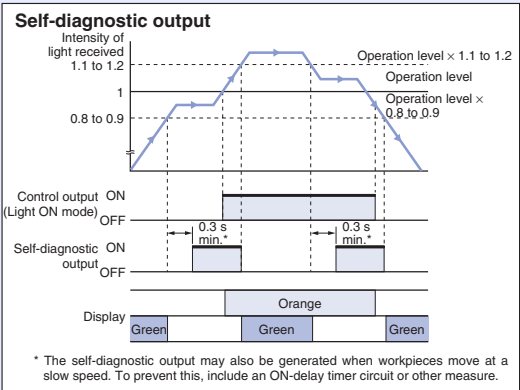
Errors might be caused by a dusty or dirty lens.

Full protection provided by light intensity switching and self-diagnostic output functions. When using the sensor in dusty, dirty environments, errors may occur due to a lowering in the intensity of the received light due to dust or dirt adhering to the detection surface of the Sensor.

The E3Z with light intensity switching can prevent malfunctions by periodically confirming the amount of leeway at operation startup. Also, when light reception becomes unstable during operation, the E3Z with self-diagnostic output function outputs an alert to enable early maintenance.



Note: for light ON mode with workpiece





Oil-resistant, compact photoelectric sensor in metal housing

High oil resistance built into a compact housing shape.




- High functional reserve for highest reliability in dirty environments

Ordering information

Sensor type	Shape	Connection method	Sensing distance	Order code
Through-beam	Horizontal model	Pre-wired	30 m (Infrared light)	E3S-CT11
		M12 connector		E3S-CT16
	Vertical model	Pre-wired		E3S-CT61
		M12 connector		E3S-CT66
Retroreflective models	Horizontal model	Pre-wired	3 m (Red light)	E3S-CR11
		M12 connector		E3S-CR16
	Vertical model	Pre-wired		E3S-CR61
		M12 connector		E3S-CR66
Diffuse-reflective	Horizontal model	Pre-wired	2 m (Infrared light)	E3S-CD12
		M12 connector		E3S-CD17
	Vertical model	Pre-wired	2 m (Infrared light)	E3S-CD62
		M12 connector		E3S-CD67

Note: All pre-wired models are also available as M12 -junction connector type- M1J.

Specifications

Item		Through-beam	Retroreflective model (with M.S.R. function)	Diffuse-reflective
		Horizontal E3S-CT11 (-M1J)	Horizontal E3S-CR11 (-M1J)	Horizontal E3S-CD12 (-M1J)
		Vertical E3S-CT61 (-M1J)	Vertical E3S-CR61 (-M1J)	Vertical E3S-CD62 (-M1J)
Sensing distance		30 m	3 m (When using the E39-R1)	2 m (White paper 300x300 mm)
Light source (wave length)		Infrared LED (880 nm)	Red LED (700 nm)	Infrared LED (880 nm)
Supply voltage		10 to 30 VDC [ripple (p-p) 10% included]		
Protective circuits		Reverse polarity protection, output short-circuit protection	Reverse polarity protection, output short-circuit protection, mutual interference prevention	
Response time		Operation or reset: 1 ms max.		Operation/reset: 2 ms max. each
Ambient temperature		Operating: -25 to 55°C, Storage: -40 to 70°C (with no icing or condensation)		
Vibration resistance		10 to 2,000 Hz double amplitude 1.5 mm or 300 m/s ² for 0.5 h in each of X, Y, Z directions		
Shock resistance		1000 m/s ² (approx. - 100 G) 3 times each in X, Y, and Z directions		
Protective structure		IEC Standard IP67, NEMA 6P (limited to indoors use) ^{*1}		
Connection method		<div> Pre-wired (standard length: 2 m)</div> <div> Junction connector (standard length: 300 mm)</div> <div> M12 Connector</div>		
Materials	Case	Zinc diecast		
	Operation panel cover	Polyethyl sulfon		
	Lens	Acrylics		
Size in mm (HxWxD)		20x57x23		

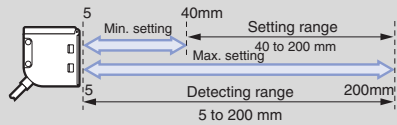
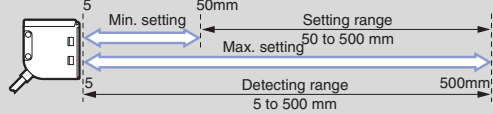
^{*1} NEMA (National Electrical Manufacturers Association) standards




Distance setting photoelectric sensor in metal housing

- High water, oil and detergent resistance
- Minimal black/white error for highest reliability detecting different colored objects (E3S-CL1)

Ordering information

Sensing/Setting range	Order code
	E3S-CL1
	E3S-CL2

Specifications

Item	E3S-CL1	E3S-CL2
Sensing distance	5 to 200 mm (White paper 200x200 mm) (Setting distance 200 mm)	5 to 500 mm (White paper 200x200 mm) (Setting distance 500 mm)
Light source (wave length)	Red LED (700 nm)	Infrared LED (860 nm)
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	Operation or reset: 1 ms max.	Operation or reset: 2 ms max.
Ambient temperature	Operating/Storage: -25 to 55°C (with no icing or condensation)	
Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions	
Shock resistance	Destruction: 500 m/s ² for 3 times each in X, Y, and Z directions	
Degree of protection	IEC standard IP67, NEMA 6P (limited to indoor use) ^{*1}	
Connection method	 Pre-wired models (standard length: 2 m)	
Reflectivity characteristics (black/white error) ^{*2}	2% max.	10% max.
Materials	Case	Zinc diecast
	Operation panel cover	Polyethyl sulfon
	Lens	Acrylics
Size in mm	15.4Hx40Wx42D	

^{*1} NEMA (National Electrical Manufacturers Association) standards
^{*2} Sensing distance difference between standard white paper (reflectivity 90%) and standard black paper (reflectivity 5%)

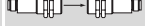
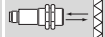




Standard cylindrical M18 photoelectric sensor

The cylindrical M18 size family offers a large standard portfolio in plastic, brass or stainless steel housings for through-beam, retro-reflective, diffuse-reflective and background-suppression models. For excellent price-performance for your standard applications.

- Plastic, brass or stainless steel housings
- IP67, IP69K for highest water resistance
- Special beam and LED models available

Ordering information

Sensor type		Appearance	Connection method	Sensing distance	Housing	Order code	
						NPN output	PNP output
Through-beam	Multi purpose		Pre-wired	7 m (Infrared LED)	Plastic	E3F2-7C4	E3F2-7B4
			M12 connector		Brass	E3F2-7C4-M	E3F2-7B4-M
					Stainless steel	E3F2-7C4-S	E3F2-7B4-S
					Plastic	E3F2-7C4-P1	E3F2-7B4-P1
					Brass	E3F2-7C4-M1-M	E3F2-7B4-M1-M
					Stainless steel	E3F2-7C4-M1-S	E3F2-7B4-M1-S
Retro-reflective ^{*1}	Non-polarizing (without MSR function)		Pre-wired	0.1 to 2 m ^{*2} (Infrared LED)	Plastic	E3F2-R2C4-E	E3F2-R2B4-E
	M12 connector		Plastic		E3F2-R2C4-P1-E	E3F2-R2B4-P1-E	
	Polarizing (with MSR function)		Pre-wired	0.1 to 4 m (red LED)	Brass	^{*3}	^{*3}
			M12 connector		Stainless steel	^{*3}	^{*3}
					Brass	^{*3}	^{*3}
					Stainless steel	^{*3}	^{*3}
Diffuse reflective	Adjustable sensitivity		Pre-wired	0.3 m	Plastic	E3F2-DS30C4	E3F2-DS30B4
			M12 connector		Brass	E3F2-DS30C4-M	E3F2-DS30B4-M
					Stainless steel	E3F2-DS30C4-S	E3F2-DS30B4-S
					Plastic	E3F2-DS30C4-P1	E3F2-DS30B4-P1
					Brass	E3F2-DS30C4-M1-M	E3F2-DS30B4-M1-M
					Stainless steel	E3F2-DS30C4-M1-S	E3F2-DS30B4-M1-S
Background suppression	Fixed sensing distance		Pre-wired	0.1 m	Plastic	E3F2-LS10C4	E3F2-LS10B4
			M12 connector		Brass	E3F2-LS10C4-M	E3F2-LS10B4-M
					Stainless steel	E3F2-LS10C4-S	E3F2-LS10B4-S
					Plastic	E3F2-LS10C4-P1	E3F2-LS10B4-P1
					Brass	E3F2-LS10C4-M1-M	E3F2-LS10B4-M1-M
					Stainless steel	E3F2-LS10C4-M1-S	E3F2-LS10B4-M1-S

^{*1} Retroreflective models incl. reflectors E39-R1 or E39-R1S are also available

^{*2} Measured using E39-R1S

^{*3} Please refer to E3F2 long distance models

Specifications

Item	E3F2-7_	E3F2-R2_4_	E3F2-R2R_	E3F2-DS30_	E3F2-LS10_4_
Sensing distance type	Through-beam	Retroreflective		Diffuse reflective	
	multi purpose	Non-polarizing	Polarizing	Adjustable sensing distance	Background suppression
Light source (wave length)	Infrared LED (880 nm/850 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 and power supply reverse polarity				
Response time	≤ 2.5 ms				
Ambient temperature	Operating: -25 to 55°C/Storage: -30 to 70°C (with no icing or condensation)				
Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude for 2 hrs each direction (X, Y, Z)				
Shock resistance	Destruction: 500 m/s ² each direction (X, Y, Z)				
Degree of protection	IP67 ^{*1} ; NEMA 1, 2, 4; IP69K after DIN 40050 part 9				
Connection method	2 m, 5 m pre-wired cable (PVC, dia. 4 mm (18/0.12) ^{*2}) or M12-connector				
Material	Plastic (case: ABS; lens: PMMA)				
	Nickel brass	—	Nickel brass	Nickel brass	Nickel brass
	Stainless steel ^{*3}	—	Stainless steel ^{*3}	Stainless steel ^{*3}	Stainless steel ^{*3}

^{*1} The enclosure rating IP67 of Omron internal standards correspond to stricter test requirements than the standard IEC 60529 (refer to chapter "Precautions")

^{*2} For other cable materials (e.g. PUR) please contact your Omron sales representative.

^{*3} Material-specification for stainless steel housing case: 1.4305 (W.-No.), 303 (AISI), 2346 (SS). For other stainless steel materials please contact your Omron sales representative.






Long distance cylindrical M18 photoelectric sensors

The long distance types within the E3F2 family provide enhanced sensing distances and functional reserve for enhanced reliability in dirty environments.

- High-power LED for enhanced sensing distance

Ordering information

Sensor type		Appearance	Connection method	Sensing distance	Housing	Order code	
						NPN output	PNP output
Through-beam	Precision positioning Test input		Pre-wired	10 m	Plastic	E3F2-10C4	E3F2-10B4
			M12 connector		Brass	E3F2-10C4-M	E3F2-10B4-M
					Plastic	E3F2-10C4-P1	E3F2-10B4-P1
					Brass	E3F2-10C4-M1-M	E3F2-10B4-M1-M
Retro-reflective ^{*1}	Polarizing (Adjustable sensitivity)		Pre-wired	0.1 to 4 m ^{*2}	Plastic	E3F2-R4C4-E	E3F2-R4B4-E
			M12 connector		Brass	E3F2-R4C4-M-E	E3F2-R4B4-M-E
					Plastic	E3F2-R4C4-M1-E	E3F2-R4B4-M1-E
					Brass	E3F2-R4C4-M1-M-E	E3F2-R4B4-M1-M-E
Diffuse reflective	Adjustable sensitivity		Pre-wired	1 m	Plastic	E3F2-D1C4	E3F2-D1B4
			M12 connector		Brass	E3F2-D1C4-M	E3F2-D1B4-M
					Plastic	E3F2-D1C4-P1	E3F2-D1B4-P1
					Brass	E3F2-D1C4-M1-M	E3F2-D1B4-M1-M

^{*1} Retroreflective models incl. reflectors E39-R1 or E39-R1S are also available.

^{*2} Measured with reflector E39-R1S.

Specifications

Item	E3F2-10_	E3F2-R4_	E3F2-DS1_
Type	Through-beam multi purpose	Retroreflective Polarizing	Diffuse reflective Adjustable sensing distance
Light source (wave length)	Infrared LED (880 nm)	Red LED (660 nm)	Infrared LED (880 nm)
Power supply voltage	12 to 24 VDC	10 to 30 VDC	10 to 30 VDC
Protective circuits	Output short-circuit and power supply reverse polarity		
Ambient temperature	Operating: -25 to 55°C/Storage: -30 to 70°C (with no icing or condensation)		
Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude for 2 hrs each direction (X, Y, Z)		
Shock resistance	Destruction: 500 m/s ² each direction (X, Y, Z)		
Degree of protection	IP67 ^{*1} ; NEMA 1, 2, 4; IP69K after DIN 40050 part 9		
Connection method	2 m, 5 m pre-wired cable (PVC, dia. 4 mm (18/0.12) ^{*2}) or M12-connector		
Material	Plastic (case: ABS; lens: PMMA)		
	Nickel brass	Nickel brass	Nickel brass

^{*1} The enclosure rating IP67 of Omron internal standards correspond to stricter test requirements than the standard IEC 60529 (refer to chapter “Precautions”)

^{*2} For other cable materials (e.g. PUR) please contact your Omron sales representative.





Radial cylindrical M18 photoelectric sensor

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

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

Ordering information

Sensor type		Appearance	Connection method	Sensing distance	Housing	Order code	
						NPN output	PNP output
Retro-reflective ^{*1}	Polarizing (Adjustable sensitivity)		Pre-wired	0.1 to 2 m ^{*2}	Plastic	E3F2-R2RC41-E	E3F2-R2RB41-E
			M12 connector		Brass	E3F2-R2RC41-M-E	E3F2-R2RB41-M-E
					Plastic	E3F2-R2RC41-P1-E	E3F2-R2RB41-P1-E
					Brass	E3F2-R2RC41-M1-M-E	E3F2-R2RB41-M1-M-E
Diffuse reflective	Adjustable sensitivity		Pre-wired	0.3 m	Plastic	E3F2-DS30C41	E3F2-DS30B41
			M12 connector		Brass	E3F2-DS30C41-M	E3F2-DS30B41-M
					Plastic	E3F2-DS30C41-P1	E3F2-DS30B41-P1
					Brass	E3F2-DS30C41-M1-M	E3F2-DS30B41-M1-M

^{*1} Retroreflective models incl. reflectors E39-R1 or E39-R1S are also available.

For through beam models please contact your Omron representative.

^{*2} With reflector E39-R1S.

Note: For background suppression models please contact your Omron representative.

Specifications

Item	E3F2-R2R_41_	E3F2-DS30_41_
Sensing distance type	Retroreflective Polarizing, adjustable sensing distance	Diffuse reflective Adjustable sensing distance
Light source (wave length)	Red LED (660 nm)	Infrared LED (880 nm)
Power supply voltage	10 to 30 VDC	—
Protective circuits	Output short-circuit and power supply reverse polarity	—
Response time	≤ 2.5 ms	
Ambient temperature	Operating: -25 to 55°C/Storage: -30 to 70°C (with no icing or condensation)	
Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude for 2 hrs each direction (X, Y, Z)	
Shock resistance	Destruction: 500 m/s ² each direction (X, Y, Z)	
Enclosure ratings	IP67 ^{*1} ; NEMA 1, 2, 4; IP69K after DIN 40050 part 9	
Connection method	2 m, 5 m pre-wired cable (PVC, dia. 4 mm (18/0.12) ^{*2}) or M12-connector	
Material	Nickel brass Plastic (case ABS, lens PMMA)	

^{*1} The enclosure rating IP67 of Omron internal standards correspond to stricter test requirements than the standard IEC 60529 (refer to chapter "Precautions").

^{*2} For other cable materials (e.g. PUR) please contact your Omron sales representative.

Easy Mounting M18 photoelectric sensor

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





Ordering information

Sensor type		Connection method	Sensing distance	Housing	Order code	
					NPN output	PNP output
Through-beam	–	Pre-wired	15 m	Plastic	E3FZ-T61	E3FZ-T81
		M12 connector		Plastic	E3FZ-T66	E3FZ-T86
Retro-reflective ^{*1}	Polarizing (Adjustable sensitivity)	Pre-wired	0.1 to 4 m ^{*2}	Plastic	E3FZ-R61H	E3FZ-R81H
		M12 connector		Plastic	E3FZ-R66H	E3FZ-R86H
Diffuse reflective	Adjustable sensitivity	Pre-wired	1 m	Plastic	E3FZ-D62	E3FZ-D82
		M12 connector		Plastic	E3FZ-D67	E3FZ-D87
Background suppression	Fixed sensing distance	Pre-wired	0.1 m	Plastic	E3FZ-LS61H	E3FZ-LS81H
		M12 connector			E3FZ-LS66H	E3FZ-LS86H

^{*1} Retroreflective models incl. reflectors E39-R1 or E39-R1S are also available

^{*2} Measured with reflector E39-R1S

Specifications

Item	E3FZ-T	E3FZ-R	E3FZ-D	E3FZ-LS
Type	Through-beam	Retroreflective	Diffuse reflective	
	–	Polarizing	Adjustable sensing distance	Background suppression
Light source (wave length)	Infrared LED (870 nm)	Red LED (660 nm)	Infrared LED (860 nm)	Red LED (650 nm)
Power supply voltage	10 to 30 VDC			
Protective circuits	Output short-circuit and power supply reverse polarity			
Ambient temperature	Operating: -25 to 55°C/Storage: -40 to +70°C (with no icing or condensation)			
Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude for 2 hrs each direction (X, Y, Z)			
Shock resistance	Destruction: 500 m/s ² each direction (X, Y, Z)			
Degree of protection	IP67 ^{*1} ; NEMA 1, 2, 4; IP69K after DIN 40050 part 9			
Connection method	 2 m, 5 m pre-wired cable (PVC, dia. 4 mm (18/0.12) ^{*2}) or			
	 M12-connector			
Material	Plastic (case: ABS; lens: PMMA)			

^{*1} The enclosure rating IP67 of Omron internal standards correspond to stricter test requirements than the standard IEC 60529 (refer to chapter “Precautions”)

^{*2} For other cable materials (e.g. PUR) please contact your Omron sales representative.

AC voltage sensor in cylindrical M18 housing

The E3F2 family of cylindrical M18 sized photoelectric sensors features models for direct AC voltage switching.

- 24 to 240 VAC power supply
- UL and CSA approved



Ordering information

Sensing method		Appearance	Connection method	Sensing distance	Order code	
					Light-ON	Dark-ON
Through-beam	—		pre-wired	3 m	E3F2-3Z1	E3F2-3Z2
Retro-reflective	Non-polarizing (without MSR function)		pre-wired	0.1 to 2 m (measured with reflector E39-R1)	E3F2-R2Z1-E	E3F2-R2Z2-E
Diffuse reflective	Fixed sensing distance wide-beam characteristics		pre-wired	0.1 m	E3F2-DS10Z1-N	E3F2-DS10Z2-N

Note: Standard cable length is 2 m. Models provided with a 5 m long cable are available. When ordering, specify the cable length by adding the length of the cable (e.g. E3F2-R2Z1 2M or E3F2-R2Z1 5M). For other cable length please contact your Omron sales representative.

Specifications

Item	E3F2-3Z1 E3F2-3Z2	E3F2-R2Z1 E3F2-R2Z2	E3F2-DS10Z1 E3F2-DS10Z2
Type	Through-beam	Non-polarizing Retroreflective	Diffuse reflective (wide-beam characteristic)
Power supply voltage	24 to 240 VAC $\pm 10\%$, 50/60 Hz		
Rated sensing distance ^{*1}	3 m	0.1 to 2 m (with reflector E39-R1)	0.1 m (5×5 cm white mat paper)
Ambient temperature	Operating: -25 to 55°C/Storage: -30 to 70°C (with no icing or condensation)		
Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude for 2 hrs each direction (X, Y, Z)		
Shock resistance	500 m/sqr (approx. 50 g) for each direction (X, Y, Z)		
Enclosure rating	IP67 ^{*2} ; NEMA 1, 2, 4; IP69K after DIN 40050 part 9		
Light source	Infrared LED (880 nm)		
Connection method	2 m, 5 m pre-wired cable (PVC dia. 4 mm (14/0.15) ^{*3})		
Housing materials	Plastic (case: ABS; lens: PMMA)		

^{*1} For stable sensing distance in detail, please refer to 'Engineering data'.

^{*2} The enclosure rating IP67 of Omron internal standards correspond to stricter test requirements than the standard IEC 60529 (refer to chapter "Precautions").

^{*3} For other cable materials (e.g. PUR) please contact your Omron sales representative.

Miniature size sensors with built-in amplifier



Small sized photoelectric sensors in flat and side view shape for demanding mount-
ing conditions.

- Ultra small size with high power pinpoint LED where space is crucial
- High precision flat-size background-suppression for stable detection of objects with different colors
- Unique alignment technology ensuring minimal deviation of optical axis

Ordering information

Sensors

Sensing method	Appearance	Connection method	Sensing distance	Operation mode	Order code ^{*1}	
					NPN output	PNP output
Through-beam	Side-view	Pre-wired	1 m ^{*2}	Light-ON	E3T-ST11 ^{*3}	E3T-ST13
				Dark-ON	E3T-ST12 ^{*3}	E3T-ST14
			300 mm	Light-ON	E3T-ST21	E3T-ST23
				Dark-ON	E3T-ST22	E3T-ST24
	Flat		500 mm	Light-ON	E3T-FT11 ^{*3}	E3T-FT13
				Dark-ON	E3T-FT12	E3T-FT14
Retro-reflective	Side-view		300 mm	Light-ON	E3T-FT21	E3T-FT23
				Dark-ON	E3T-FT22	E3T-FT24
	Side-view		200 mm [10 mm] ^{*4}	Light-ON	E3T-SR21 ^{*3}	E3T-SR23
				Dark-ON	E3T-SR22 ^{*3}	E3T-SR24
	Side-view		100 mm [10 mm] ^{*4}	Light-ON	E3T-SR31 ^{*3}	E3T-SR33
				Dark-ON	E3T-SR32 ^{*3}	E3T-SR34
Diffuse-reflective	Flat		5 to 30 mm	Light-ON	E3T-FD11 ^{*3}	E3T-FD13
				Dark-ON	E3T-FD12 ^{*3}	E3T-FD14
Convergent-reflective	Side-view		5 to 15 mm	Light-ON	E3T-SL11 ^{*3}	E3T-SL13
				Dark-ON	E3T-SL12 ^{*3}	E3T-SL14
			5 to 30 mm	Light-ON	E3T-SL21 ^{*3}	E3T-SL23
				Dark-ON	E3T-SL22 ^{*3}	E3T-SL24
BGS reflective	Flat		1 to 15 mm	Light-ON	E3T-FL11 ^{*3}	E3T-FL13
				Dark-ON	E3T-FL12 ^{*3}	E3T-FL14
			1 to 30 mm	Light-ON	E3T-FL21 ^{*3}	E3T-FL23
				Dark-ON	E3T-FL22 ^{*3}	E3T-FL24

^{*1} Please contact your Omron representative for models with M8 junction connectors.
^{*2} Sensitivity Adjustment Unit can be used.
^{*3} A robotics cable is provided. These models have an R suffix. (Example: E3T-ST11R). Models with e-CON connector are available.
^{*4} Values in parentheses indicate the minimum required distance between the sensor and reflector.

Specifications

Sensing method		Through-beam				Retro-reflective			
		Side-view		Flat		Side-view			
		NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP
		E3T-ST11	E3T-ST13	E3T-FT11	E3T-FT13	E3T-SR21	E3T-SR23	E3T-SR31	E3T-SR33
		E3T-ST12	E3T-ST14	E3T-FT12	E3T-FT14	E3T-SR22	E3T-SR24	E3T-SR32	E3T-SR34
		E3T-ST21	E3T-ST23	E3T-FT21	E3T-FT23			E3T-SR32	E3T-SR34
		E3T-ST22	E3T-ST24	E3T-FT22	E3T-FT24				
Sensing distance		E3T-ST1_ E3T-ST2_	1 m 300 mm	E3T-FT1_ E3T-FT2_	500 mm 300 mm	E3T-SR2_200 mm (10 mm) ^{*1} (with the E39-R4)		E3T-SR3_100 mm (10 mm) ^{*1} (with the E39-R37)	
Directional angle		Emitter: 2° to 20° Receiver: 2° to 70°		Emitter: 3° to 25° Receiver: 3° min.		2° to 20°			
Light source (wavelength)		Red LED ("Pin-point" LED) λ = 650 nm							
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p) 10% max.							
Control output		Load power supply voltage: 26.4 VDC max. Load current: 50 mA max. (residual voltage: 2 V max. for load current of 10 to 50 mA, 1 V max. for load current of less than 10 mA) Open collector output Light ON: E3T-___1 and E3T-___3 Dark ON: E3T-___2 and E3T-___4							
Protection 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			
Ambient temperature range		Operating: -25 to 55°C Storage: -40 to 70°C (with no icing or condensation)							
Degree of protection		IP67 (IEC60529)							
Connection method		Pre-wired (standard length: 2 m)							
Materials	Case	PBT (polybutylene terephthalate)							
	Display window	Denatured polyarylate							
	Lens	Denatured polyarylate				Methacrylic resin			

^{*1} Values in parentheses indicate the minimum required distance between Sensor and Reflector.

Sensing method		Diffuse-reflective		Convergent-reflective				BGS reflective			
		Flat		Side-view				Flat			
		NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP
		E3T-FD11 E3T-FD12	E3T-FD13 E3T-FD14	E3T-SL11 E3T-SL12	E3T-SL13 E3T-SL14	E3T-SL21 E3T-SL22	E3T-SL23 E3T-SL24	E3T-FL11 E3T-FL12	E3T-FL13 E3T-FL14	E3T-FL21 E3T-FL22	E3T-FL23 E3T-FL24
Sensing distance		5 to 30 mm (50x50 mm white paper)		5 to 15 mm (50x50 mm white paper)		5 to 30 mm (50x50 mm white paper)		1 to 15 mm (50x50 mm white paper)		1 to 30 mm (50x50 mm white paper)	
Black/white error		—						15% max.			
Light source (wavelength)		Red LED (“Pin-point” LED) λ = 650 nm									
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p) 10% max.									
Control output		Load power supply voltage: 26.4 VDC max. Load current: 50 mA max. (residual voltage: 2 V max. for load current of 10 to 50 mA, 1 V max. for load current of less than 10 mA) Open-collector output Light ON: E3T-___1 and E3T-___3 Dark ON: E3T-___2 and E3T-___4									
Protection circuits		Power supply and control output reverse polarity protection Output short-circuit protection, Mutual interference prevention									
Ambient temperature range		Operating: -25 to 55°C Storage: -40 to 70°C (with no icing or condensation)									
Degree of protection		IP67 (IEC60529)									
Connection method		Pre-wired (standard length: 2 m)									
Materials	Case	PBT (polybutylene terephthalate)									
	Display window	Denatured polyarylate									
	Lens	Denatured polyarylate									


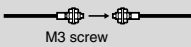



Miniature general purpose photoelectric sensors

Miniature M3, M4 or M6 size photoelectric sensing heads for demanding mounting conditions. The Plug & Play combo package with the E3X-NA_V amplifier provides easy installation and the best price-performance ratio of Omron's extensive fibre and amplifier portfolio.

- Miniature M3, M4 or M6 size for demanding mounting conditions
- Plug & Play connection for quick installation of fibre optics and separate amplifier
- Excellent price-performance fibre+amplifier combination package
- IP67 (sensing head) and IP66 (amplifier)

Ordering information

Size	Shape	Type	Sensing distance* ¹ (Parentheses: With E39-F1 Lens Unit)	Standard object (min. sensing object* ²) (Parentheses: Opaque object)	Permissible bending radius	Order code
M4		Through-beam	400 mm (3,000 mm)	1.0 mm ø (0.03 mm ø)	25 mm	E32-TC200
M3			360 mm	1.0 mm ø (0.03 mm ø)	25 mm	E32-TC200A
M6		Diffuse reflective	150 mm	200x200 (0.01 mm ø)	25 mm	E32-DC200

*¹ Sensing distance based on white paper.

*² Indicates values for standard mode.

Amplifier Units

Pre-wired		
Control output	Order code	
	NPN output	PNP output
ON/OFF output	E3X-NA11V	E3X-NA41V

Connector type		
Control output	Order code	
	NPN output	PNP output
ON/OFF output	E3X-NA14V	E3X-NA44V

Specifications

Item	E32- 200
Ambient temperature	Operation
	Storage
Admissible bending radius	25 mm min.
Fiber sheath material	Black polyethylene
Protective structure	IEC 60529 IP67

Amplifier Units

Model	Output	Pre-wired	Connector type
	NPN output	E3X-NA11V	E3X-NA14V
	PNP output	E3X-NA41V	E3X-NA44V
Light source (wave length)	Red LED (680 nm)		
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p): 10% max.		
Control output	Load current 50 mA (residual voltage 1 V max. each) Open collector output type (depends on the NPN/PNP output format) Light-ON/Dark-ON switch selectable		
Response time	200 µs max. for operation and reset respectively* ¹		
Timer function	OFF-delay timer: 40 ms (fixed)		
Ambient temperature	Operating: Groups of 1 to 3 Amplifiers: -25 to +55°C, Groups of 4 to 11 Amplifiers: -25 to +50°C, Groups of 12 to 16 Amplifiers: -25 to +45°C Storage: -30 to +70°C (with no icing and condensation)		
Vibration resistance	10 to 55 Hz with a 1.5 mm double amplitude for 2 hrs each in X, Y and Z directions		
Shock resistance	Destruction: 500 m/s ² for 3 times each in X, Y, and Z directions		
Protective structure	IEC 60529 IP66 (with protective cover attached)		
Connection method	Pre-wired models (standard length: 2 m)		M8 connector
Material	Case	PBT (polybutylene terephthalate)	
	Cover	Polyethersulfone (PES)	

*¹ If 8 or more units are installed side-by-side, the response time is 350 s max.



Fast response photomicrosensors in forked housing

The EE-SX family of photomicrosensors is the ideal choice for fast response counting and presence detection. The small size fork shaped housing ensures simple installation and prevents misalignment.

- 5 mm slot width
- Light-on & dark-on (antivalent) output
- 15 µs response time (avg.)

Ordering information

List of models

Models with robot cables


Appearance	Sensing method	Sensing distance	Output configuration	Indicator mode	Connecting method (Cable length)	Order code	
						NPN output	PNP output
Standard	Through-beam type (with slot)	5 mm (slot width)	Light-ON Dark-ON (2 outputs)	Lit when light is incident	Pre-wired models (1 m)	EE-SX910-R	EE-SX910P-R
					Models with connectors (0.3 m)	EE-SX910-C1J-R	EE-SX910P-C1J-R
L-shaped					Pre-wired models (1 m)	EE-SX911-R	EE-SX911P-R
					Models with connectors (0.3 m)	EE-SX911-C1J-R	EE-SX911P-C1J-R
F-shaped					Pre-wired models (1 m)	EE-SX912-R	EE-SX912P-R
					Models with connectors (0.3 m)	EE-SX912-C1J-R	EE-SX912P-C1J-R
R-shaped					Pre-wired models (1 m)	EE-SX913-R	EE-SX913P-R
					Models with connectors (0.3 m)	EE-SX913-C1J-R	EE-SX913P-C1J-R
U-shaped					Pre-wired models (1 m)	E-SX914-R	EE-SX914P-R
					Models with connectors (0.3 m)	EE-SX914-C1J-R	EE-SX914P-C1J-R

Accessories (order separately)

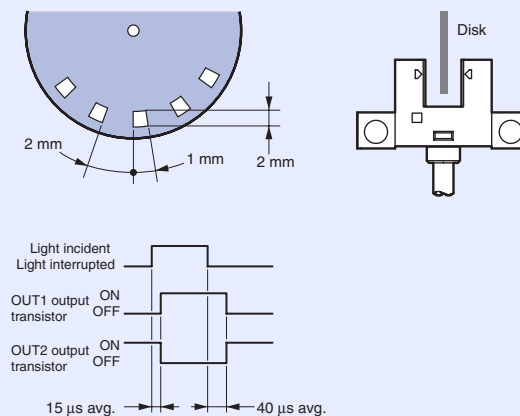
Connector with robot cable			
Type	Cable length	Remarks	Order code
Connector with cable	2 m	Connector with lock, AWG26, 4-core robot cable	EE-1016-R

Specifications

Item	Type		Standard	L-shaped	F-shaped	R-shaped	U-shaped
	NPN models	Pre-wired models	EE-SX910-R	EE-SX911-R	EE-SX912-R	EE-SX913-R	EE-SX914-R
		Models with connectors	EE-SX910-C1J-R	EE-SX911-C1J-R	EE-SX912-C1J-R	EE-SX913-C1J-R	EE-SX914-C1J-R
	PNP models	Pre-wired models	EE-SX910P-R	EE-SX911P-R	EE-SX912P-R	EE-SX913P-R	EE-SX914P-R
Models with connectors		EE-SX910P-C1J-R	EE-SX911P-C1J-R	EE-SX912P-C1J-R	EE-SX913P-C1J-R	EE-SX914P-C1J-R	
Supply voltage			5 to 24 VDC ±10%, ripple (p-p): 10% max.				
Current consumption			15 mA max.				
Sensing distance			5 mm (slot width)				
Differential distance			0.025 mm max.				
Light source			GaAs infrared LED				
Sensing object			Opaque: 1.2x0.8 mm min.				
Control output			Load power supply voltage: 5 to 24 VDC Load current: 100 mA max. 100 mA load current with a residual voltage of 1.0 V max. 5 mA load current with a residual voltage of 0.4 V max.				
Indicator			Light indicator (red LED)				
Protection circuits			Power supply reverse polarity protection; output reverse polarity protection				
Response frequency			3 kHz min. (8 kHz average) Light incident: 15 μs average; light interrupted: 40 μs average*				
Ambient illumination			1,000 lx max. with fluorescent light on the surface of the receiver				
Ambient temperature range			Operating: -25 to 55°C Storage: -30 to 80°C (with no icing or condensation)				
Ambient humidity range			Operating: 5% to 85% Storage: 5% to 95% (with no icing or condensation)				
Vibration resistance (Destruction)			10 to 2,000 Hz 0.75 mm single amplitude for 2.5 h (15 min periods, 10 cycles) each in X, Y, and Z directions				
Shock resistance (Destruction)			500 m/s ² for 3 times each in X, Y, and Z directions				
Connecting method			Pre-wired Models (standard cable length: 1 m), Models with Connectors (standard cable length: 0.3 m)				
Enclosure rating			IEC IP50				
Weight (packaged)	Pre-wired models		Approx. 17 g				
	Models with connectors		Approx. 7 g				
Materials	Case		Polybutylene phthalate (PBT)				
	Cover						
	Emitter/Receiver		Polycarbonate (PC)				

Applicable connector		
Item	Product	Connector with cable
	Model	EE-1016-R
	Appearance	
Contact resistance		25 m Ω max.
Insertion strength		20 N max.
Surplus strength (housing holding strength)		15 N min.
Cable length		2 m
Ambient temperature range		-25 to 85°C
Materials	Housing	Nylon
	Contact	Phosphor bronze

*The response frequency was measured by detecting the following rotating disk. The response times for light incidence and light interruption are shown in the timing chart.





AC&DC voltage sensor in compact size housing

The compact sized E3JK family provides 12 to 240 VDC and 24 to 240 VAC power supply voltage and is ideally suited to AC installations. The wide voltage range also reduces the product variety needed for different voltage requirements.

- Built-in amplifier accepts wide supply voltage range
- Compact, space-saving construction. Size in mm (HxWxD): 50x50x17.4
- Relay outputs with long life expectancy and high switching capacity (3 A, 250 VAC)


Ordering information

Sensor type	Shape	Connection method	Sensing distance	Output form	Order code	
					NPN Transistor Output	Relay output
Through-beam		Pre-wired	5 m (Infrared light)	Light ON	—	E3JK-5M1
				Dark ON	—	E3JK-5M2
				Light ON/Dark ON (selectable)	E3JK-5S3	—
Retroreflective model (with M.S.R. function polarizing)			2.5 m (3 m) ^{*1} (Red light)	Light ON	—	E3JK-R2M1
				Dark ON	—	E3JK-R2M2
				Light ON/Dark ON (selectable)	E3JK-R2S3	E3JK-R2R3
Retroreflective model (without M.S.R. function)			4 m (5 m) ^{*1} (Red light)	Light ON	—	E3JK-R4M1
				Dark ON	—	E3JK-R4M2
				Light ON/Dark ON (selectable)	E3JK-R4S3	—
Diffuse-reflective			300 mm (Infrared light)	Light ON	—	E3JK-DS30M1
				Dark ON	—	E3JK-DS30M2
				Light ON/Dark ON (selectable)	E3JK-DS30S3	—

^{*1} The value within the parentheses indicates the sensing distance applied when the E39-R2 reflector is used.

Note: The UL-listed model ends with '-US'. (Example: E3JK-5M1-US). Note that the DC transistor type of the E3JK is UL-unlisted.

Specifications

Item		Through-beam	Retroflective model (with M.S.R. function)		Retroflective model (without M.S.R. function)		Diffuse-reflective	
		E3JK-5M_	E3JK-R2M_	E3JK-R2_3	E3JK-R4M_	E3JK-R4S3	E3JK-DS30M_	E3JK-DS30S3
Sensing distance		5 m	2.5 m (When using the E39-R1)		4 m (When using the E39-R1)		300 mm (White paper 100x100 mm)	
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						
Response time		≤ 30 ms	≤ 30 ms	≤ 5 ms	≤ 30 ms	≤ 5 ms	≤ 30 ms	≤ 5 ms
Ambient temperature		Operating: -25 to 55°C, Storage: -30 to 70°C (with no icing or condensation)						
Vibration resistance		10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions						
Shock resistance		Destruction: 500 m/s ² for 3 times each in X, Y, and Z directions						
Degree of protection		IEC60529 IP64						
Connection method		 Pre-wired models (standard length: 2 m)						
Material	Case	ABS						
Size in mm (HxWxD)		50x50x22						



Long distance sensors in plastic housing





Long distance retro-reflective and touchable diffuse reflective sensors in plastic housing.

- Diffuse reflective model with
- M12 rotary connector or pre-wired models

Ordering information

Sensor type	Shape	Size in mm (HxWxD)	Connection method	Sensing distance	Order code
					NPN/PNP selector
Retroreflective models (with M.S.R. function polarizing)		45x17.8x21	Pre-wired	0.5 to 10 m (Red light)	E3G-R13-G
		43x67.8x21	Connector type		E3G-R17-G
Distance setting		45x67.8x21	Pre-wired	0.2 to 2 m White paper 300x300 mm (Infrared light)	E3G-L73
		43x67.8x21	Connector type		E3G-L77

Specifications

Item		Retroreflective models (M.S.R. function)		Distance-setting	
		E3G-R13-G	E3G-R17-G	E3G-L73	E3G-L77
Sensing distance		10 m (500 mm) ^{*1} (When using the E39-R2)		0.2 to 2 m (White paper 300x300 mm) (setting distance 0.5 to 1.2 m)	
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		Operation/reset: 1 ms each		Operation/reset: 5 ms each	
Ambient temperature		Operating: -25 to 55°C, Storage: -30 to 70°C (with no icing or condensation)			
Vibration resistance		Destruction: 10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions			
Shock resistance		500 m/s ² 3 times in each of X, Y and Z directions			
Degree of protection		IEC 60529 IP67 (with Protective Cover attached)			
Connection method		 Pre-wired (standard length: 2 m)	 M12 connector	 Pre-wired (standard length: 2 m)	 M12 connector
Materials	Case	PBT (polybutylene terephthalate)			
	Lens	Acrylics (PMMA)			
	Mounting brackets	Stainless steel (SUS304)			

^{*1} Values in parentheses indicate the minimum required distance between the sensor and reflector.

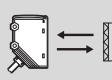
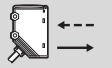


Long distance all voltage photoelectric sensor in plastic housing

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	Shape	Connection method	Sensing distance	Timer function	Order code
					Relay contact output
Retroreflective models (with M.S.R. function)		Terminal block	10 m (500 mm) ^{*1} (Red light)	—	E3G-MR19-G
				ON or OFF delay 0 to 5 s (adjustable)	E3G-MR19T-G
Distance setting			0.2 to 2 m White paper 300x300 mm (Infrared light)	—	E3G-ML79-G
				ON or OFF delay 0 to 5 s (adjustable)	E3G-ML79T-G

^{*1} Values in parentheses indicate the minimum required distance between the sensor and reflector.

Specifications

Sensor type	Retroreflective models (M.S.R. function)		Distance-setting	
Item	E3G-MR19-G	E3G-MR19T-G	E3G-ML79-G	E3G-ML79T-G
Sensing distance	10 m (500 mm) ^{*1} (When using the E39-R2)		0.2 to 2 m (White paper 300×300 mm)	
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		12 to 240 VDC ±10% ripple (p-p) : 10% max. 24 to 240 VAC ±10% 50/60 Hz	
Control output	Relay output: Switch-over contact 250 VAC 3A (cosφ= 1) max. 30 VDC 3A max. L-ON/D-ON switch selectable		Relay output: Switch-over contact 250 VAC 3A (cosφ= 1) max. 30 VDC 3A max. L-ON/D-ON switch selectable	
Response time	Operation/reset: 30 ms each		Operation/reset: 30 ms each	
Timer function	—		—	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)			
Vibration resistance	Destruction: 10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions			
Shock resistance	500 m/s ² 3 times in each of X, Y and Z directions			
Protective structure	IEC 60529 IP67 (with protective cover attached)			

^{*1} Values in parentheses indicate the minimum required distance between the sensor and reflector.



Transparent bottle sensor


The special optical design of the E3S-CR62/67 ensures reliable detection of glass bottles compensating the often noticed 'double-detection-effect' when using other sensors.

- Special optical system for reliable bottle detection preventing 'lens effect'
- Thin beam for reliable bottle counting

Ordering information

Sensor type	Shape	Connection method	Sensing distance		Order code
			Reflector E39-R6	Reflector E39-R1	
Retro-reflective models		Pre-wired type	0 to 250 mm (Red light)	0.25 to 1 m (Red light)	E3S-CR62-C
		Connector type			E3S-CR67-C

Specifications

Item		E3S-CR62-C	E3S-CR67-C
Sensing distance		250 mm (When using the E39-R6), 1 m (250 mm)*1 (When using the E39-R1)	
Light source (wave length)		Red LED (660 nm)	
Power supply voltage		10 to 30 VDC, ripple (p-p) : 10% max.	
Protective circuits		Load short protection, reverse connection protection, mutual interference protection function	
Response time		Operation or reset: 1 ms max.	
Ambient temperature		Operating: -25 to 55°C, Storage: -40 to 70°C (with no icing or condensation)	
Vibration resistance		Destruction: 10 to 2,000 Hz, 1.5 mm double amplitude or 300 m/s ² (approx. 30 G) for 0.5 hrs each in x, y, and Z directions	
Shock resistance		1000 m/s ² (approx. 100 G) 3 times each in X, Y, and Z directions	
Degree of protection		IEC Standard IP67; NEMA 6P (restricted to indoor use)	
Connection method		 Pre-wired models (standard length: 2 m)	Connector type
Materials	Case	Zinc diecast	
	Lens	Acrylics	
	Display operation panel	Polyethyl sulfon	
Size in mm (HxWxD)		20x57x23	

*1 Values in parentheses indicate the minimum required distance between the sensor and reflector.



Photoelectric sensor for mark detection

The coaxial optical system of the E3M-V provides reliable mark detection on laminated objects









- Detects laminated or light-dispersing objects in stable operation without being influenced by mirror reflection
- Automatically sets to the optimum threshold level by auto-teaching
- Green LED

Ordering information

Connection method	Setting distance	Spot diameter	Order code	
			NPN output	PNP output
Connector type ^{*1}	10±3 mm	1x4 mm	E3M-VG11	E3M-VG16
		4x1 mm	E3M-VG21	E3M-VG26
		1x4 mm	E3M-VG12	E3M-VG17
		4x1 mm	E3M-VG22	E3M-VG27
Pre-wired				

^{*1} Possible to switch between vertical or horizontal connection using the M12 rotary connector

Specifications

Item	E3M-VG11	E3M-VG12	E3M-VG21	E3M-VG22	E3M-VG16	E3M-VG17	E3M-VG26	E3M-VG27
Sensing distance	10±3 mm							
Spot size (HxW)	4x1 mm		1x4 mm		4x1 mm		1x4 mm	
Light source (wavelength)	Green LED (525 nm)							
Power supply voltage	10 to 30 VDC, ripple (p-p) 10% max.							
Control output	Load power supply voltage:30 VDC max. Load current: 100 mA max. (Residual voltage: 1.2 V max.) NPN open collector output type				Load power supply voltage:30 VDC max. Load current: 100 ma max. (Residual voltage: 2 V max.) PNP open collector output type			
Response time	ON: 50 μs max. OFF: 70 μs max.							
Ambient illumination (on receiver lens)	Incandescent lamp:3,000 lx max. Sunlight: 10,000 lx max.							
Ambient temperature	Operating: -20 to 55°C/Storage: -30 to 70°C (with no icing)							
Vibration resistance ^{*1}	Destruction: 10 to 55 Hz, 1-mm double amplitude or 150 m/s2 for 2 hrs each in X, Y, and Z directions							
Shock resistance ^{*2}	Destruction: 500 m/s ² , 3 times each in X, Y, and Z directions							
Degree of protection	IEC60529 IP67 (with protective cover)							
Connection method	Connector 	Pre-wired 	Connector 	Pre-wired 	Connector 	Pre-wired 	Connector 	Pre-wired 
Material	Case: Polybutylene terephthalate Lens: Acrylic (PMMA)							

^{*1} The sensor withstands 0.75 mm double amplitude or 100 m/s² if the mounting bracket is attached to the sensor.
^{*2} The sensor withstands 300 m/s² if the mounting bracket is attached to the sensor.

Photoelectric sensor for structured object detection

The special wide beam optics of the E3S-LS3 ensures reliable detection of structured objects (with holes or different heights) and is therefore ideally suited to detect printed circuit boards (PCBs), for example.



- Wide beam for reliable detection of structured and irregular shaped objects



Ordering information

Sensor type	Output	Connection method	Detection distance	Timer function	Order code
Limited reflective	NPN Light ON	Pre-wired (2 m)	20 to 35 mm (Red light)	No	E3S-LS3N
			10 to 60 mm (Red light)		E3S-LS3NW
	PNP Light ON	Pre-wired (2 m)	20 to 35 mm (Red light)	No	E3S-LS3P
				Yes	E3S-LS3PT
		Pre-wired M8 3-pin connector (0.3 m)		No	E3S-LS3P-M5J
				Yes	E3S-LS3PT-M5J
		Pre-wired M8 4-pin connector (0.3 m)		No	E3S-LS3P-M3J
				Yes	E3S-LS3PT-M3J
		Pre-wired (2 m)	10 to 60 mm (Red light)	No	E3S-LS3PW
				Yes	E3S-LS3PWT
		Pre-wired M8 3-pin connector (0.3 m)		No	E3S-LS3PW-M5J
				Yes	E3S-LS3PWT-M5J
		Pre-wired M8 4-pin connector (0.3 m)		No	E3S-LS3PW-M3J
				Yes	E3S-LS3PWT-M3J

Specifications

Item		E3S-LS3_	E3S-LS3PT	E3S-LS3_W	E3S-LS3PWT
Sensing	White paper *	20 to 35 mm		10 to 60 mm	
	Black paper *	20 to 30 mm		15 to 50 mm	
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. for operation and reset respectively			
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)			
Vibration resistance		10 to 55 Hz with a 1.5 mm double amplitude for 2 hrs each in X, Y and Z directions			
Shock resistance		500 m/s ² , 3 times each in X, Y and Z directions			
Degree of protection		IEC60529 IP40			
Connection method		 Pre-wired (standard length: 2 m)/Pre-wired  M8 connector (standard length: 0.3 m)			
Material	Case	ABS			
	Lens	Acrylic			



High precision Laser sensor

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

- Easy installation due to adjustable focus point and optical axis
- Wide range sensor head portfolio with different laser beam shapes
- Stable detection of transparent objects such as plastic or glass materials
- Controller functions with easy wiring concept and power tuning function

Ordering information

Sensor heads

Sensing method	Focus	Remarks	Order code
Diffuse reflective	Spot	Mounting a beam unit (sold separately) allows the use of line and area beams.	E3C-LD11
	Line	This model number is for the set consisting of the E39-P11 mounted to the E3C-LD11.	E3C-LD21
	Area	This model number is for the set consisting of the E39-P21 mounted to the E3C-LD11.	E3C-LD31
Coaxial retroreflective	Spot (variable)	Mounting a beam unit (sold separately) allows the use of line and area beams.	E3C-LR11 ^{*1}
	Spot (2.0 mm fixed dia.)	–	E3C-LR12 ^{*1}

^{*1} Select a reflector (sold separately) according to the application.

Amplifier units

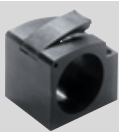


Item		Functions	Order code			
			pre-wired		with connector	
			NPN output	PNP output	NPN output	PNP output
Advanced models	Twin-output models	Area output, self-diagnosis, differential operation	E3C-LDA11	E3C-LDA41	E3C-LDA6	E3C-LDA8
	External-input models	Remote setting, counter, differential operation	E3C-LDA21	E3C-LDA51	E3C-LDA7	E3C-LDA9

Specifications

Sensor heads

Item	Diffuse reflective			Coaxial retroreflective			
	E3C-LD11	E3C-LD21	E3C-LD31	E3C-LR11	E3C-LR11 + E39-P31	E3C-LR11 + E39-P41	E3C-LR12
Light source (emission wavelength)	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	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)	28x16 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)						
Indicators	LDON indicator: Green; Operation indicator: Orange						

Mounting brackets



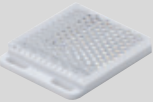










Shape	Type	Applicable sensors	Order code
	Quick access - snap fix for cylindrical sensors	All cylindrical sensors (e.g. E3F2, E2A)	Y92E-BC
	Standard-surface mounting	E3Z ^{*1}	E39-L104 ^{*1}
	Standard-backwall mounting	E3Z ^{*1}	E39-L44 ^{*1}
	Protection-wall mounting	E3Z ^{*1}	E39-L142 ^{*1}
	Protection-surface mounting	E3Z ^{*1}	E39-L98 ^{*1}
	Telescope mounting	E3Z ^{*1}	E39-L93
	3D rotation mounting	E3Z ^{*1}	E39-EL4


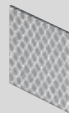





^{*1} For sensor families E3T, E3S, E3G and E32 the order references for the mounting brackets may differ. Please refer to the sensor accessory datasheet E26E-EN2 for the complete list of mounting brackets.

Cable connectors

Shape	Type	Applicable/Recommended sensors	Features	Size	Material		Order code
					Nut	Cable	
	General purpose (screw)	Inductive: E2A-_-M5, E2A-_-M3, E2E small diameter, E2C-EDA Photoelectric: E3Z, E3G-L1/L3, E3C, E3X All sensors with M8-junction connectors -M3J, -M5J	• 3 or 4 pin • LED optionally	M8	Brass (CuZn) or zinc diecast (ZnAl Cu)	PVC or PUR	Y92E-M08
		Photoelectric: E3F2, E3G-(M)R, E3G-(M)L7, E3S-C, E3MV Inductive: E2-_-M1, E2E, E2E_, E2F All sensors with M12-junction connector -M1J	• 3, 4 or 5 wire • LED optionally	M12			Y92E-M12
	General purpose (snap)	Inductive: E2A-_-M5, E2A-_-M3, E2E small diameter, E2C-EDA Photoelectric: E3Z, E3G-L1/L3, E3C, E3X	3 or 4 pin	M8	PUR	PVC or PUR	Y92E-MS08
	General purpose - extended wiring	See Y92E-M12 plus AC 2-wire types: E2E-_-Y, E2F-_-Y, E3F2-_-Z	2, 3, 4 or 5 wire	M12	Brass	PVC	XS2F-_-A
	small size (screw or snap)	Inductive: E2A-_-M3, E2E small diameter, E2C-EDA Photoelectric: E3Z, E3G-L1/L3, E3C, E3X All sensors with M8-junction connectors -M3J	4 pin	M8			XS3F-_-A
	Robot cable (vibration resistant)	See Y92E-M08	4 pin	M8	Brass	PVC	XS3F-_-R
		See Y92E-M12	3, 4 or 5 wire	M12			XS2F-_-R
	Detergent resistant	E3ZM	3 or 4 pin	M8	Stainless steel	PVC	Y92E-S08
		E2EH	4 wire	M12			Y92E-S12
	Fire retardant	See Y92E-M12	3, 4 or 5 wire	M12	Brass	PVC	XS2F-_-F
	Spatter proof	E2FM	4 wire	M12		Polyethylene	XS2F-_-AS

Reflectors for retroreflective photoelectric sensors

Shape	Type	Housing material	Features	Key specification	Applicable Sensor	Order code
	General purpose reflectors	<ul style="list-style-type: none"> • ABS base • Acrylic surface 	Surface screw mounting (diagonal holes)	Size: 59.9x40.3x7.5	<ul style="list-style-type: none"> • Retroreflective photo electric sensors - non polarizing • Retroreflective photo electric sensors - polarizing (MSR) 	E39-R1S
			Surface screw mounting (holes on one side only)	Size: 35.4x42.3x8		E39-R9
				Size: 51.4x60.3x8.5		E39-R42
	Small size		Side screw mounting or surface selfadhesive	Size: 41.8x22.5x11		E39-R3
			Surface screw mounting	Size: 23x13.7x4.9		E39-R4
	Large size			Size: 100x100x9		E39-R8
				Size: 84.5x84.5x8.7		E39-R40
	High precision		Microtripel for improved performance with small beam sensors	Size: 52x40x4.8	Recommended for fine beam and laser sensors (E3S-CR62/67, E3C, E3X)	E39-R6
				Size: 30x45		E39-R12 E39-R14
				Size: 12x24		E39-R13
	Simple mounting		Round shape with centered mounting hole for simple screw mounting	Diameter: 84 Depth: 7.4	Polarizing and non-polarizing photoelectric sensors	E39-R7
	Harsh environments reflectors	<ul style="list-style-type: none"> • Mounting plate stainless steel • Reflector acrylic 	Direct mount or bracket mount	Size: 14x1x1	Recommended for harsh environment sensors (e.g. E3F2-R_-S, E3S-CR, E3ZM)	E39-R37
	Non-fogging reflector	<ul style="list-style-type: none"> • ABS • Acrylic surface 	Anti-fogging coating	Size: 40x60x7.5		E39-R1K

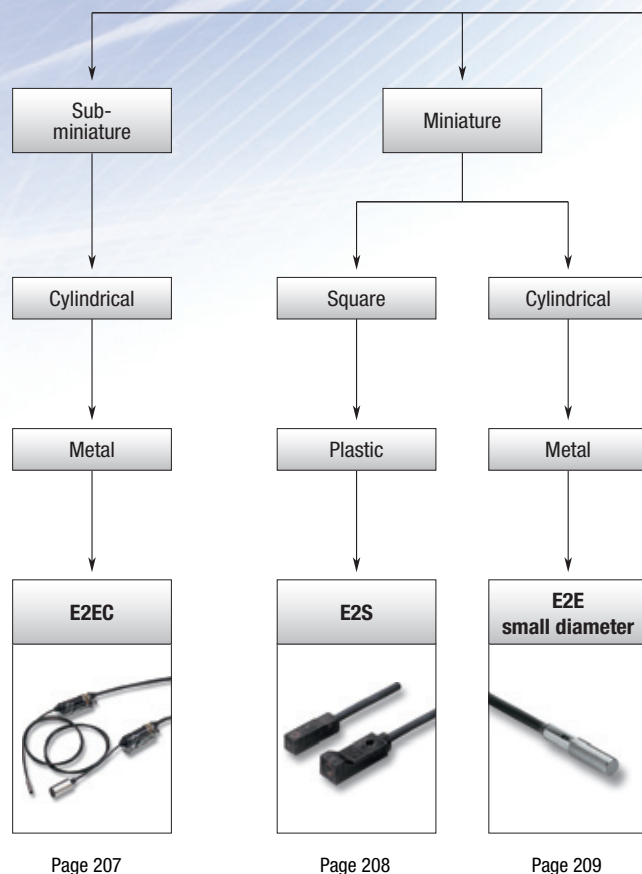
Shape	Type	Housing material	Features	Key specification	Applicable Sensor	Order code
	General purpose tape reflectors	• Acrylic	• Self adhesive • Pre cut	Size: 35x10x0.6	Polarizing and non-polarizing photoelectric sensors	E39-RS1
				Size: 40x35x0.6		E39-RS2
				Size: 80x70x0.6		E39-RS3
			• Self adhesive • Self cut/roll material	Size: 25 mm x 5 m Size: 25 mm x 22.8 m		E39-RS25
				Size: 50 mm x 5 m Size: 50 mm x 22.8 m		E39-RS50
	High precision tape reflectors		• Self adhesive • Pre cut	Size: 195x22	Recommended for fine beam and laser sensors (E3S-CR62/67, E3C, E3X)	E39-RS4
				Size: 108x46		E39-RS5

WHEN FAILURE IS NOT AN OPTION

Tested reliability for demanding conditions

Continuous improvement processes of our inductive sensor range ensure that Omron always is one step ahead to meet highest performance and reliability. With our modular concept approach you can choose the performance you need.

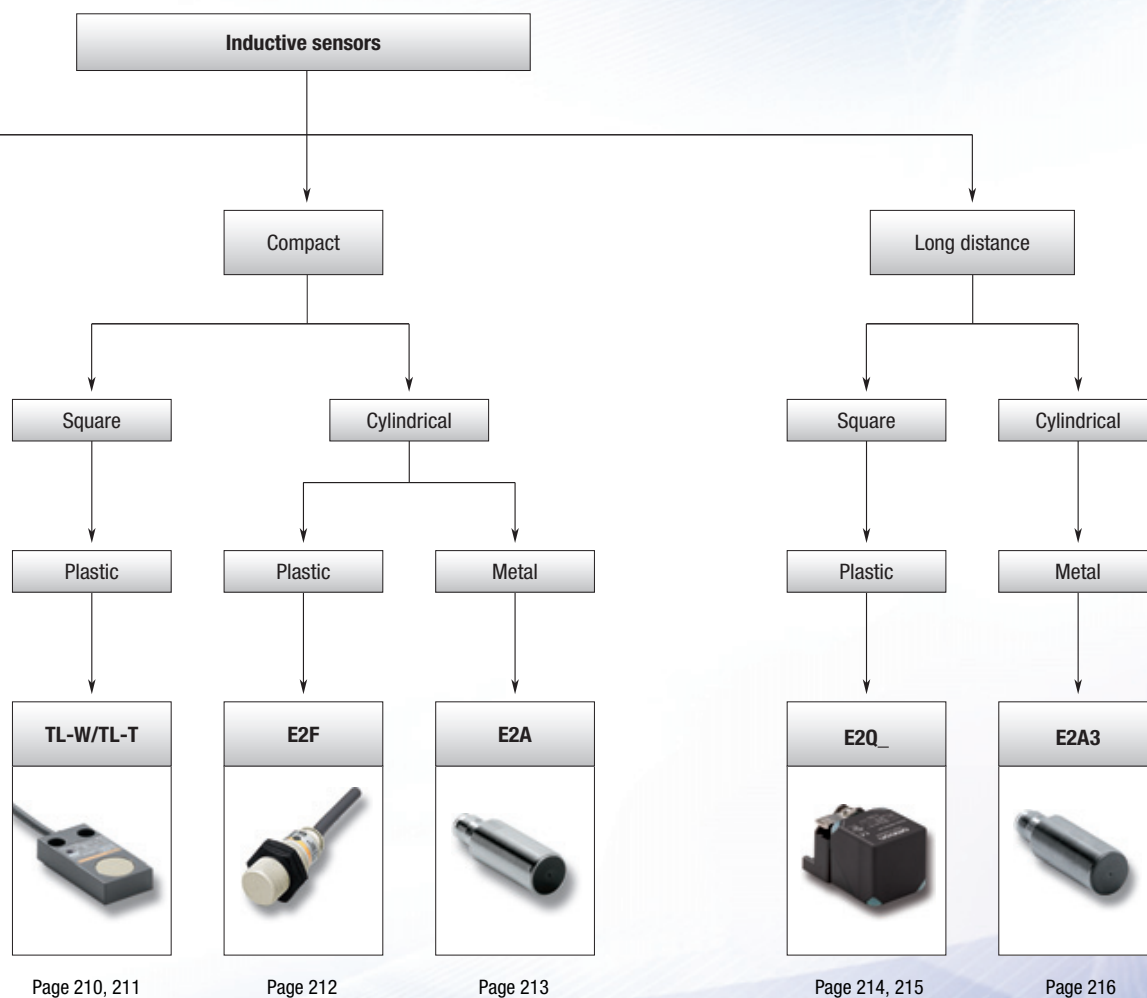
- Best sensing performance for your application
- Best housing to meet your design demands
- Materials that withstand even harsh environments



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Selection table





Format		Cylindrical				
						
Model		E2F	E2A	E2A3	E2EC	E2E small diameter
Type		Compact		Long distance	Subminiature	Miniature
Material		Polyarylate	Brass, SUS	Brass	Brass	Brass
Max. sensing distance	dia 3	–	–	–	0.8 mm	–
	dia 4	–	–	–	–	0.8 mm
	M5	–	–	–	–	1 mm
	dia 5.4	–	–	–	1.5 mm	1 mm
	M8	1.5 mm	4 mm	3 mm	–	–
	M12	2 mm	8 mm	6 mm	4 mm	–
	M18	5 mm	16 mm	11 mm	–	–
	M30	10 mm	30 mm	20 mm	–	–
	19x6x6	–	–	–	–	–
	22x8x6	–	–	–	–	–
	26x40x12	–	–	–	–	–
	31x18x10	–	–	–	–	–
	53x40x23	–	–	–	–	–
	67x40x40	–	–	–	–	–
Mount.	Shielded	■	■	■	■	■
	Non-shielded	–	■	–	–	–
Oper. mode	NO	■	■	■	■	■
	NC	■	■	■	■	■
	NO + NC	–	■	–	–	–
Wiring	DC 2-wire	–	■	–	■	–
	DC 3-wire	■	■	■	■	■
	DC 4-wire	–	■	–	–	–
	AC 2-wire	■	□	–	–	–
Voltage	10-30 VDC	■	■	■	■	■
	10-60 VDC	–	–	–	–	–
	12-240 VAC	■	□	–	–	–
IP rating	IP67	■	■	■	■	■
	IP69K	–	■	■	–	–
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Special models

Type	Anti-microbial housing	Chemical resistant	Full Metal face	Vehicle usage certified	ATEX 3D certified
					
Model	E2F-D	E2FQ	E2FM	E2AU	E2AX
Application	<ul style="list-style-type: none"> meat and dairy products processing pharmaceutical packaging 	<ul style="list-style-type: none"> applications with aggressive chemicals (etching, cleaning, water treatment) 	<ul style="list-style-type: none"> metal cutting in machine tool industry 	<ul style="list-style-type: none"> utility vehicles mobile construction equipment RCVs (refuse collecting vehicles) mobile agricultural equipment 	<ul style="list-style-type: none"> powder handling and packaging wood cutting/wood chip handling
Key features	<ul style="list-style-type: none"> anti-microbial housing material inhibiting and reducing bacteria and microbe growth 	<ul style="list-style-type: none"> PTFE housing 	<ul style="list-style-type: none"> immune to aluminium and cast iron chips on sensing surface 	<ul style="list-style-type: none"> e1 mark high EMC immunity (additional test up to 100V/m) 	<ul style="list-style-type: none"> ATEX certification Group II category 3D (94/9/EG Appendix VIII) typically for explosive areas zone 22 with non-leading dust
3 mm	–	–	–	–	–
5.4 mm	–	–	–	–	–
6.5 mm	–	–	–	–	–
M8	–	–	–	–	–
M12	■	■	■	■	■
M18	■	■	■	■	■
M30	–	■	■	■	■
Page	221	222	Datasheet is missing	218	219

Format		Square			
					
Model		TL-W	TL-T	E2S	E2Q2/E2Q5
Type		Compact	Compact	Miniature	Long distance
Material		ABS	PBT	Polyarylate	PBT
Max. sensing distance	dia 3	—	—	—	—
	dia 4	—	—	—	—
	M5	—	—	—	—
	dia 5.4	—	—	—	—
	M8	—	—	—	—
	M12	—	—	—	—
	M18	—	—	—	—
	M30	—	—	—	—
	19x6x6	—	—	1.6 mm	—
	22x8x6	1.5 mm	—	2.5 mm	—
	26x40x12	—	4 mm	—	—
	31x18x10	5 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	10-30 VDC	■	■	■	—
	10-60 VDC	—	—	—	■
	12-240 VAC	—	—	—	—
IP rating	IP67	■	■	■	■
	IP69K	—	—	—	—
Page		210	211	208	214/215

Special models

Type	Oil resistant	AC power supply	High precision positioning	SMART inductive sensor
				
Model	E2E	E2E- _Y/E2F- _Y	E2C-EDA	ZX-E
Application	• automotive manufacturing lines	• building installations	• precision positioning	• high precision positioning
Key features	• tested oil resistance on commonly used lubricants	• 24-240 VAC direct switching	• repeat accuracy 1 µm • typically 1 mm precision	• 1 µm measurement resolution • typically 2 µm precision
3 mm	—	—	■	■
5.4 mm	—	—	■	■
6.5 mm	—	—	—	—
M8	■	■	—	—
M12	■	■	—	—
M18	■	■	■	■
M30	■	■	—	—
Page	220	217	223	241

■ Standard

□ Available

— No/not available





Sub-miniature sensor for demanding mounting conditions

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 the most demanding mounting conditions
- 18 mm long ultra short M12 size housing

Ordering information

DC 2-wire

Size	Shape	Sensing distance	Order code	
			Operation status NO	Operating status NC
3-mm dia. ^{*1}	Shielded	0.8 mm	E2EC-CR8D1	E2EC-CR8D2
5.4-mm dia. ^{*1}		1.5 mm	E2EC-C1R5D1	E2EC-C1R5D2
8-mm dia. ^{*1}		3 mm	E2EC-C3D1	E2EC-C3D2
M12 ^{*1}		4 mm	E2EC-X4D1	E2EC-X4D2

^{*1} A different frequency type is available. (E2EC-__ 5; e.g. E2EC-CR8D15)

Specifications

Item	E2EC-CR8D_	E2EC-C1R5D_	E2EC-C3D_	E2EC-X4D_
Sensing distance	0.8 mm ±15%	1.5 mm ±10%	3 mm ±10%	4 mm ±10%
Response frequency	1.5 kHz		1 kHz	
Power supply voltage (Operating voltage)	12 to 24 VDC (10 to 30 VDC) ripple (p-p): 10% max.			
Protective circuit	Surge absorber, short-circuit protection			
Ambient temperature	Operating/Storage: -25 °C to 70 °C (with no icing or condensation)			
Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions			
Shock resistance	Destruction: 1,000 m/s ² for 10 times each in X, Y, and Z directions			
Degree of protection	IEC60529 IP67			
Material	Case	Brass		
	Sensing surface	ABS		

Note: The response frequencies for DC switching are average values measured on condition that the distance between each sensing object is twice as large as the size of the sensing object and the sensing distance set is half of the maximum sensing distance.

Miniature square inductive sensor

The E2S family features miniature block style plastic housings for demanding mounting conditions.

- Miniature housing with long sensing ranges
- Front and side facing sensing surfaces
- Simple mounting with one screw
- IP67

Ordering information

DC 2-wire models

Sensing surface	Shape	Size in mm (HxWxD)	Sensing distance	Order code	
				Operating status NO	Operating status NC
Front face	Unshielded	19x6x6	1.6 mm	E2S-W11	E2S-W12
End face				E2S-Q11	E2S-Q12
Front face		23x8x8	2.5 mm	E2S-W21	E2S-W22
End face				E2S-Q21	E2S-Q22

DC 3-wire models

Sensing surface	Shape	Size in mm (HxWxD)	Sensing distance	Output specifications	Order code		
					Operating status NO	Operating status NC	
Front face	Unshielded	19x6x6	1.6 mm	NPN	E2S-W13	E2S-W14	
End face					E2S-Q13	E2S-Q14	
Front face		27x8x8	2.5 mm		E2S-W23	E2S-W24	
End face					E2S-Q23	E2S-Q24	
Front face		19x6x6	1.6 mm	PNP	E2S-W15	E2S-W16	
End face					E2S-Q15	E2S-Q16	
Front face		23x8x8	2.5 mm		E2S-W25	E2S-W26	
End face					E2S-Q25	E2S-Q26	

Specifications

DC 2-wire models

Item	E2S-W11 E2S-W12	E2S-Q11 E2S-Q12	E2S-W21 E2S-W22	E2S-Q21 E2S-Q22
Sensing surface	Front face	End face	Front face	End face
Sensing distance	1.6 mm ±10%		2.5 mm ±15%	
Response frequency	1 kHz min.			
Rated supply voltage (operating voltage)	12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.			
Operating status (with sensing object approaching)	__ 1 models: NO __ 2 models: NC			

DC 3-wire models

Item	E2S-W13 E2S-W14	E2S-Q13 E2S-Q14	E2S-W23 E2S-W24	E2S-Q23 E2S-Q24	E2S-W15 E2S-W16	E2S-Q15 E2S-Q16	E2S-W25 E2S-W26	E2S-Q25 E2S-Q26
Sensing surface	Front face	End face	Front face	End face	Front face	End face	Front face	End face
Sensing distance	1.6 mm ±10%		2.5 mm ±15%		1.6 mm ±10%		2.5 mm ±15%	
Response frequency	1 kHz min.							
Rated supply voltage (operating voltage)	12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.							
Protective circuit	Reverse polarity connection and surge absorber							
Ambient temperature	Operating: -25 to 70°C, Storage: -40 to 85°C (with no icing or condensation)							
Vibration resistance	10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions							
Shock resistance	Destruction: 500 m/s ² for 3 times each in X, Y, and Z directions							
Degree of protection	IEC60529 IP67							
Material	Case	Polyarylate						



Miniature inductive proximity sensor

The E2E Small Diameter line with housing sizes dia 4 mm, M5 or dia 5.4 mm is part of the E2E family and is the ideal solution for tight mounting spaces.

- Miniature housing sizes dia 4 mm, M5 or dia 5.4 mm
- IP67

Ordering information

Size	Shape	Sensing distance	Connection	Housing material	Output	Order code		
						Operation mode NO	Operation mode NC	
dia 4 mm	Shielded	0.8 mm	Pre-wired	brass	PNP	E2E-CR8B1	E2E-CR8B2	
			M8 connector		NPN	E2E-CR8C1	E2E-CR8C2	
					PNP	E2E-CR8B1-M5	E2E-CR8B2-M5	
M5		1 mm	Pre-wired		NPN	E2E-CR8C1-M5	E2E-CR8C2-M5	
			M8 connector		PNP	E2E-X1B1	E2E-X1B2	
					NPN	E2E-X1C1	E2E-X1C2	
dia 5.4 mm					Pre-wired	PNP	E2E-X1B1-M5	E2E-X1B2-M5
						NPN	E2E-X1C1-M5	E2E-X1C2-M5
						PNP	E2E-C1B1	E2E-C1B2
				NPN	E2E-C1C1	E2E-C1C2		

Specifications

Item	4 dia.		M5		5.4 dia.	
	E2E-CR8C /B_		E2E-X1C /B_		E2E-C1C /B_	
Sensing distance	0.8 mm ±15%		1 mm ±15%			
Response frequency ^{*1}	3 kHz					
Power supply voltage (operating voltage)	12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.					
Protective circuit	Power supply reverse polarity protection, surge suppressor					
Ambient temperature	Operating/Storage: -25 °C to 70 °C (with no icing or condensation)					
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/s ² 10 times each in X, Y, and Z directions					
Degree of protection	IEC 60529 IP67					
Material	Case	Stainless steel (SUS303)		Brass-nickel plated		
	Sensing surface	Heat-resistant ABS				

^{*1} The response speed is an average value. Measurement conditions are as follows: Standard sensing object, a distance of twice the standard sensing object, and a set distance of half the sensing distance.



Compact square (flat shape) inductive sensor

The TL-W family offers a wide range of block style inductive sensors featuring different housing sizes for all standard applications.

- Front and side facing surface
- IP67
- DC 2-wire and DC 3-wire models

Ordering information

DC 2-wire models

Shape	Sensing distance	Order code	
		Output and operating status	
		NO	NC
Non-Shielded	5 mm	TL-W5MD1 ^{*1}	TL-W5MD2 ^{*1}

^{*1} Models with different response frequency are available. These model numbers take the form TL-W5MD_5 (e.g., TL-W5MD15)

DC 3-wire models

Shape	Size in mm (HxWxD)	Sensing distance	Output specifications	Order code			
				Output and operating status			
				PNP-NO	PNP-NC	NPN-NO	NPN-NC
Non-Shielded	25x8x5	1.5 mm	DC 3-wire	TL-W1R5MB1	—	TL-W1R5MC1 ^{*1}	—
	22x8x6	3 mm		TL-W3MB1	TL-W3MB2	TL-W3MC1 ^{*1}	TL-W3MC2
	31x18x10	5 mm		TL-W5MB1	TL-W5MB2	TL-W5MC1 ^{*1}	TL-W5MC2
	53x40x23	20 mm		—	—	TL-W20ME1 ^{*1}	TL-W20ME2 ^{*1}
Shielded	31x18x10	5 mm	DC 3-wire	TL-W5F1	TL-W5F2	TL-W5E1	TL-W5E2

^{*1} Models with different response frequency are available. These model numbers take the form TL-W5MD_5 (e.g., TL-W5MD15)

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	0.5 kHz	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.
Ambient temperature	Operating/Storage: -25 to 70°C (with no icing or condensation)					
Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions					
Shock resistance	Destruction: 500 m/s ² for 3 times each in X, Y, and Z directions					Destruction: 500 m/s ² for 10 times each in X, Y, and Z directions
Degree of protection	IEC60529 IP67					
Material	Case	Heat-resistant ABS resin			Diecast aluminum	Heat-resistant ABS resin
	Sensing surface	Heat-resistant ABS resin				



Compact square (thin shape) inductive sensor

The TL-T features a 12mm thin housing for space saving direct wall mounting.

- 12 mm thin housing
- Direct side wall mounting for bracket-less installation

Ordering information

DC 3-wire models

Mounting	Sensing distance	Connection	Output configuration	Order code	
				Operation status mode NO	Operation status mode NC
Shielded	2.0 mm	Pre-wired	NPN	TL-T2E1-E	TL-T2E2-E
			PNP	TL-T2F1-E	TL-T2F2-E
		M8 connector (3-pin)	NPN	TL-T2E1-M5-E	TL-T2E2-M5-E
			PNP	TL-T2F1-M5-E	TL-T2F2-M5-E
Non-shielded	4.0 mm	Pre-wired	NPN	TL-T4ME1-E	TL-T4ME2-E
			PNP	TL-T4MF1-E	TL-T4MF2-E
		M8 connector (3-pin)	NPN	TL-T4ME1-M5-E	TL-T4ME2-M5-E
			PNP	TL-T4MF1-M5-E	TL-T4MF2-M5-E

DC 4-wire models (NO + NC)

Mounting	Sensing distance	Connection	Output configuration	Order code
				Operation status mode antivalent (NO + NC)
Shielded	2.0 mm	Pre-wired	NPN	TL-T2E3-E
			PNP	TL-T2F3-E
Non-shielded	4.0 mm	Pre-wired	NPN	TL-T4ME3-E
			PNP	TL-T4MF3-E

Specifications

Item		Shielded TL-T2	Non-shielded TL-T4
Sensing distance		2 mm $\pm 10\%$	4 mm $\pm 10\%$
Response frequency ^{*1}		3000 Hz	1500 Hz
Power supply voltage (operating voltage)		24 VDC. Ripple (p-p): 10% max. (10 to 35 VDC)	
Protective circuit		Output reverse polarity protection, power source circuit reverse polarity protection, surge suppressor, short-circuit protection	
Ambient temperature		Operating/Storage: -25 to 70°C	
Vibration resistance		0 to 55 Hz with 30 min. dwell time at resonance frequency or 55 Hz each in X, Y, and Z directions 55 to 2000 Hz, 150 m/s ² , double amplitude for 2 hours each in X, Y, and Z directions	
Shock resistance		300 m/s ² 6 times each in X, Y, and Z directions	
Degree of protection		in accordance with IEC 60529: Pre-wired models: IP67 M8 Connector models: IP65	
Material	Case	PBT	
	Cable	PVC	
Size in mm (HxWxD)		26x40x12	

^{*1} The response frequency is an average value. Measurement conditions are as follows: Standard target, a distance of twice the standard target distance between targets, and a setting distance of half the sensing distance.



Cylindrical inductive sensor in compact plastic housing

The general purpose E2F family features a full body plastic housing for high water and light chemical resistance.

- High quality full body plastic housing for high waterproof requirements
- Light chemical resistance

Ordering information

Size	Shape	Sensing distance	Output specifications	Order code	
				Operating status NO	Operating status NC
M8	Shielded	1.5 mm	NPN	E2F-X1R5E1	E2F-X1R5E2
M12		2 mm	NPN	E2F-X2E1 ^{*1}	E2F-X2E2 ^{*1}
M18		5 mm	NPN	E2F-X5E1 ^{*1}	E2F-X5E2 ^{*1}
M30		10 mm	NPN	E2F-X10E1 ^{*1}	E2F-X10E2 ^{*1}

^{*1} An alternative frequency type is available. (E2F-X__5; e.g.E2F-X5E15)

Specifications

Item	E2F-X1R5E_	E2F-X2E_	E2F-X5E_	E2F-X10E_
Sensing distance	1.5 mm ±10%	2 mm ±10%	5 mm ±10%	10 mm ±10%
Response frequency ^{*1}	2 kHz	1.5 kHz	600 Hz	400 Hz
Power supply voltage (operating voltage)	12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.			
Protective circuits	Reverse connection protection, load short-circuit protection, surge absorber			
Ambient temperature	Operating/Storage: -25 °C to 70 °C (with no icing or condensation)			
Vibration resistance	10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions			
Shock resistance	Destruction: 1,000 m/s ² for 10 times each in X, Y, and Z directions			
Degree of protection	IEC IP67			
Material	Case	Polyarylate		
	Sensing surface			

^{*1} The response frequencies are average values measured on condition that the distance between each sensing object is twice as large as the size of the sensing object and the sensing distance set is half of the maximum sensing distance.



Cylindrical inductive sensor in brass and stainless steel housing

The modular E2A family of inductive sensors is designed and tested for extra long life with maximum quality consistency in manufacturing. The modular design provides the basis for an unmatched portfolio flexibility.

- Extended (double) sensing distance
- IP67 and IP69k for highest protection in wet environments
- Continuously high quality level through specialized manufacturing process
- DC 3-wire (NO, NC), DC 4-wire (NO+NC) and DC 2-wire models
- Wide portfolio range through modular concept

Ordering information

Pre-wired

(Exemplary for pre-wired and connector versions. For different cable materials and lengths, special housing length, DC2-wire models, reduced sensing distances or special connectors, please refer to complete datasheet.)

Size	Shape	Sensing distance	Thread length (overall length)	Output configuration	Order code		
					Operation mode NO	Operation mode NC	Operation mode NO + NC
M8	Shielded	2.0 mm	27 (40) ^{*1}	PNP ^{*2}	E2A-S08KS02-WP-B1 2M	E2A-S08KS02-WP-B2 2M	—
	Non-shielded	4.0 mm	27 (40) ^{*1}	PNP ^{*2}	E2A-S08KN04-WP-B1 2M	E2A-S08KN04-WP-B2 2M	—
M12	Shielded	4.0 mm	34 (50) ^{*1}	PNP ^{*2}	E2A-M12KS04-WP-B1 2M	E2A-M12KS04-WP-B2 2M	E2A-M12KS04-WP-B3 2M
	Non-shielded	8.0 mm	34 (50) ^{*1}	PNP ^{*2}	E2A-M12KN08-WP-B1 2M	E2A-M12KN08-WP-B2 2M	E2A-M12KN08-WP-B3 2M
M18	Shielded	8.0 mm	39 (59) ^{*1}	PNP ^{*2}	E2A-M18KS08-WP-B1 2M	E2A-M18KS08-WP-B2 2M	E2A-M18KS08-WP-B3 2M
	Non-shielded	16.0 mm	39 (59) ^{*1}	PNP ^{*2}	E2A-M18KN16-WP-B1 2M	E2A-M18KN16-WP-B2 2M	E2A-M18KN16-WP-B3 2M
M30	Shielded	15.0 mm	44 (64) ^{*1}	PNP ^{*2}	E2A-M30KS15-WP-B1 2M	E2A-M30KS15-WP-B2 2M	E2A-M30KS15-WP-B3 2M
	Non-shielded	20.0 mm	44 (64) ^{*1}	PNP ^{*2}	E2A-M30KN20-WP-B1 2M	E2A-M30KN20-WP-B2 2M	E2A-M30KN20-WP-B3 2M

^{*1} Longer housing models are available.

^{*2} NPN models are also available.

Connector versions

Size	Shape	Sensing distance	Thread length (overall length)	Output configuration	Order code		
					Operation mode NO	Operation mode NC	Operation mode NO + NC
M8	Shielded	2.0 mm	27 (40) ^{*1}	PNP ^{*2}	E2A-S08KS02-M3-B1	E2A-S08KS02-M3-B2	—
	Non-shielded	4.0 mm	27 (40) ^{*1}	PNP ^{*2}	E2A-S08KN04-M3-B1	E2A-S08KN04-M3-B2	—
M12	Shielded	4.0 mm	34 (50) ^{*1}	PNP ^{*2}	E2A-M12KS04-M1-B1	E2A-M12KS04-M1-B2	E2A-M12KS04-M1-B3
	Non-shielded	8.0 mm	34 (50) ^{*1}	PNP ^{*2}	E2A-M12KN08-M1-B1	E2A-M12KN08-M1-B2	E2A-M12KN08-M1-B3
M18	Shielded	8.0 mm	39 (59) ^{*1}	PNP ^{*2}	E2A-M18KS08-M1-B1	E2A-M18KS08-M1-B2	E2A-M18KS08-M1-B3
	Non-shielded	16.0 mm	39 (59) ^{*1}	PNP ^{*2}	E2A-M18KN16-M1-B1	E2A-M18KN16-M1-B2	E2A-M18KN16-M1-B3
M30	Shielded	15.0 mm	44 (64) ^{*1}	PNP ^{*2}	E2A-M30KS15-M1-B1	E2A-M30KS15-M1-B2	E2A-M30KS15-M1-B3
	Non-shielded	20.0 mm	44 (64) ^{*1}	PNP ^{*2}	E2A-M30KN20-M1-B1	E2A-M30KN20-M1-B2	E2A-M30KN20-M1-B3

^{*1} Longer housing models are available.

^{*2} NPN models are also available.

Specifications

(Exemplary for shielded versions. Sensing distance is double for nonshielded version)

Type	M8	M12	M18	M30
Item	E2A-S08KS	E2A-M12KS	E2A-M18KS	E2A-M30KS
Sensing distance	2 mm ±10% ^{*1}	4 mm ±10% ^{*2}	8 mm±10% ^{*3}	15 mm±10% ^{*4}
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 circuit	Power source circuit reverse polarity protection, Surge suppressor, Short-circuit protection			
Ambient temperature	Operating: -40 °C to 70 °C, Storage: -40 °C to 85 °C (with no icing or condensation)			
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/s ² , 10 times each in X, Y and Z directions			
Standard and listings (Degree of protection)	IP67 after IEC 60529; IP69K after DIN 40050 part 9; EMC after EN60947-5-2; UL (CSA) E196555			
Material	Case: Stainless steel; Sensing surface: PBT			
	Brass-nickel plated or stainless steel			

^{*1} Models with 1 mm sensing distance are available.

^{*2} Models with 2 mm sensing distance are available.

^{*3} Models with 4 mm sensing distance are available.

^{*4} Models with 10 mm sensing distance are available.



Long distance square inductive sensor

The E2Q family of long distance sensors features two housing styles. The compact sized E2Q4 with M12 connector and the E2Q2 with the same housing dimensions as standard type electromechanical limit switches and terminal connection for simple wiring connections.

- Sensing distance of up to 40mm
- Active face direction changeable
- 10 to 60 VDC supply voltage
- Optionally Weld-Field-Immune or AC voltage models

Ordering information

Shape	Sensing distance	Connection	Active face	Output	Order code	
					Operating status NO	Operating status NO + NC
Shielded	20 mm	Terminals	Changeable	NPN	E2Q2-N20E1-H	E2Q2-N20E3-_* ⁺¹
Non-shielded	30 mm			PNP	E2Q2-N20F1-H	E2Q2-N20F3-_*
				NPN	—	E2Q2-N30ME3-_*
				PNP	—	E2Q2-N30MF3-_*
Non-shielded	40 mm			NPN	—	E2Q2-N40ME3-_*
				PNP	—	E2Q2-N40MF3-_*

^{*1} - ^{*} = H: terminal conduit M20x1,5
U: terminal conduit 1/2" NPT

Specifications

Item		Shielded	Non-shielded	
		E2Q2-N20 [*] - [*]	E2Q2-N30 [*] - [*]	E2Q2-N40 [*] - [*]
Sensing distance		20 mm ±10%	30 mm ±10%	40 mm ±10%
Response frequency		150 Hz	100 Hz	30 Hz
Power supply voltage (operating voltage)		10 to 60 VDC		
Protective circuit		Reverse polarity, output short circuit		
Ambient temperature		Operating: -25 to 70°C		
Vibration resistance		10 to 55 Hz, 1 mm amplitude according IEC 60068-2-6		
Shock resistance		Approx. 30 G for 11 ms according to IEC 60068-2-27		
Degree of protection		IEC 60529 IP 67		
Material	Case terminal base	PBT		
		Al		
	Sensing face	PBT (...-H type)		
Size in mm (HxWxD)		118x40x40		



Long distance square inductive proximity sensor

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

Ordering information

Shape	Sensing distance	Connection	Active face	Output	Order code	
					Operating status NO	Operating status NO + NC
Shielded	20 mm	Plug-in connector	Changable	NPN	E2Q5-N20E1-M1	E2Q5-N20E3-M1
				PNP	E2Q5-N20F1-M1	E2Q5-N20F3-M1
Non-shielded	40 mm			NPN	E2Q5-N40ME1-M1	E2Q5-N40ME3-M1
				PNP	E2Q5-N40MF1-M1	E2Q5-N40MF3-M1

Specifications

Item		Shielded	
		E2Q5-N20__ - M1	E2Q5-N40M_3- M1
Sensing distance S_n		20 mm±10%	40 mm±10%
Switching frequency		150 Hz	
Power supply voltage (operating voltage)		10 to 30 VDC	
Protective circuit		Reverse polarity, output short circuit	
Ambient temperature		Operating: -25 to 85°C	
Vibration resistance		10 to 55 Hz, 1 mm amplitude according IEC 60068-2-6	
Shock resistance		Approx. 30 G for 11 ms according to IEC 60068-2-27	
Degree of protection		IEC 60529 IP 67, DIN 40050 part 9 IP 69 k	
Material	Case	PBT	
	Sensing face	PBT	
Size in mm (HxWxD)		67x40x40	



Long (triple) distance inductive sensor

The E2A3 family features an optimised sensing performance to achieve triple sensing distance for flush mounting requirements. The E2A3 is based on the modular concept of the E2A family.

- Triple distance for demanding sensing requirements and enhanced sensor protection
- IP67 and IP69k

Ordering information

Diameter	Thread length	Type	Sensing distance	Connection	Output	Order code				
						Operation mode: NO	Operation mode: NC			
M8	27 (40) mm	Shielded	3.0mm	Pre-wired	PNP	E2A3-S08KS03-WP-B1 2M	E2A3-S08KS03-WP-B2 2M			
	NPN				E2A3-S08KS03-WP-C1 2M	E2A3-S08KS03-WP-C2 2M				
	27 (44) mm			M12 Connector	PNP	E2A3-S08KS03-M1-B1	E2A3-S08KS03-M1-B2			
					NPN	E2A3-S08KS03-M1-C1	E2A3-S08KS03-M1-C2			
	27 (40) mm			M8 Connector (3-pin)	PNP	E2A3-S08KS03-M5-B1	E2A3-S08KS03-M5-B2			
					NPN	E2A3-S08KS03-M5-C1	E2A3-S08KS03-M5-C2			
M12	34 (50) mm	Shielded	6.0 mm	Pre-wired	PNP	E2A3-M12KS06-WP-B1 2M	E2A3-M12KS06-WP-B2 2M			
	NPN				E2A3-M12KS06-WP-C1 2M	E2A3-M12KS06-WP-C2 2M				
	34 (49) mm			M12 Connector	PNP	E2A3-M12KS06-M1-B1	E2A3-M12KS06-M1-B2			
					NPN	E2A3-M12KS06-M1-C1	E2A3-M12KS06-M1-C2			
	M18			39 (60) mm	Shielded	11.0 mm	Pre-wired	PNP	E2A3-M18KS11-WP-B1 2M	E2A3-M18KS11-WP-B2 2M
								NPN	E2A3-M18KS11-WP-C1 2M	E2A3-M18KS11-WP-C2 2M
39 (54) mm		M12 Connector	PNP				E2A3-M18KS11-M1-B1	E2A3-M18KS11-M1-B2		
			NPN				E2A3-M18KS11-M1-C1	E2A3-M18KS11-M1-C2		
M30	44 (65) mm	Shielded	20.0 mm	Pre-wired	PNP	E2A3-M30KS20-WP-B1 2M	E2A3-M30KS20-WP-B2 2M			
	NPN				E2A3-M30KS20-WP-C1 2M	E2A3-M30KS20-WP-C2 2M				
	44 (59) mm			M12 Connector	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-__-B E2A3-S08KS03-__-C	E2A3-M12KS06-__-B E2A3-M12KS06-__-C	E2A3-M18KS11-__-B E2A3-M18KS11-__-C	E2A3-M30KS20-__-B E2A3-M30KS20-__-C
Sensing distance	3 mm ±10%	6 mm ±10%	11 mm ±10%	20 mm ±10%
Response frequency *1	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)			
Protection circuit	Power source circuit reverse polarity protection, Surge suppressor, Short-circuit protection			
Ambient temperature	Operating: -25 to 70°C, Storage: -25 to 70°C			
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/s ² , 10 times each in X, Y, and Z directions			
Standards and listings	IP67 after IEC 60529 IP69K after DIN 40050 EMC after EN60947-5-2 UL (CSA) E196555 *2			
Material	Stainless steel *3			
Case	Brass-nickel plated			
Sensing surface	PBT			

*1 The response frequency is an average value. Measurement conditions are as follows: Standard sensing object, a distance of twice the standard sensing object length between sensing objects, and a set distance of half the sensing distance.

*2 UL (CSA) [E196555]: Use class 2 circuit only.

*3 Material specifications for stainless steel housing case: 1.4305 (W.-No.), SUS303 (AISI), 2346 (SS).





Inductive sensor line for AC power supply

The E2E-_Y and E2F-_Y models offer the same functionality and protection as the standard E2E (brass housing) and E2F (plastic housing) families but can be connected to an AC power supply.

- 24-240 VAC direct switching
- IP67
- Brass or plastic housing

Ordering information

AC 2-wire/Pre-wired models

Size		Sensing distance	Operation mode	Order code		
				Metal housing		Plastic housing
				Pre-wired	Connector	Pre-wired
Shielded 	M8	1.5 mm	NO	E2E-X1R5Y1	—	E2F-X1R5Y1
			NC	E2E-X1R5Y2	—	E2F-X1R5Y2
	M12	2 mm	NO	E2E-X2Y1	E2E-X2Y1-M1	E2F-X2Y1
			NC	E2E-X2Y2	E2E-X2Y2-M1	E2F-X2Y2
	M18	5 mm	NO	E2E-X5Y1	E2E-X5Y1-M1	E2F-X5Y1
			NC	E2E-X5Y2	E2E-X5Y2-M1	E2F-X5Y2
	M30	10 mm	NO	E2E-X10Y1	E2E-X10Y1-M1	E2F-X10Y1
			NC	E2E-X10Y2	E2E-X10Y2-M1	E2F-X10Y2
Unshielded 	M8	2 mm	NO	E2E-X2MY1	—	—
			NC	E2E-X2MY2	—	—
	M12	5 mm	NO	E2E-X5MY1	E2E-X5MY1-M1	—
			NC	E2E-X5MY2	E2E-X5MY2-M1	—
	M18	10 mm	NO	E2E-X10MY1	E2E-X10MY1-M1	—
			NC	E2E-X10MY2	E2E-X10MY2-M1	—
	M30	18 mm	NO	E2E-X18MY1	E2E-X18MY1-M1	—
			NC	E2E-X18MY2	E2E-X18MY2-M1	—

Specifications (exemplary)

Metal housing (E2E)

Size	M8		M12		M18		M30	
Type	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
Item	E2E-X1R5Y_	E2E-X2MY_	E2E-X2Y_	E2E-X5MY_	E2E-X5Y_	E2E-X10MY_	E2E-X10Y_	E2E-X18MY_
Sensing distance	1.5 mm ±10%	2 mm ±10%	2 mm ±10%	5 mm ±10%	5 mm ±10%	10 mm ±10%	10 mm ±10%	18 mm ±10%
Response speed	25 Hz							
Power supply voltage (operating voltage range) *1	24 to 240 VAC, 50/60 Hz (20 to 264 VAC)							
Operation mode (with sensing object approaching)	Y1 Models: NO Y2 Models: NC For details, refer to <i>Timing charts</i> .							
Ambient temperature *1 *2	Operating/Storage: -25 to 70°C (with no icing or condensation)		Operating/Storage: -40 to 85°C (with no icing or condensation)					
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/s ² 10 times each in X, Y, and Z directions		1,000 m/s ² 10 times each in X, Y, and Z directions					
Degree of protection	IEC 60529 IP67 (Pre-wired models: JEM standard IP67g (waterproof, oil-proof))							
Connection method	Pre-wired models (standard length 2 m), connector models							
Material	Case	Stainless steel (SUS303)		Brass-nickel plated				
	Sensing surface	PBT (polybutylene terephthalate)						
	Clamping nuts	Brass-nickel plated						
	Toothed washer	Iron-zinc plated						

*1 When supplying 24 VAC to any of the above models, make sure that the operating ambient temperature range is over -25°C.

*2 When using an M18- or M30-sized E2E within an ambient temperature of 70 to 85°C, make sure that the E2E has a control output of 5 to 200 mA max.



Cylindrical inductive sensor for mobile usage

Designed and tested to keep your machines moving.

- IP69K tested and certified for highest water resistance
- e1 type approval (according to Automotive Directive 95/54/EC)
- EMC noise tested up to 100 V/m (ISO 11452-2)
- Cable breakage protection

Ordering information

Size	Length	Type	Sensing distance	Connection	Output configuration	Order code Operation mode NO
M12	34 (50)	Shielded	4.0 mm	Pre-wired	PNP	E2AU-M12KS04-WP-B1 2M
	56 (72)				PNP	E2AU-M12LS04-WP-B1 2M
	34 (48)			M12 connector	PNP	E2AU-M12KS04-M1-B1
	56 (70)				PNP	E2AU-M12LS04-M1-B1
M18	39 (59)	Shielded	8.0 mm	Pre-wired	PNP	E2AU-M18KS08-WP-B1 2M
	61 (81)				PNP	E2AU-M18LS08-WP-B1 2M
	39 (53)			M12 connector	PNP	E2AU-M18KS08-M1-B1
	61 (75)				PNP	E2AU-M18LS08-M1-B1
M30	44 (64)	Shielded	15.0 mm	Pre-wired	PNP	E2AU-M30KS15-WP-B1 2M
	66 (86)				PNP	E2AU-M30LS15-WP-B1 2M
	44 (58)			M12 connector	PNP	E2AU-M30KS15-M1-B1
	66 (80)				PNP	E2AU-M30LS15-M1-B1

Specifications

Item	M12 E2AU-M12_S04-__-B1	M18 E2AU-M18_S08-__-B1	M30 E2AU-M30_S15-__-B1
Sensing distance	4 mm ±10%	8 mm ±10%	15 mm ±10%
Response frequency ^{*1}	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 circuit	Output reverse polarity protection, power source circuit 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)		
Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y and Z directions		
Shock resistance	1,000 m/s ² , 10 times each in X, Y and Z directions		
Degree of protection	IP67 after IEC 60529 IP69K after DIN 40050		
Standard and listings	EMC after EN60947-5-2 UL (CSA) E196555 ^{*2} EMC after 95/94/EC EMC after ISO11452-2		
Material	Case	Brass-nickel plated	
	Sensing surface	PBT	

^{*1} The response frequency is an average value. Measurement conditions are as follows: Standard target, a distance of twice the standard target distance between targets, and a setting distance of half the sensing distance.

^{*2} UL (CSA) [E196555]: Use class 2 circuit only.



Cylindrical inductive sensor for explosive environments

The high-reliability and robustness of the E2A family is now also available for explosive environments. The protective structure of the E2A family (based on EN50014 and EN50281-1-1/2) allows the ATEX certification Group II category 3D (94/9/EC Appendix VIII) typically for explosive areas zone 22 with non-leading dust.

- Protective connector cover to avoid disconnection under power
- Certified ATEX Group II category 3D (94/9/EC Appendix VIII)
- Rugged housing construction based on EN50014 and EN50281-1-1/2

Ordering information

DC 3-wire models (NO + NC: DC 4-wire) *1

Size		Sensing distance	Connection	Body material	Thread length (overall length)	Output configuration	Order code		
							Operation mode NO	Operation mode NC	Operation mode NO + NC
M12	Shielded	4.0 mm	M12 connector	Brass *2	34 (48)	PNP	E2AX-M12KS04-M1-B1	E2AX-M12KS04-M1-B2	E2AX-M12KS04-M1-B3
						NPN	E2AX-M12KS04-M1-C1	E2AX-M12KS04-M1-C2	E2AX-M12KS04-M1-C3
	Non-shielded	8.0 mm	M12 connector	Brass *2	34 (48)	PNP	E2AX-M12KN08-M1-B1	E2AX-M12KN08-M1-B2	E2AX-M12KN08-M1-B3
						NPN	E2AX-M12KN08-M1-C1	E2AX-M12KN08-M1-C2	E2AX-M12KN08-M1-C3
M18	Shielded	8.0 mm	M12 connector	Brass *2	39 (53)	PNP	E2AX-M18KS08-M1-B1	E2AX-M18KS08-M1-B2	E2AX-M18KS08-M1-B3
						NPN	E2AX-M18KS08-M1-C1	E2AX-M18KS08-M1-C2	E2AX-M18KS08-M1-C3
	Non-shielded	16.0 mm	M12 connector	Brass *2	39 (53)	PNP	E2AX-M18KN16-M1-B1	E2AX-M18KN16-M1-B2	E2AX-M18KN16-M1-B3
						NPN	E2AX-M18KN16-M1-C1	E2AX-M18KN16-M1-C2	E2AX-M18KN16-M1-C3
M30	Shielded	15.0 mm	M12 connector	Brass *2	44 (58)	PNP	E2AX-M30KS15-M1-B1	E2AX-M30KS15-M1-B2	E2AX-M30KS15-M1-B3
						NPN	E2AX-M30KS15-M1-C1	E2AX-M30KS15-M1-C2	E2AX-M30KS15-M1-C3
	Non-shielded	20.0 mm	M12 connector	Brass *2	44 (58) *3	PNP	E2AX-M30KN20-M1-B1	E2AX-M30KN20-M1-B2	E2AX-M30KN20-M1-B3
						NPN	E2AX-M30KN20-M1-C1	E2AX-M30KN20-M1-C2	E2AX-M30KN20-M1-C3

*1 Please contact your Omron representative for DC 2-wire models.

*2 Stainless steel models are also available. Please contact your Omron representative.

*3 M30 non-shielded models with double sensing distance and short barrels cannot be mounted due to the necessary separation distance from the surrounding metal. Standard sensing models are thus available.

Specifications

Size	M12		M18		M30		
Type	Shielded	Non-shielded	Shielded	Non-shielded	Shielded	Non-shielded	Non-shielded
Item	E2AX-M12_S	E2AX-M12_N	E2AX-M18_S	E2AX-M18_N	E2AX-M30_S	E2AX-M30KN	E2AX-M30LN
Sensing distance	4 mm ±10%	8 mm ±10%	8 mm ±10%	16 mm ±10%	15 mm ±10%	20 mm ±10%	30 mm ±10%
Response frequency *1	1,000 Hz	800 Hz	500 Hz	400 Hz	250 Hz	100 Hz	100 Hz
Power supply voltage (operating voltage range)	12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)						
Protection circuit	Output reverse polarity protection, power source circuit reverse polarity protection, surge suppressor, short-circuit protection						
Ambient air temperature	Operating: -40 to 70°C, Storage: -40 to 85°C (with no icing or condensation)						
Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y and Z directions						
Shock resistance	1,000 m/s ² , 10 times each in X, Y and Z directions						
Standard and listings	IP65 EMC after EN60947-5-2 UL (CSA) E196555 *2 ATEX after EN50014 EN50281-1-1/2						
Material	Case	Brass-nickel plated or stainless steel					
	Sensing surface	PBT					
	Clamping nut	Brass-nickel plated for brass models stainless steel for steel models					

*1 The response frequency is an average value. Measurement conditions are as follows: Standard target, a distance of twice the standard target distance between targets, and a setting distance of half the sensing distance.

*2 UL (CSA) [E196555]: Use class 2 circuit only



Oil resistant inductive sensor family

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

- DC 3-wire and DC 2-wire models
- M8, M12, M18 and M30 standard sizes
- IP67g (water and oil resistance)

Ordering information

Size		Sensing distance	Self-diagnostic output function	Order code	
				NO	NC
M12	Shielded	3 mm	Yes	E2E-X3D1S ^{*1}	–
M18		7 mm		E2E-X7D1S ^{*1}	–
M30		10 mm		E2E-X10D1S ^{*1}	–
M12	Unshielded	8 mm		E2E-X8MD1S ^{*1}	–
M18		14 mm		E2E-X14MD1S ^{*1}	–
M30		20 mm		E2E-X20MD1S ^{*1}	–
M8	Shielded	2 mm	No	E2E-X2D1-N ^{*2 *3}	E2E-X2D2-N ^{*3}
M12		3 mm		E2E-X3D1-N ^{*1 *2 *3}	E2E-X3D2-N ^{*3}
M18		7 mm		E2E-X7D1-N ^{*1 *2 *3}	E2E-X7D2-N ^{*3}
M30		10 mm		E2E-X10D1-N ^{*1 *2 *3}	E2E-X10D2-N
M8	Unshielded	4 mm		E2E-X4MD1 ^{*2 *3}	E2E-X4MD2
M12		8 mm		E2E-X8MD1 ^{*1 *2 *3}	E2E-X8MD2
M18		14 mm		E2E-X14MD1 ^{*1 *2 *3}	E2E-X14MD2
M30		20 mm		E2E-X20MD1 ^{*1 *2 *3}	E2E-X20MD2

^{*1} In addition to the above models, E2E-X_ 15 models (e.g., E2E-X3D15-N), which are different in frequency from the above models, are available.
^{*2} E2E models with a robotics cable are available as well. The model number of a model with a robotics cable has the suffix '-R' (e.g., E2E-X3D1-R).
^{*3} Cables with a length of 5 m are also available. Specify the cable length at the end of the model number (e.g., E2E-X3D1-N 5M).

Specifications

Item		M8		M12		M18		M30	
		E2E-X2D_	E2E-X4MD_	E2E-X3D_	E2E-X8MD_	E2E-X7D_	E2E-X14MD_	E2E-X10D_	E2E-X20MD_
Sensing distance		2 mm ±10%	4 mm ±10%	3 mm ±10%	8 mm ±10%	7 mm ±10%	14 mm ±10%	10 mm ±10%	20 mm ±10%
Response frequency *1		1.5 kHz	1.0 kHz	1.0 kHz	0.8 kHz	0.5 kHz	0.4 kHz	0.4 kHz	0.1 kHz
Power supply voltage (operating voltage)		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.							
Protective circuit		Surge suppressor, output load short-circuit protection (for control and diagnostic output)							
Ambient temperature		Operating: -25 °C to 70 °C, Storage: -40 °C to 85 °C (with no icing or condensation)							
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/s ² 10 times each in X, Y, and Z directions		1,000 m/s ² 10 times each in X, Y, and Z directions					
Degree of protection		IEC 60529 IP67 (Pre-wired models, pre-wired connector models: JEM standard IP67g (waterproof and oil-proof))							
Material	Case	Stainless steel (SUS303)		Brass-nickel plated					
	Sensing surface	PBT (polybutylene terephthalate)							

^{*1} The response speed is an average value. Measurement conditions are as follows: Standard sensing object, a distance of twice the standard sensing object, and a set distance of half the sensing distance.



Anti-microbial inductive sensor in cylindrical plastic housing

The E2F-D housing features a FDA approved anti-microbial additive reducing the risk of food contamination.

- Anti-microbial housing material reducing bacteria growth
- IP67 and IP69k for highest water resistance
- Tested detergent resistance

Ordering information

Size	Shape	Sensing distance	Output specifications	Order code	
				Operating status NO	Operating status NC
M12	non-shielded	4 mm	NPN	E2F-DX4E1	E2F-DX4E2
			PNP	E2F-DX4F1	E2F-DX4F2
M18		8 mm	NPN	E2F-DX8E1	E2F-DX8E2
			PNP	E2F-DX8F1	E2F-DX8F2

Specifications

Item	E2F-DX4_	E2F-DX8_
Sensing distance	4 mm ±10%	8 mm ±10%
Response frequency	1 kHz	500 Hz
Power supply voltage	10 to 35 VDC	
Ambient temperature	Operating/Storage: -25 to 70°C (with no icing or condensation)	
Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions	
Degree of protection	IP67, IP69K	
Material	PBT with anti-microbial SAN additive based on silver ions	

Chemical resistant inductive sensor

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

- Full body Fluoro plastic housing for chemical resistance
- DC 2-wire



Ordering information

Size	Shape	Sensing distance	Order code		
			DC 3-wire models		DC 2-wire models
			PNP (NO)	NPN (NO)	NO
M12	Shielded	2 mm	E2FQ-X2F1	E2FQ-X2E1	E2FQ-X2D1
M18		5 mm	E2FQ-X5F1	E2FQ-X5E1	E2FQ-X5D1
M30		10 mm	E2FQ-X10F1	E2FQ-X10E1	E2FQ-X10D1

Specifications

Item	E2FQ-X2_	E2FQ-X5_	E2FQ-X10_
Sensing distance	2 mm $\pm 10\%$	5 mm $\pm 10\%$	10 mm $\pm 10\%$
Response frequency ^{*1}	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 circuit	E1, F1 models: Protection for reverse polarity, load short circuit, surge voltage		
Ambient temperature	Operating/Storage: -25 to 70°C (with no icing or condensation)		
Vibration resistance	Destruction: 10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions		
Shock resistance	Destruction: 500 m/s ² for 10 times each in X, Y, and Z directions Destruction: 1,000 m/s ² for 10 times each in X, Y, and Z directions		
Degree of protection	IEC60529 IP67		
Material	PTFE	—	—

^{*1} The response frequencies for DC switching are average values measured on condition that the distance between each sensing object is twice as large as the size of the sensing object and the sensing distance set is half of the maximum sensing distance.



High precision positioning inductive proximity sensor

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 1 mm precision
- Precision distance teaching
- Window function (2 outputs) for production tolerance checks

Ordering information

Sensor heads

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

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

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

Specifications

Sensor heads

Item		E2C-EDR6-F	E2C-ED01(-_)	E2C-ED02(-_)	E2C-EM02(-_)	E2C-EM07(-_)	E2C-EV05(-_)	E2C-EM02H
		3 dia.×18 mm	5.4 dia.×18 mm	8 dia.×22 mm	M10×22 mm	M18×46.3 mm	30×14×4.8 mm	M12×22 mm
Sensing distance		0.6 mm	1 mm	2 mm		7 mm	5 mm	2 mm
Ambient temperature ^{*1}	operating	-10 °C to 60°C (with no icing or condensation)						-10 °C to 200°C ^{*2}
	storage	-10°C to 60°C (with no icing or condensation)	-20 °C to 70°C (with no icing or condensation)					
Vibration resistance		Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions						
Shock resistance		Destruction: 500 m/s ² for 3 times each in X, Y, and Z directions						
Degree of protection		IEC60529 IP67						IEC60529 IP60 ^{*3}
Material	Sensor head	Case	Brass	Stainless steel	Brass		Zinc	Brass
		Sensing surface	Heat-resistant ABS					

^{*1} A sudden temperature rise even within the rated temperature range may degrade characteristics.

^{*2} For the Sensor Head only without the preamplifier (-10 to 60°C). With no icing or condensation.

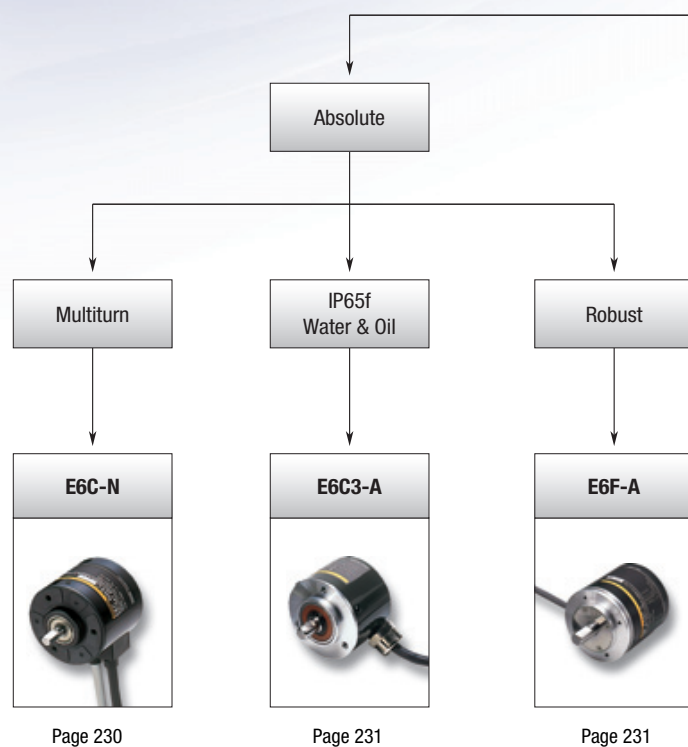
^{*3} Do not operate in areas exposed to water vapor because the enclosure is not waterproof.

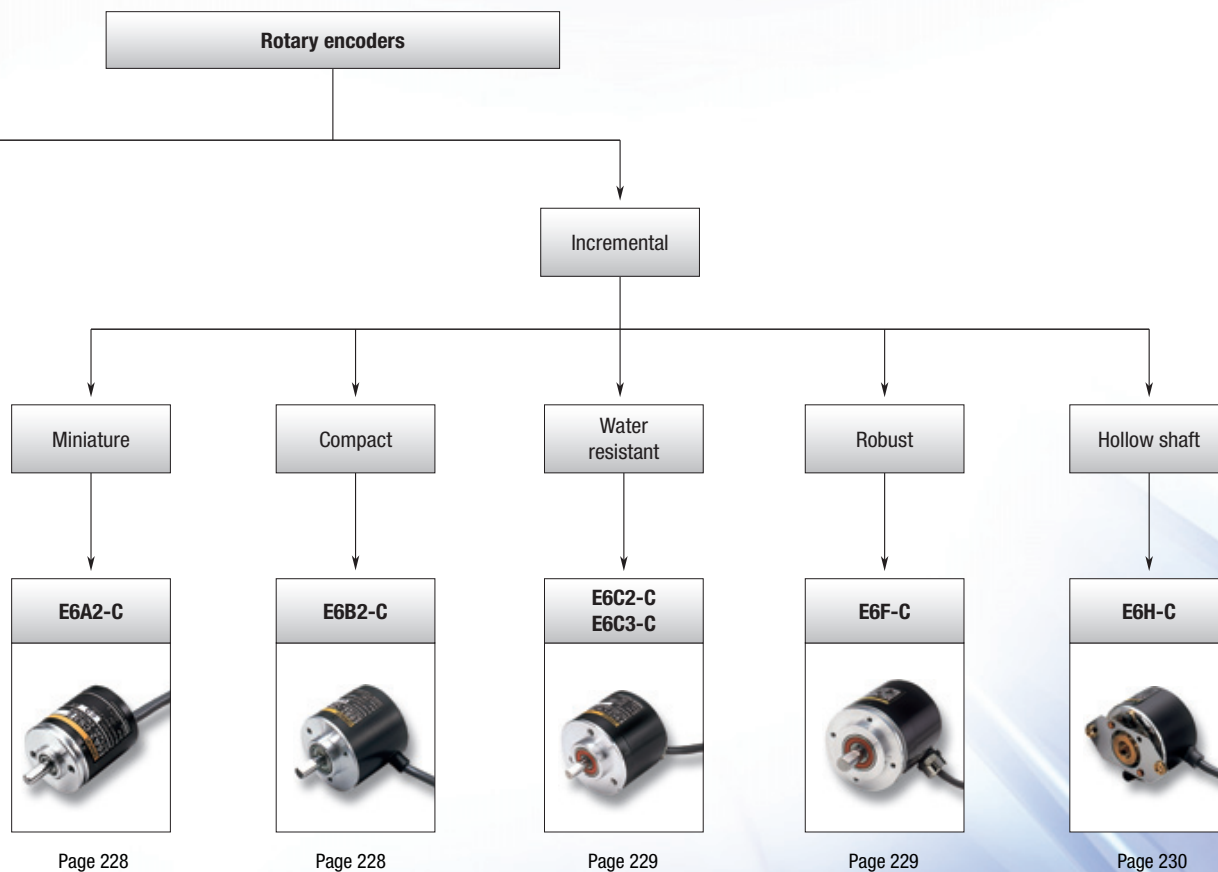
ACCURACY AND ROBUSTNESS MADE RELIABLE

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 for harsh environment
- Models for multiturn applications





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Output		Incremental				
						
Model		E6A2-C	E6B2-C	E6C2-C	E6C3-C	E6F-C
Type		Miniature	Compact	Water resistant		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	
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Output		Incremental	Absolute			
						
Model		E6H-C	E6C-N	E6C3-A	E6F-A	
Type		Hollow shaft	Multiturn	Water resistant	Rugged housing	
Resolution Range	Min	300	500	6	256	
	Max	3,600	500	1,024		
Output	NPN	■	■	■	■	
	PNP	–	–	–	–	
Size dia. in mm		40 (hollow)	50 (full and hollow)	50	60	
Max force	radial	29.4	30	80	120	
	axial	4.9	20	50	50	
IP rating	IP50	■	■	–	–	
	IP64	–	–	–	–	
	IP65	–	–	■	■	
Max. rotation frequency		10,000	1,500	5,000	5,000	
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■ Standard

□ Available

– No/not available



Miniature size rotary encoder

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



Compact size rotary encoder

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

Improved water resistant rotary encoder

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

Rugged housing rotary encoder

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	Supply voltage	Output form	Resolution (pulse/rotation)	Order code
60	12 to 24VDC	Complimentary output	100, 200, 360, 500, 600, 1000	E6F-CWZ5G



Hollow shaft rotary encoder

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

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

Ordering information

Size dia. in mm	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

E6C-N



Multiturn rotary encoder

The E6C-N rotary encoder provides a multiturn function for applications with rotations over 360°.

- Multiturn function

Ordering information

Size dia. in mm	Name	Order code
50	Shaft model with cable	E6C-NN5C
	Hollow-shaft model with cable	E6C-NN5CA
	Shaft model with connector	E6C-NN5C-C
	Hollow-shaft model with connector	E6C-NN5CA-C

Improved water resistant rotary encoder



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	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
		PNP open collector output	BCD	6, 8, 12		E6C3-AB5C
			Gray code	256, 360, 720, 1,024		E6C3-AG5B
			Binary	32, 40		E6C3-AN5B
	5 VDC 12 VDC	NPN voltage output	BCD	6, 8, 12		E6C3-AB5B
			Binary	256		E6C3-AN1E
						E6C3-AN2E

E6F-A

Rugged housing rotary encoder



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	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	E6F-AB5C-C
		PNP open collector	Gray code	256, 360, 720, 1,024	Pre-wired	E6F-AG5C
			BCD	360	Pre-wired	E6F-AB5B
			Gray code	256, 360, 720, 1,024	Pre-wired	E6F-AG5B

HIGH PRECISION QUALITY INSPECTION

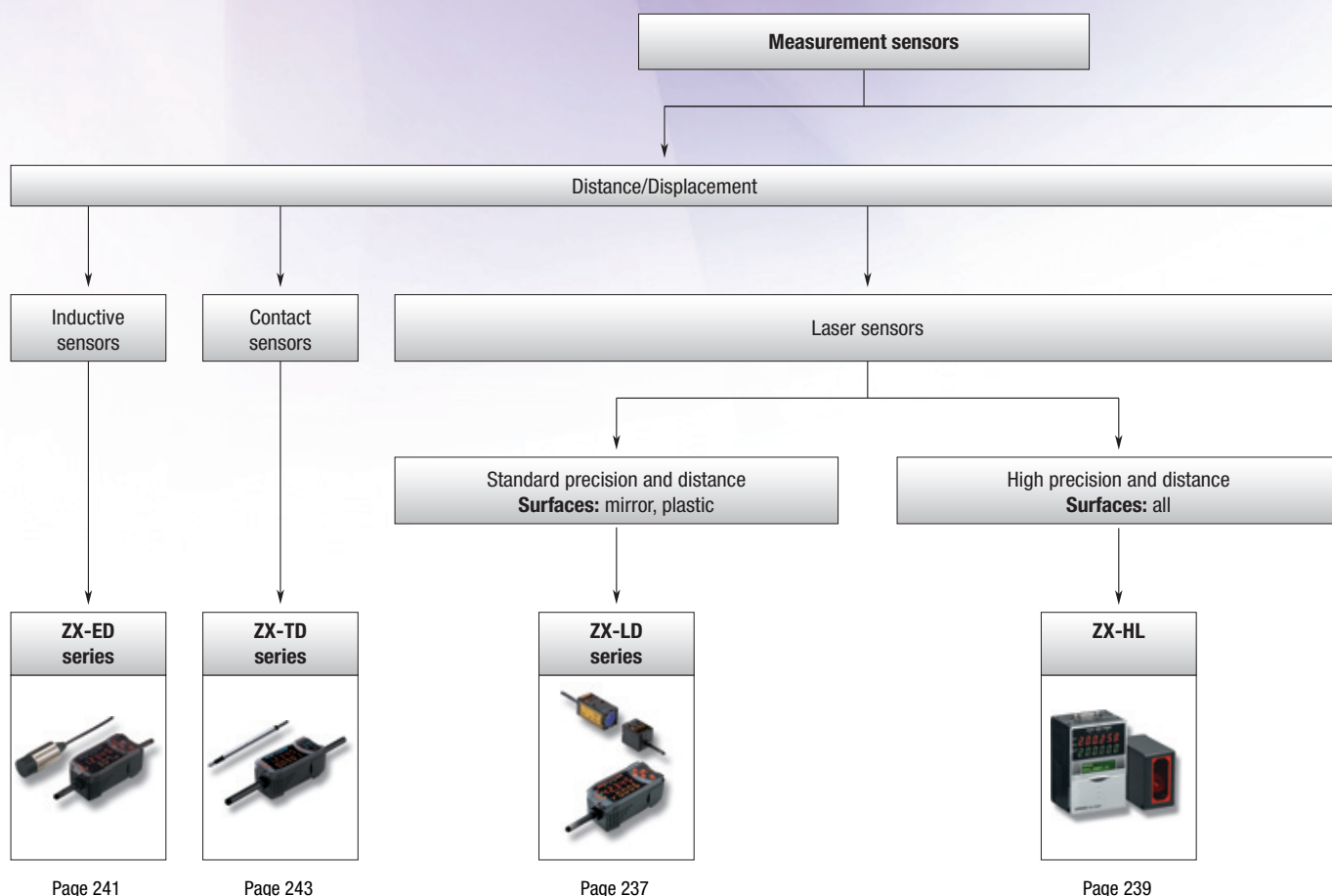
Zero defect becomes reality – scalable accuracy in inspection

The Smart displacement sensor family offers a modular and scalable approach to solve the most challenging measurement tasks. The powerful portfolio enables to measure profiles, thickness, distance, evenness/warpage as well as width, edge, etc. Several measurements profile can be performed simultaneously, using a single- or multi-controller unit. Aided by Omron's advanced technologies, highest accuracy over long distances, speed and reliability will be achieved.

- Accurate and fast – 0.25 m at less than 110 s sampling time
- Scalable – multi-controller unit to coordinate and calculate up to 9 units
- Smart – data storage and remote control via networking capabilities



See the top 5 application examples at:
www.never-fail.info

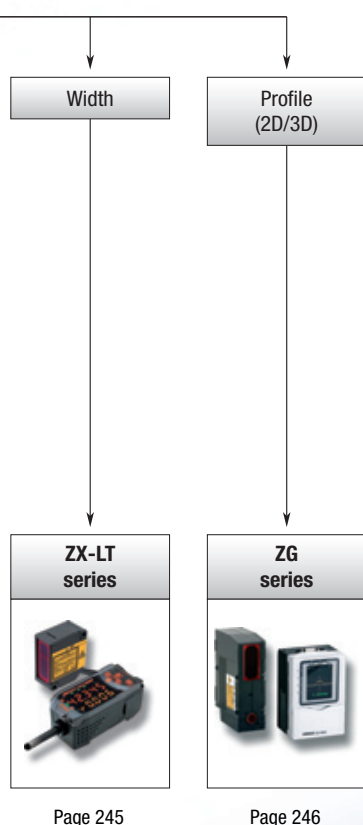


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Selection table

		1D smart laser measuring sensors		Inductive measuring sensors
				
Selection criteria	Model	ZX-LD	ZS-HL	ZX-E
	Measurement range Z Min.	30 ±2 mm	10 ±0.5 mm	0.5 mm
	Max.	300 ±200 mm	1500 ±500 mm	7 mm
	Measurement range X Min.	–	–	–
	Max.	–	–	–
	*1 Resolution Z	0.25 µm	0.25 µm	1 µm
	*1 Resolution X	–	–	–
	*1 Linearity (±% of full scale)	0.2%	0.05%	0.5%
	Response time	150 µs	110 µs	150 µs
	Spot beam	■	■	–
	Line beam	■	■	–
	IP-rating head	IP50	IP64/IP67	IP67
	IP-rating controller	IP40	IP40	IP40
	Ambient oper. temperature	0 to 50°C	0 to 50°C	0 to 50°C
	Number of connectable sensors	5	9	5
Features	Thickness measurement	■	■	■
	Excentricity	■	■	■
	Height	■	■	■
	Step	■	■	■
	Profile	–	–	–
	Distance	–	–	■
	Evenness	–	–	■
	Warpage	–	–	■
	Edge	–	–	–
	Width	–	–	–
	Peak	■	■	■
	Peak to peak	■	■	■
	Bottom	■	■	■
	Self-trigger	■	■	■
	Calibration	■	■	–
	Signal scaling	–	–	■
	PC-software	■	■	■
Application	Mirror	–	■	–
	Glass	–	■	–
	Metal	□	■	■
	Plastic	■	■	–
	Black rubber	–	■	–
	Paper	□	■	–
Supply voltage	12 to 24 VDC	■	–	■
	21.6 to 26.4 VDC	–	■	–
Control I/O	4 to 20 mA	■	■	■
	1 to 5 VDC	■	–	■
	Judgement output High/Pass/Low	■	■	■
	Trigger	■	■	■
Commu- nication	RS-232C	■	■	■
	USB2.0	–	■	■
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Displacement/measurement sensors

		Contact measuring sensors	Width measuring sensors	Profile measuring sensor
				
Selection criteria	Model	ZX-T	ZX-LT	ZG
	Measurement range Z Min.	1 mm	1 mm	20 ±0.5 mm
	Max.	10 mm	30 mm	210 ±30 mm
	Measurement range X Min.	–	–	3 mm
	Max.	–	–	70 mm
	^{*1} Resolution Z	0.1 µm	4 µm	0.2 µm
	^{*1} Resolution X	–	–	3 mm/631 pixels
	^{*1} Linearity (±% of full scale)	0.3%	1%	0.5%
	Response time	1 ms	150 µs	5 ms
	Spot beam	–	–	–
	Line beam	–	■	□
	IP-rating head	IP67	IP40	IP64/66
	IP-rating controller	IP40	IP40	IP20
	Ambient oper. temperature	0 to 50°C	0 to 50°C	0 to 50°C
	Number of connectable sensors	7	5	1
Features	Thickness measurement	■	■	■
	Excentricity	■	■	■
	Height	■	■	■
	Step	■	■	■
	Profile	–	–	□
	Distance	■	–	–
	Evenness	■	–	–
	Warpage	■	–	–
	Edge	–	■	–
	Width	–	■	□
	Peak	■	■	■
	Peak to peak	■	■	■
	Bottom	■	■	■
	Self-trigger	■	■	■
	Calibration	–	–	■
	Signal scaling	■	■	–
	PC-software	■	■	■
Application	Mirror	■	■	■
	Glass	■	■	■
	Metal	■	■	■
	Plastic	■	■	■
	Black rubber	■	■	■
	Paper	–	–	■
Supply voltage	12 to 24 VDC	■	■	–
	21.6 to 26.4 VDC	–	–	■
Control I/O	4 to 20 mA	■	■	■
	1 to 5 VDC	■	■	–
	Judgement output High/Pass/Low	■	■	■
	Trigger	■	■	■
Commu- nication	RS-232C	■	■	■
	USB2.0	–	–	■
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■ Standard

□ Available

– No/not available





Smart, fast and accurate laser measurement sensor

Smart ZX-L offers plug & measure technology for applications where high resolution and fast response time is required. A wide range of interchangeable sensor heads provides greater flexibility in solving most demanding applications.

- Small and light sensor heads for easy integration
- High speed response time of 150 µs
- Easy sensor head replacement
- Scalability through a modular platform concept
- Multipoint measurement with up to 5 sensors



Ordering information

Sensor head (reflection type)

Optical method	Beam shape	Sensing distance	Resolution *1	Size in mm (HxWxD)	Order code
Diffuse-reflective	Spot beam	40±10 mm	2 µm	39x33x17	ZX-LD40
		100±40 mm	16 µm		ZX-LD100
		300±200 mm	300 µm		ZX-LD300
	Line beam	40±10 mm	2 µm		ZX-LD40L
		100±40 mm	16 µm		ZX-LD100L
		300±200 mm	300 µm		ZX-LD300L
Regular reflection type	Spot beam	30±2 mm	0.25 µm	45x55x25	ZX-LD30V
	Line beam				ZX-LD30VL

*1 At average count of 4,096 times

Amplifier units

Power supply	Output specifications	Order code
DC	NPN output	ZX-LDA11-N
	PNP output	ZX-LDA41-N

Note: Compatible with sensor head connection.

Specifications

Sensor head (reflection type)

Item	ZX-LD40	ZX-LD100	ZX-LD300	ZX-LD30V	ZX-LD40L	ZX-LD100L	ZX-LD300L	ZX-LD30VL
Optical method	Diffuse reflection			Regular reflection	Diffuse reflection			Regular reflection
Light source (wave length)	Visible-light semiconductor laser (wavelength 650 nm, 1 mW or less, Class 2)							
Measurement center distance	40 mm	100 mm	300 mm	30 mm	40 mm	100 mm	300 mm	30 mm
Measurement range	±10 mm	±40 mm	±200 mm	±2 mm	±10 mm	±40 mm	±200 mm	±2 mm
Beam shape	Spot			Line				
Beam diameter *1	50 mm dia.	100 mm dia.	300 mm dia.	75 mm dia.	75 mm×2mm	150 μm×2 mm	450 μm×2 mm	100 μm×1.8 mm
Resolution*2	2 μm	16 μm	300 μm	0.25 μm	2 μm	16 μm	300 μm	0.25 μm
Linearity*3	±0.2% F.S. (entire range)	±0.2% F.S. (80 to 121 mm)	±2% F.S. (200 to 401 mm)	±0.2% F.S. (entire range)	±0.2% F.S. (32 to 49 mm)	±0.2% F.S. (80 to 121 mm)	±2% F.S. (200 to 401 mm)	±0.2% F.S. (entire range)
Protective structure	IEC 60529 IP50			IEC Standard IP40	IEC 60529 IP50			IEC Standard IP40

*1 Beam diameter: This is the value of the measurement center distance (actual value), and is defined at 1/e² (13.5%) of the central light intensity. If there is stray light outside, the defined area and the area around the object has a higher reflectance than the object.

*2 Resolution: Indicates the amount of fluctuation (±3 σ) in the linear output when connected to the ZX-LDA. (The measured value when the average count of the ZX-LDA is set to 4,096 and our standard object (white ceramic) is used for the central distance.) This indicates the repeatability precision when the work is in a static state, and does indicate the distance precision. The resolution performance may not be satisfactory in a strong electromagnetic field.

*3 Linearity: This indicates the error with respect to the ideal straight line of the displacement output when measuring our standard object.

Note: When an object has a high reflectance, detection errors are possible outside the measurement range.

Amplifier units

Item	ZX-LDA11-N	ZX-LDA41-N
Measurement period	150 s	
Possible average count settings *1	1/2/4/8/16/32/64/128/256/512/1,024/2,048/4,096 times	
Temperature drift	When reflective head is connected: 0.01% F.S./°C, when transmissive head is connected: 0.1% F.S./°C	
Linear output *2	4 to 20 mA/F.S., maximum load resistance of 300 Ω ±4 V (±5 V, 1 to 5 V *3), output impedance of 100 Ω.	
Decision output (HIGH/PASS/LOW: 3 outputs) *1	NPN open collector output, 30 VDC 50 mA max., residual voltage 1.2 V or less	PNP open collector output, 30 VDC 50 mA max., residual voltage 2 V or less
Laser OFF input/zero reset input/timing input/reset	When ON: Supply voltage 1.5 V or less, when OFF: Open circuit (maximum leakage current 0.1 mA or less)	When ON: Supply voltage 1.5 V or less, when OFF: Open circuit (maximum leakage current 0.1 mA or less)
Functions	Measurement value display, setting value and incident level and resolution display, scaling, display reverse, display off mode, ECO mode, change number of display digits, sample hold, peak hold, bottom hold, peak to peak hold, self peak hold, self-bottom hold, intensity mode, zero reset, initial reset, on-delay timer, off-delay timer, one-shot timer, differential, sensitivity selection, keeping clamp change, threshold value settings, positioning teaching, two-point teaching, automatic teaching, hiss width variable, timing input, reset input, monitor focus, (A-B) operation, (A+B) operation *4, mutual interference *4, laser degradation detection zero reset memory, function lock	
Indicator lamp	Operation indicator lamp: High (orange), pass (green), low (yellow), 7-segment digital main display (red), 7-segment digital sub-display (yellow), laser ON (green), zero reset (green), enable display (green)	
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p) : 10% max.	
Current consumption	200 mA or less (when sensor is connected)	

*1 The response speed of linear output (when the sensitivity is fixed) is calculated as (measurement period) x (average count setting + 1).

The response speed of decision output (when the sensitivity is fixed) is calculated as (measurement period) x (average count setting + 1).

*2 Current/voltage can be switched using the switch on the bottom of the amplifier unit.

*3 Can be set with the monitor focus function.

*4 Computing unit is required.



The scalable high-precision laser measurement sensor

Smart ZS-HL sensor offers superb dynamic sensing range for all surfaces from black rubber to glass and mirror surfaces by simply scaling it to your needs. The ZS-HL is the enhanced variant of the ZS-L, applicable for longer measurement distances, and offers compatibility with sensor heads and accessories.

- Highest resolution and dynamic sensing range for all surfaces
- Modular and scalable platform concept for up to 9 sensors
- Easy to use, install and maintain for all user levels
- Fast response time of 110 μ s
- Multi-tasking capability - Manages up to 4 measurement tools in one controller

Ordering information

ZS-HL-series sensor heads

Optical system	Sensing distance	Beam shape	Beam diameter	Resolution	Order code
Regular Reflective Models	20 \pm 1 mm	Line beam	1.0 mm x 20 μ m	0.25 μ m	ZS-HLD2ST
Diffuse Reflective Models	50 \pm 5 mm		1.0 mm x 30 μ m	0.25 m	ZS-HLDS5T
	100 \pm 20 mm		3.5 mm x 60 μ m	1 μ m	ZS-HLDS10
	600 \pm 350 mm		16 mm x 0.3 mm	8 μ m	ZS-HLDS60
	1500 \pm 500 mm		40 mm x 1.5 mm	500 μ m	ZS-HLDS150

ZS-HL-series sensor heads (for nozzle gaps) also compatible with ZS-L controller

Optical system	Sensing distance	Beam shape	Beam diameter	Resolution	Order code
Regular Reflective Models	10 \pm 0.5 mm	Line beam	900 x 25 μ m	0.25 μ m	ZS-LD10GT
	15 \pm 0.75 mm				ZS-LD15GT

ZS-L-series sensor heads

Optical system	Sensing distance	Beam shape	Beam diameter	Resolution	Order code
Regular Reflective Models	20 \pm 1 mm	Line beam	900 x 25 μ m	0.25 μ m	ZS-LD20T
	40 \pm 2.5 mm	Spot beam	25 μ m dia.		ZS-LD20ST
		Line beam	2000 x 35 μ m		ZS-LD40T
Diffuse Reflective Models	50 \pm 5 mm	Line beam	900 x 60 μ m	0.8 μ m	ZS-LD50
	80 \pm 15 mm	Spot beam	50 μ m dia.	2 μ m	ZS-LD50S
		Line beam	900 x 60 μ m		ZS-LD80
		Line beam	600 x 70 μ m		ZS-LD130
	200 \pm 50 mm	Line beam	900 x 100 μ m	5 μ m	ZS-LD200
	350 \pm 135 mm	Spot beam	240 μ m dia.	20 μ m	ZS-LD350S

ZS-HL-series sensor controllers

Supply voltage	Control outputs	Order code
24 VDC	NPN outputs	ZS-HLDC11
	PNP outputs	ZS-HLDC41

ZS-L-series sensor controllers

Supply voltage	Control outputs	Order code
24 VDC	NPN outputs	ZS-LDC11
	PNP outputs	ZS-LDC41

Multi-controllers

Supply voltage	Control outputs	Order code
24 VDC	NPN outputs	ZS-MDC11
	PNP outputs	ZS-MDC41

Data storage units

Supply voltage	Control outputs	Order code
24 VDC	NPN outputs	ZS-DSU11
	PNP outputs	ZS-DSU41

Specifications

ZS-HL-series sensor heads

Item	ZS-HLDS2T		ZS-HLDS5T		ZS-HLDS10	
Applicable controllers	ZS-HLDC series					
Optical system	Regular reflection	Diffuse reflection	Regular reflection	Diffuse reflection	Regular reflection	Diffuse reflection
Measuring center distance	20 mm	5.2 mm	44 mm	50 mm	94 mm	100 mm
Measuring range	±1 mm	±1 mm	±4 mm	±5 mm	±16 mm	±20 mm
Light source	Visible semiconductor laser (wavelength: 650 nm, 1 mW max., JIS Clas					
Beam shape	Line beam					
Beam diameter	1.0 mm x 20 μm		1.0 mm x 30 μm		3.5 mm x 60 μm	
Linearity	±0.05% F.S.		±0.1% F.S.			
Resolution	0.25 μm (No. of samples to average: 256)		0.25 μm (No. of samples to average: 512)		1 μm (No. of samples to average: 64)	
Temperature characteristic	0.01%F.S./°C					
Sampling cycle	110 μs (High-speed Mode), 500 μs (Standard Mode), 2.2 μs (High-precision Mode), 4.4 μs (High-sensitivity					
Degree of protection	IP64		Cable length 0.5 m: IP66, cable length 2 m: IP67			

ZS-L-series sensor heads

Item	ZS-LD20T		ZS-LD20ST		ZS-LD40T		ZS-LD10GT	ZS-LD15GT
Applicable controllers	ZS-HLDC/LDC series							
Optical system	Regular reflection	Diffuse reflection	Regular reflection	Diffuse reflection	Regular reflection	Diffuse reflection	Regular reflection	
Measuring center distance	20 mm	6.3 mm	20 mm	6.3 mm	40 mm	30 mm	10 mm	15 mm
Measuring range	±1 mm	±1 mm	±1 mm	±1 mm	±2.5 mm	±2 mm	±0.5 mm	±0.75 mm
Light source	Visible semiconductor laser (wavelength: 650 nm, 1 mW max., JIS Class 2)							
Beam shape	Line beam				Spot beam			
Beam diameter	900 x 25 μm		25 μm dia.		2,000 x 35 μm		approx. 25 x 900 μm	
Linearity	±0.1%F.S							
Resolution	0.25 μm		0.25 μm		0.4 μm		0.25 μm	0.25 μm
Temperature characteristic	0.04% FS/°C		0.04% FS/°C		0.02% FS/°C		0.04% FS/°C	
Sampling cycle	110 μs (High-speed Mode), 500 μs (Standard Mode), 2.2 ms (High-precision Mode), 4.4 ms (High-sensitivity Mode)							
Degree of protection	Cable length 0.5 m: IP66, cable length 2 m: IP67						IP40	

ZS-L-series sensor heads

Item	ZS-LD50	ZS-LD50S	ZS-LD80	ZS-LD130	ZS-LD200	ZS-LD350S
Applicable controllers	ZS-HLDC/LDC series					
Optical system (reflection)	Diffuse	Regular	Diffuse	Regular	Diffuse	Regular
Measuring center distance	50 mm	47 mm	50 mm	47 mm	80 mm	78 mm
Measuring range	±5 mm	±4 mm	±5 mm	±4 mm	±15 mm	±14 mm
Light source	Visible semiconductor laser (wavelength: 650 nm, 1 mW max., JIS Class 2)					
Beam shape	Line beam	Spot beam	Line beam	Line beam	Line beam	Spot beam
Beam diameter	900 x 60 µm	50 µm dia.	900 x 60 µm	600 x 70 µm	900 100 µm	240 µm dia.
Linearity 10±0.1%F.S.	±0.1%F.S.			±0.25%F.S.	±0.1%F.S.	±0.25%F.S.
Resolution	0.8 µm	0.8 µm	2 µm	3 µm	5 µm	20 µm
Temperature characteristic	0.02% FS/°C	0.02% FS/°C	0.01% FS/°C	0.02% FS/°C	0.02% FS/°C	0.04% FS/°C
Sampling cycle	110 µs (High-speed Mode), 500 µs (Standard Mode), 2.2 ms (High-precision Mode), 4.4 ms (High-sensitivity Mode)					
Degree of protection	Cable length 0.5 m: IP66, cable length 2 m: IP67					

ZS-HL-series sensor controllers

Item	ZS-HLDC11	ZS-HLDC41
No. of samples to average	1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1,024, 2,048, or 4,096	
Number of mounted sensors	1 per sensor controller	
External interface	Connection method	
	Serial I/O	Serial I/O: connector, other: pre-wired (standard cable length: 2 m)
	USB 2.0	1 port, full speed (12 Mbps max.), MINI-B
	RS-232C	1 port, 115,200 bps. max.
	Output	Judgement output
Inputs	Laser OFF, ZERO reset timing, RESET	HIGH/PASS/LOW 3 outputs NPN open collector, 30 VDC, 50 mA max., residual voltage 1.2 V max
		HIGH/PASS/LOW: 3 outputs PNP open collector, 50 mA max., residual voltage 1.2 V max
Linear output	Selectable from 2 types of output, voltage or current (selected by slide switch on bottom). Voltage output: .10 to 10 V, output impedance: 40 Ω Current output: 4 to 20 mA	
Functions	Display: Measured value, threshold value, voltage/current, received light amount, and resolution/terminal block output Sensing: Mode, gain, measurement object, head installation Measurement point: Average, peak, bottom, thickness, step, and calculations Filter: Smooth, average, and differentiation Outputs: Scaling, various hold values, and zero reset I/O settings: Linear (focus/correction), judgments (hysteresis and timer), non-measurement, and bank (switching and clear) System: Save, initialization, measurement information display, communications settings, key lock, language, and data load Task: Single task or multitask (up to 4)	
Status indicators	HIGH (orange), PASS (green), LOW (orange), LDON (green), ZERO (green), and ENABLE (green)	
Segment display	Main digital	8-segment red LED, 6 digits
	Sub-digital	8-segment green LEDs, 6 digits
LCD	16 digits x 2 rows, Color of characters: green, Resolution per character: 5 x 8 pixel matrix	
Setting inputs	Setting keys	Direction keys (UP, DOWN, LEFT, and RIGHT), SET key, ESC key, MENU key, and function keys (1 to 4)
	Slide switch	Threshold switch (2 states: High/Low), mode switch (3 states: FUN, TEACH, and RUN)
Power supply voltage	21.6 V to 26.4 VDC (including ripple)	
Current consumption	0.5 A max. (when Sensor Head is connected)	
Ambient temperature	Operating: 0 to 50°C, Storage: -15 to +60°C (with no icing or condensation)	
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)	
Degree of protection	IP20	
Weight	Approx. 280 g (excluding packing materials and accessories)	



Smart inductive measurement sensor

ZX-E offers the best solution for the accurate measurement of metallic objects. It is highly recommended in harsh environments such as automotive and metal working machines.

- High resolution of 1 μm
- High-speed response time of 150 μs
- Easy sensor head replacement
- Modular platform concept for different sensing technologies
- Easy linearity adjustment for any metal

Ordering information

Sensor heads

Shape	Dimensions	Sensing distance	Accuracy ^{*1}	Order code
Cylindrical	3 dia. x 18 mm	0.5 mm	1 μm	ZX-EDR5T
	5.4 dia. x 18 mm	1 mm		ZX-ED01T ^{*2}
	8 dia. x 22 mm	2 mm		ZX-ED02T ^{*2}
Screw-shaped	M10 x 22 mm	2 mm		ZX-EM02T ^{*2}
	M18 x 46.3 mm	7 mm		ZX-EM07MT ^{*2}
Flat	30×14×4.8 mm	4 mm		ZX-EV04T
Heat-resistant, cylindrical	M12 x 22 mm	2 mm		ZX-EM02HT

^{*1} For an average count of 4,096.

^{*2} Models with protective spiral tubes are also available. Add a suffix of "-S" to the above model numbers when ordering. (Example: ZX-ED01T-S)

Amplifier units

Power supply	Output type	Order code
DC	NPN	ZX-EDA11
	PNP	ZX-EDA41

Note: Compatible connection with the sensor head.

Specifications

Sensor heads

Item	ZX-EDR5T	ZX-ED01T	ZX-ED02T/EM02T	ZX-EM07MT	ZX-EV04T	ZX-EM02HT
Measurement range	0 to 0.5 mm	0 to 1 mm	0 to 2 mm	0 to 7 mm	0 to 4 mm	0 to 2 mm
Sensing object	Magnetic metals (Measurement ranges and linearities are different for non-magnetic metals. Refer to Engineering Data on B-67.)					
Standard reference object	18×18×3 mm	30×30×3 mm	60×60×3 mm	45×45×3 mm		
	Material: Ferrous (S50C)					
Accuracy ^{*1}	1 μm					
Linearity ^{*2}	±0.5% F.S.					±1% F.S.
Linear output range	Same as measurement range.					
Shock resistance (destruction)	500 m/s ² , 3 times each in X, Y, and Z directions					
Degree of protection (Sensor head)	IEC60529, IP65	IEC60529, IP67				IEC60529, IP60

^{*1} Accuracy: The resolution is the deviation ($\pm 3\sigma$) in the linear output when connected to the ZX-EDA amplifier unit. The above values indicate the deviations observed 30 minutes after the power is turned ON.

(The resolution is measured with Omron's standard reference object at 1/2 of the measurement range with the ZX-EDA set for the maximum average count of 4,096 per period.)

The resolution is given at the repeat accuracy for a stationary workpiece, and is not an indication of the distance accuracy. The resolution may be adversely affected under strong electromagnetic fields.

^{*2} Linearity: The linearity is given as the error in an ideal straight line displacement output when measuring the standard reference object. The linearity and measurement values vary with the object being measured.

Amplifier units

Item	ZX-EDA11	ZX-EDA41
Measurement period	150 μs	
Possible average count settings ^{*1}	1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1,024, 2,048, or 4,096	
Linear output ^{*2}	Current output: 4 to 20 mA/F.S., max. load resistance: 300 Ω Voltage output: ±4 V (±5 V, 1 to 5 V ^{*3}), Output impedance: 100 Ω	
Judgement outputs (3 outputs: HIGH/PASS/LOW)	NPN open-collector outputs, 30 VDC, 50 mA max. Residual voltage: 1.2 V max.	PNP open-collector outputs, 30 VDC, 50 mA max. Residual voltage: 2 V max.
Zero reset input, timing input, reset input, judgement output hold input	ON: Short-circuited with 0-V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Supply voltage short-circuited or supply voltage within 1.5 V OFF: Open (leakage current: 0.1 mA max.)
Function	<ul style="list-style-type: none"> • Measurement value display • Linearity adjustment (materials selection) • Display reverse • Number of display digit changes • Bottom hold, peak-to-peak hold • Average hold • Initial reset • OFF-delay timer • Non-measurement setting • Automatic teaching • Reset input • Linear output correction • K-(A+B) calculation^{*4} • Sensor disconnection detection • Key lock 	
Indications	Judgement indicators: High (orange), pass (green), low (yellow), 7-segment main digital display (red), 7-segment sub-digital display (yellow), power ON (green), zero reset (green), enable (green)	
Voltage influence (including sensor)	0.5% F.S. of linear output value at ±20% of power supply voltage	
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p): 10% max.	

^{*1} The response speed of the linear output is calculated as the measurement period × (average count setting + 1) (with fixed sensitivity).

^{*2} The response speed of the judgement outputs is calculated as the measurement period × (average count setting + 1) (with fixed sensitivity).

^{*3} The output can be switched between a current output and voltage output using a switch on the bottom of the amplifier unit.

^{*4} Setting is possible via the monitor focus function.

^{*4} A calculating unit (ZX-CAL or ZX-CAL2) is required.



Smart contact measurement sensor

ZX-T is ideal for applications where the target object may contain oil deposits or other micro-structures. In this case contact measurement is the most reliable way.

- Modular platform concept for different sensing technologies
- Air-retracting types for automated inspection
- Multipoint measurement with up to 8 sensors
- Pressing force alarm prevents malfunction
- Strong ball bearing structure assures long life time

Ordering information

Sensor heads

Size	Type	Sensing distance	Resolution (See note.)	Order code
6 dia.	Short type	1 mm	0.1 µm	ZX-TDS01T
	Standard type	4 mm		ZX-TDS04T
	Low-load type			ZX-TDS04T-L
8 dia.	Standard type	10 mm	0.4 µm	ZX-TDS10T
	Ultra-low-load type			ZX-TDS10T-L
	Air lift type			ZX-TDS10T-V
	Air lift/air push type			ZX-TDS10T-VL

Note: The resolution refers to the minimum value that can be read when a ZX-TDA_1 amplifier unit is connected.

Amplifier units

Power supply	Output type	Order code
DC	NPN	ZX-TDA11
	PNP	ZX-TDA41

Accessories (actuators)

Type (material)	Screw section	Appearance	Application	Applicable sensor (see note.) ZX-TDS_T	Order code
Ball type (steel)	Female screw M2.5 x 0.45		Measuring ordinary flat surfaces (standard actuator supplied with the ZX-TDS series)		D5SN- TB1 TB2 TB3 TN1 TF1 TA
Ball type (carbide steel)	Female screw M2.5 x 0.45		Measurements where abrasion resistance is critical Measured objects: Carbide (HR90) or lower.		
Ball type (ruby)	Female screw M2.5 x 0.45		Measurements where abrasion resistance is critical Measured objects: Carbide (HR90) or higher.		
Needle type (carbide steel)	Male screw M2.5 x 0.45		Measuring the bottom of grooves and holes		
Flat (carbide steel)	Male screw M2.5 x 0.45		Measuring spherical objects		
Conversion adapter (stainless steel)	Through-hole female screw M2.5 x 0.45		Mounting D5SN-TN1/-TF1 or commercially available actuators on ZX-TDS-series sensors		

Note: ○ Replacement possible

△ Conversion Adapter required

Specifications

Sensor heads

Item		ZX-TDS01T	ZX-TDS04T	ZX-TDS04T-L	ZX-TDS10T	ZX-TDS10T-V	ZX-TDS10T-L	ZX-TDS10T-VL
Vacuum retract (VR) and air push (AP) compatible		—	—	—	No	VR	No	VR/AP
Measurement range		1 mm	4 mm		10 mm			
Maximum actuator travel distance		Approx. 1.5 mm	Approx. 5 mm		10.5 mm			
Resolution* ¹		0.1 µm			0.4 µm			
Linearity* ²		±0.3% F.S.			±0.5% FS			
Operating force* ³		Approx. 0.7 N		Approx. 0.25 N	Approx. 0.7 N	Approx. 0.6 N	Approx. 0.065 N	0.09 to 1.41N
Air pressure	Vacuum retracting	—	—	—	—	-0.55 to 0.70 (bar)	—	-0.05 to 0.22 (bar)
	Air push					—		0.125 to 2 (bar)
Degree of protection	Sensor head	IEC60529, IP67		IEC60529, IP54	IP65		IP50	
	Preamplifier	—	—	—	IP40			
Mechanical durability		10,000,000 operations min.						
Ambient temperature		Operating: 0 to 50°C (with no icing or condensation), Storage: -15 to 60°C (with no icing or condensation)			Operating: 0 to 50°C (with no icing or condensation) Storage: -10 to 60°C (with no icing or condensation)			
Ambient humidity		Operating and storage: 35 to 85% (with no icing or condensation)						
Temperature characteristic* ⁴	Sensor head	0.03% F.S./°C			±0.01% FS/°C			
	Preamplifier	0.01% F.S./°C			±0.01% FS/°C			
Vibration resistance		—	—	—	0.35 mm single amplitude at 10 to 55 Hz for 50 min each in the X, Y, and Z directions			
Shock resistance		—	—	—	150 m/s ² 3 times each in 6 directions (up/down, left/right, and forward/backward)			
Connection method		—	—	—	Prewired connector (2 m from the sensor head to the preamplifier, 0.2 m from the preamplifier to the connector)			
Weight (packed state)		Approx. 100 g						
Materials	Sensor head	Stainless steel						
	Rubber sleeve	—	—	—	Viton		None	
	Preamplifier	Polycarbonate						
	Mounting brackets	Stainless steel						
Accessories		Instruction manual, preamplifier mounting brackets (ZX-XBT1)			Instruction manual, preamplifier mounting brackets (ZX-XBT1), Right-angle adapter ⁵			

*¹ The resolution is given as the minimum value that can be read when a ZX-TDA_1 amplifier unit is connected. This value is taken 15 minutes after turning ON the power with the average number of operations set to 256.

*² The linearity is given as the error in an ideal straight line displacement output.

*³ These figures are representative values that apply for the measurement mid-point, and are for when the provided actuator is used, with the actuator moving downwards. If the actuator moves horizontally or upwards, the operating force will be reduced. Also, if an actuator other than the standard one is used, the operating force will vary with the weight of the actuator itself.

*⁴ These figures are representative values that apply for the mid-point of the measurement range.

*⁵ The ZX-TDS10_ comes with a right-angle adapter.

Amplifier units

Item		ZX-TDA11	ZX-TDA41
Measurement period		1 ms	
Possible average count settings* ¹		1, 16, 32, 64, 128, 256, 512, or 1,024	
Linear output* ²		Current output: 4 to 20 mA/F.S., Max. load resistance: 300 Ω Voltage output: ±4 V (±5 V, 1 to 5 V ³), Output impedance: 100 Ω	
Judgement outputs (3 outputs: HIGH/PASS/LOW)		NPN open-collector outputs, 30 VDC, 30 mA max. Residual voltage: 1.2 V max.	PNP open-collector outputs, 30 VDC, 30 mA max. Residual voltage: 2 V max.
Zero reset input, timing input, reset input, judgement output hold input		ON: Short-circuited with 0-V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Supply voltage short-circuited or supply voltage of 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)
Function		<ul style="list-style-type: none"> • Measurement value display - present value/set value/output value display • Display reverse - ECO mode - number of display digit changes • Sample hold - peak hold - bottom hold, peak-to-peak hold • Self-peak hold - self-bottom hold - zero reset • Initial reset - direct threshold value setting - position teaching • Hysteresis width setting - timing inputs - reset input • Judgement output hold input - monitor focus - (A-B) calculations*⁴ • (A+B) calculations (See note 4.) - sensor disconnection detection • Zero reset memory - function lock - non-measurement setting • Clamp value setting - scale inversion - zero reset indicator • Span adjustment - warming-up display - pressing force alarm 	
Indicators		Judgement indicators: High (orange), pass (green), low (yellow), 7-segment main digital display (red), 7-segment sub-digital display (yellow), power ON (green), zero reset (green), enable (green)	
Power supply voltage		12 to 24 VDC ±10%, Ripple (p-p): 10% max.	
Current consumption		140 mA max. (with Sensor connected), For 24-VDC power supply voltage: 140 mA max. (with Sensor connected)	
Ambient temperature		Operating and storage: 0 to 50°C (with no icing or condensation)	
Temperature characteristic		0.03% F.S./°C	
Connection method		Prewired (standard cable length: 2 m)	
Weight (packed state)		Approx. 350 g	
Materials		Case: PBT (polybutylene terephthalate), Cover: Polycarbonate	

*¹ The response speed of the linear output is calculated as the measurement period × (average count setting + 1).

The response speed of the judgement outputs is calculated as the measurement period × (average count setting + 1).

*² The output can be switched between a current output and voltage output using a switch on the bottom of the amplifier unit.

*³ Setting is possible via the monitor focus function.

*⁴ A calculating unit (ZX-CAL2) is required.



Smart parallel laser through beam sensor

ZX-LT parallel laser through beam sensor is recommended for precise object sensing such as width, diameter size or edge control.

- Small and light sensor heads for easy integration
- High-speed response time of 150μs for more stable detection
- Plug & Play technology saves installation time
- Modular platform concept for different sensing technologies
- Wide range of sensor heads offering laser beam width from 1 mm to 30 mm

Ordering information

Sensor head

Optical method	Measurement width	Sensing distance	Resolution ^{*1}	Size in mm (HxWxD)		Order code
				Transmitter	Receiver	
Through-beam	1 mm dia.	0 to 2,000 mm	4 μm	15x15x34	15x15x19	ZX-LT001
	5 mm	0 to 500 mm				ZX-LT005
	10 mm			20x20x42	20x20x25	ZX-LT010
	30 mm		12 μm	64.25x70x22.6	64.25x54x22.6	ZX-LT030

^{*1} At average count of 64 times

Amplifier units

Power supply	Output specifications	Order code
DC	NPN output	ZX-LDA11-N
	PNP output	ZX-LDA41-N

Note: Compatible with sensor head connection.

Specifications

Sensor head (transmissive type)

Item	ZX-LT001	ZX-LT005	ZX-LT010	ZX-LT030
Optical method	Through-beam			
Light source (wave length)	Visible-light semiconductor laser (wavelength 650 nm, 1 mW or less, Class 1)			
Measurement width	1 mm dia.	1 to 2.5 mm dia.	10 mm	30 mm
Sensing distance	0 to 500 mm	500 to 2,000 mm	0 to 500 mm	
Min. sensing object	8 mm dia. opaque object	8 to 50 μm opaque object	opaque: 0.05 mm dia.	opaque: 0.1 mm dia.
Resolution ^{*1}	4 μm ^{*2}	—	4 μm ^{*3}	12 μm
Protective structure	IEC 60529 IP40			IP 40

^{*1} The amount of fluctuation (±3 σ) of the linear output when connected to an amplifier unit, converted to a detection span.

^{*2} When the average count is 64.5 μm when the count is 32. The value when the smallest detection object shades the vicinity of the center of the 1 mm dia. detection span.

^{*3} When the average count is 64.5 μm when the count is 32.

Amplifier units

Item	ZX-LDA11-N	ZX-LDA41-N
Measurement period	150 s	
Possible average count settings ^{*1}	1/2/4/8/16/32/64/128/256/512/1,024/2,048/4,096 times	
Temperature drift	When reflective head is connected: 0.01% F.S./°C, when transmissive head is connected: 0.1% F.S./°C	
Linear output ^{*2}	4 to 20 mA/F.S., maximum load resistance of 300 Ω ±4 V (±5 V, 1 to 5 V ^{*3}), output impedance of 100 Ω	
Decision output (HIGH/PASS/LOW: 3 outputs) ^{*1}	NPN open collector output, 30 VDC 50 mA max., residual voltage 1.2 V or less	PNP open collector output, 30 VDC 50 mA max., residual voltage 2 V or less
Laser OFF input/zero reset input/timing input/reset	When ON: Supply voltage 1.5 V or less, when OFF: Open circuit (maximum leakage current 0.1 mA or less)	When ON: Supply voltage 1.5 V or less, when OFF: Open circuit (maximum leakage current 0.1 mA or less)
Functions	Measurement value display, setting value and incident level and resolution display, scaling, display reverse, display off mode, ECO mode, change number of display digits, sample hold, peak hold, bottom hold, peak to peak hold, self peak hold, self-bottom hold, intensity mode, zero reset, initial reset, on-delay timer, off-delay timer, one-shot timer, differential, sensitivity selection, keeping clamp change, threshold value settings, positioning teaching, two-point teaching, automatic teaching, hiss width variable, timing input, reset input, monitor focus, (A-B) operation, (A+B) operation ^{*4} , mutual interference ^{*4} , laser degradation detection zero reset memory, function lock	
Indicator lamp	Operation indicator lamp: High (orange), pass (green), low (yellow), 7-segment digital main display (red), 7-segment digital sub-display (yellow), laser ON (green), zero reset (green), enable display (green)	
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p) : 10% max.	
Current consumption	200 mA or less (when sensor is connected)	

^{*1} The response speed of linear output (when the sensitivity is fixed) is calculated as (measurement period) x (average count setting + 1).

The response speed of decision output (when the sensitivity is fixed) is calculated as (measurement period) x (average count setting + 1).

^{*2} Current/voltage can be switched using the switch on the bottom of the amplifier unit.

^{*3} Can be set with the monitor focus function.

^{*4} Computing unit is required.



Easy profile measurement – teach & go

The ZG enables precise shape measurement on challenging materials and surfaces. An easy and intuitive user interface enables efficient installation, setup and operation. A built-in LCD monitor indicates the measurement result in real time.

- Easy to use – intuitive user interface
- Live – built-in LCD monitor for setup and immediate profile display
- Versatile – 18 measurement tools
- Accurate – 5 µm resolution (3 mm / 631 pixels)
- Wide profiles – up to 70 mm

Ordering information

Sensor heads

Optical method	Sensing distance		Resolution		Order code
	Height direction	Width direction	Height direction	Width direction	
Diffuse reflective	210±30 mm	70 mm	10 µm	70 mm/631 pixels	ZG-WDS70
Diffuse reflective	100±12 mm	22 mm	3 µm	22 mm/631 pixels	ZG-WDS22
Diffuse reflective	50±3 mm	8 mm	1 µm	8 mm/631 pixels	ZG-WDS8T
Regular reflective	20±0.5 mm	3 mm	0.2 µm	3 mm/631 pixels	ZG-WDS3T

Note: - For details, refer the ratings and specifications table.
 - Designate the cable length (0.5 m, 2 m) when ordering.

Sensor controllers

Power supply	Output type	Order code
24 VDC	NPN	ZG-WDC11A *1
		ZG-WDC11
	PNP	ZG-WDC41A *1
		ZG-WDC41

*1 Included with Smart monitor ZG setup support software.

Accessories (order separately)

Output type	Order code
NPN	ZG-RPD11
PNP	ZG-RPD41

RS-232C cable

Connecting device	Order code
For personal computer connection (2 m)	ZS-XRS2
For PLC/PT connection (2 m)	ZS-XPT2

Sensor head extension cable

Name	Order code
3 m extension cable	ZG-XC3CR
8 m extension cable	ZG-XC8CR
15 m extension cable	ZG-XC15CR
25 m extension cable	ZG-XC25CR
Digital equalizer (relay device)	ZG-XEQ
0.2 m digital equalizer connection cable	ZG-XC02D

Parallel mounting adaptor

	Order code
For 1 unit	ZS-XPM1
For 2 units or more	ZS-XPM2

Specifications

Sensor heads

Item		ZG-WDS70	ZG-WDS22		ZG-WDS8T		ZG-WDS3T		
Optical system		Diffuse reflective	Diffuse reflective	Regular reflective	Diffuse reflective	Regular reflective	Regular reflective	Diffuse reflective	
Measurement range	Height direction (in standard mode)	210±30 mm	100±12 mm	94±10 mm	50±3 mm	44±2 mm	20±0.5 mm	5.2±0.4 mm	
	Width direction	70 mm /typical)	22 mm /typical)		8 mm /typical)		3 mm /typical)		
Resolution	Height direction *1	10 μm	3 μm		1 μm		0.2 μm		
	Width direction	70 mm/631 pixels	22 mm/631 pixels		8 mm/631 pixels		3 mm/631 pixels		
Linearity (in the height direction) *2		±0.5% F.S.							—
Temperature characteristic *3		0.1% F.S./°C							—
Light source	Type	Visible semiconductor laser							—
	Wavelength	658 nm						650 nm	
	Output	5 mW max. output, 1 mW max. exposure (without using optical instruments)						1 mW max.	
	Laser class	Class 2M (JIS C 6802 2005)					—		Class 2 (JIS C 6802 2005)
Beam shape (at measurement center distance) *4		—							
Measurement object		Opaque material							
Environmental resistance	Degree of protection	IP66 (IEC 60529)						IP64 (IEC 60529)	

*1 Obtained by setting an Omron standard measurement object at the measurement center distance and determining the average height of the beam line. The conditions are given in the table below. However, satisfactory resolution cannot be attained in strong electromagnetic fields.

*2 The tolerance for an ideal straight line obtained by determining the average height of an Omron standard measurement object for the beam line. The CCD standard mode is used. Linearity varies depending on the measurement object.

*3 A value attained by using an aluminum jig to secure the distance between the Head and the measurement object. The CCD standard mode is used.

*4 Defined as 1/e2 (13.5%) of the center light intensity. This may be influenced when light leakage also exists outside the defined area and the reflectivity of the light around the measurement object is higher than that of the measurement object.

Sensor controllers

Item		ZG-WDS70	ZG-WDS22	
Input/output type		NPN	PNP	
Measurement cycle ^{*1}		16 ms (high-precision mode), 8 ms (standard mode), 5 ms (high-speed mode)		
Display		LCD monitor	1.8-inch TFT color LCD (557 × 234 pixels)	
		LEDs	<ul style="list-style-type: none">• Judgment indicators for each task (indication color: orange): T1, T2, T3, T4• Laser indicator (indication color: green): LD_ON• Zero reset indicator (indication color: green): ZERO• Trigger indicators (indication color: green): TRIG	
External interface	Input/output signal lines	Analog outputs	Select voltage or current (using the sliding switch on the bottom surface) <ul style="list-style-type: none">• Voltage output: .10 to 10 V, output impedance: 40 Ω• Current output: 4 to 20 mA, maximum load resistance: 300 Ω	
		Judgment output (ALL-PASS/NG/ERROR)	NPN open collector 30 VDC, 50 mA max.	PNP open collector 50 mA max.
		Trigger auxiliary output (ENABLE/GATE)	Residual voltage: 1.2 V max.	Residual voltage: 1.2 V max.
		Laser stop input (LD-OFF)	ON: 0 V short or 1.5 V max.	ON: Power supply voltage short or power supply voltage -1.5 V max.
		Zero reset input (ZERO)	OFF: Open (leakage current: 0.1 mA max.)	OFF: Open (leakage current: 0.1 mA max.)
		Measurement trigger input (TRIG)		
		Bank switching input (BANK A, B)		
	Serial I/O	USB2.0	1 port, full speed (12 Mbps), MINI-B	
		RS-232C	1 port, 115,200 bps max.	
Main functions		No. of settings banks	4	
		Sensitivity adjustment	Multi/auto/fixed	
		Measurement items	Height, 2-point Step, 3-point Step, Edge position, Edge width, Angle/Area/Calculation (up to four items can be measured simultaneously)	
		Trigger modes	External trigger/continuous	
Ratings		Power supply voltage	21.6 to 26.4 VDC (including ripple current)	
Environmental resistance		Degree of protection	IP20 (IEC 60529)	

^{*1} The image input periods listed here are for fixed/auto sensitivity. The image input period will be longer for multi-sensitivity or other settings. Use the eco monitor in RUN mode to determine the actual image input period.

Amplifier units

Item		ZX-EDA11	ZX-EDA41
Measurement period		150 μs	
Possible average count settings ^{*1}		1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1,024, 2,048, or 4,096	
Linear output ^{*2}		Current output: 4 to 20 mA/F.S., max. load resistance: 300 Ω Voltage output: ±4 V (±5 V, 1 to 5 V ⁻³), Output impedance: 100 Ω	
Judgement outputs (3 outputs: HIGH/PASS/LOW)		NPN open-collector outputs, 30 VDC, 50 mA max. Residual voltage: 1.2 V max.	PNP open-collector outputs, 30 VDC, 50 mA max. Residual voltage: 2 V max.
Zero reset input, timing input, reset input, judgement output hold input		ON: Short-circuited with 0-V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Supply voltage short-circuited or supply voltage within 1.5 V OFF: Open (leakage current: 0.1 mA max.)
Function		<ul style="list-style-type: none"> Measurement value display Linearity adjustment (materials selection) Display reverse Number of display digit changes Bottom hold, peak-to-peak hold Average hold Initial reset OFF-delay timer comparison Non-measurement setting Automatic teaching Reset input Linear output correction K-(A+B) calculation ^{*4} Sensor disconnection detection Key lock 	
Indications		Judgement indicators: High (orange), pass (green), low (yellow), 7-segment main digital display (red), 7-segment sub-digital display (yellow), power ON (green), zero reset (green), enable (green)	
Voltage influence (including sensor)		0.5% F.S. of linear output value at ±20% of power supply voltage	
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p): 10% max.	

^{*1} The response speed of the linear output is calculated as the measurement period × (average count setting + 1) (with fixed sensitivity).

^{*2} The response speed of the judgement outputs is calculated as the measurement period × (average count setting + 1) (with fixed sensitivity).

^{*3} The output can be switched between a current output and voltage output using a switch on the bottom of the amplifier unit.

^{*4} Setting is possible via the monitor focus function.

^{*4} A calculating unit (ZX-CAL or ZX-CAL2) is required.

EASY VISION: TOUCH, COMMUNICATE AND GO

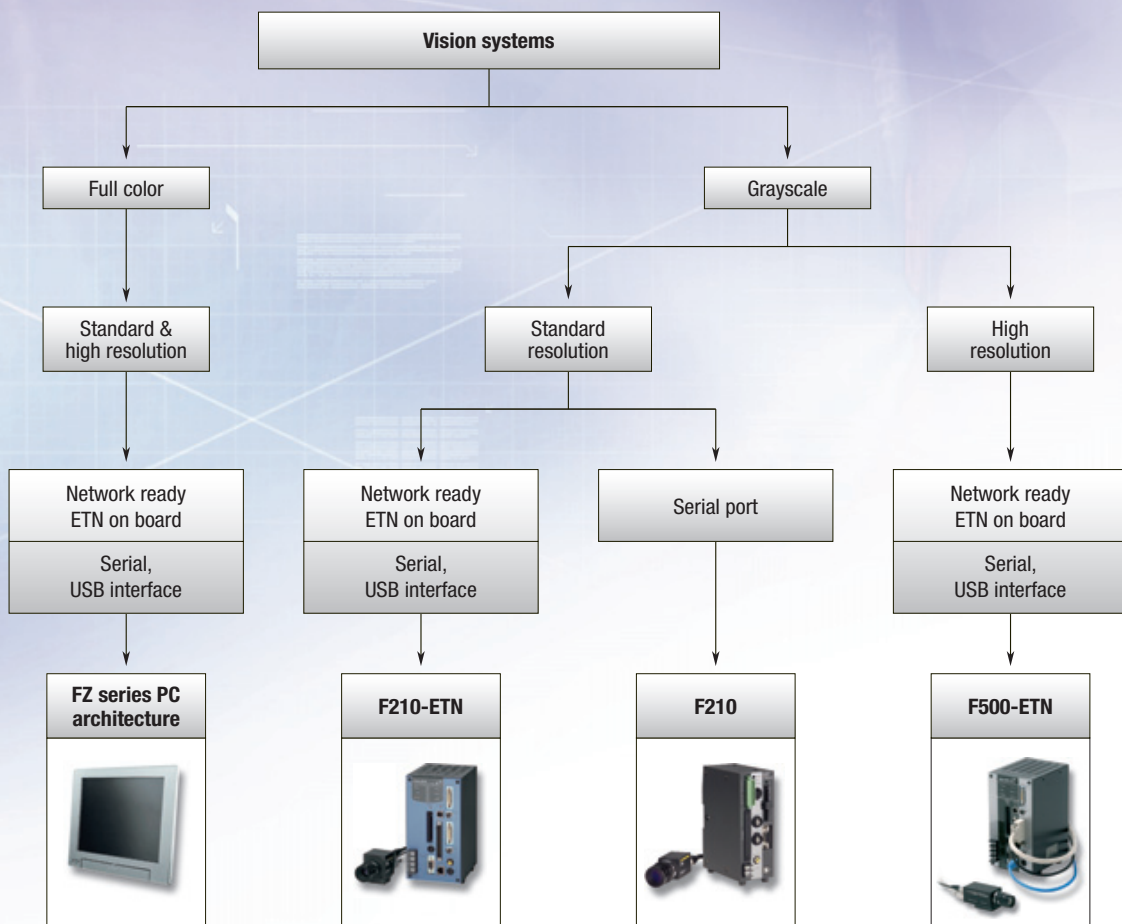
Built-in LCD monitor for setup and immediate image visualization

The easy vision sensor ZFV solves the applications by an intuitive teach & go procedure. For advanced applications features such as multiple inspections, position correction, intelligent image filtering and ethernet communication are offered by the ZFX. The high end is addressed by the new FZ.

- Easy vision – intuitive user interfaces
- Communication – centralized set-up & inspection via Ethernet
- High-end vision – PC-based system (Windows-CE inside) for challenging applications
- True color – close to human eye identification and image processing



Invite our engineers for a free test, live at your application.

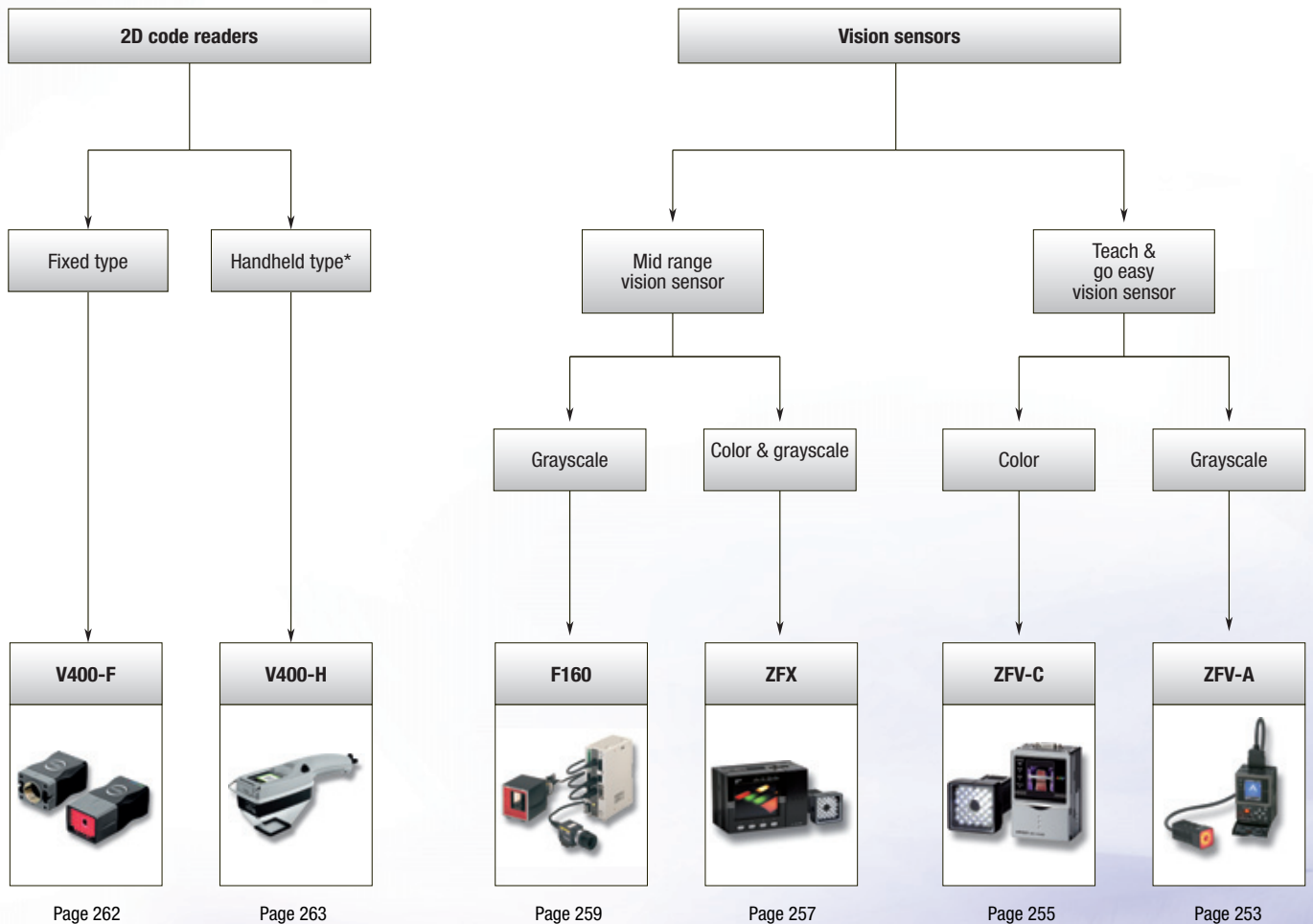


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Omron representative

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Selection table

		Vision sensors			
					
Selection criteria	Model	ZFV Monochrome	ZFV Color	ZFX	F160
	Number of connectable cameras	1	1	1	2
	Camera type	Digital black&white	Digital color	Digital Color or black & white	Analog black&white
	Resolution (usable) Display dots	468×432	468×432	up to 608 x 464	512×484
	Working distance mm	Min.	34	Depends on selected head and lens	Depends on selected lens
		Max.	194	–	–
	Field of view mm	Min.	5	Depends on selected head and lens	Depends on selected lens
		Max.	50	–	–
	Number of storable configurations	8	8	32	32 (expandable using CF card)
	Number of tools/configuration	1	1	32	32
Features	Cycle time	app. 4-25 ms depending on setup	app. 7-25 ms depending on setup	Depends on setup and used tools	Depends on setup and used tools
	IP-Rating camera head	IP65	IP65/IP67	Depend on head, up to IP65/IP67	–
	Supply voltage	24 VDC			
	Image processing tools	Up to seven (area, brightness, width, position, character, count, pattern)	Up to seven (hue, area, brightness, width, position, character, count, pattern)	9 image processing tools, plus position compensation, calculations and others	App. 50 processing tools for object or defect recognition, measure- ments, calculations, input/output and more, including character recognition tool
	Image preprocessing	–	–	Smoothing, erosion, dilation, edge enhancement, median, sharpen and background suppression	Smoothing, edge enhancement, edge extraction, erosion, dilation, median, background suppression
	Optional macro programming interface	–	–	–	–
	User interface	On board 'teach&go'	On board 'teach&go'	On board "teach&go" touch screen	Point to point GUI
	Optional PC configuration software	–	–	–	–
	Security tools	–	–	–	–
	RS-232C	Optional via ZS-DSU	■	■	■
Communication	USB	–	■	■	–
	Ethernet	–	–	■ functionality added app. Summer 2007	–
	Number of digital I/O	5 in/3 out	5 in/3 out	12 in/22 out	13 in/22 out
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		Vision systems		Vision systems	
					
Selection criteria	Model	F210	F500ETN/F210ETN	V400-F	V400-H
	Number of connectable cameras	2	2	1	1
	Camera type	—	Digital black&white	Digital	Digital black&white
	Resolution (usable)	512x484	512x484 F210 ETN 1K x 1K F500 ETN	512x484	—
	Display dots	Min.	—	100 mm	40 mm
		Max.	—	200 mm	40 mm
	Field of view mm	Min.	—	14x18 mm	5x5 mm
		Max.	—	31x42 mm	30x30 mm
	Number of storable configurations	—	32 (expandable using CF card)	—	limited by SD card
	Number of tools/configuration	limited only by memory space/ depends on type of tools	limited only by memory space/ depends on type of tools	—	—
Features	Cycle time	—	Depends on setup and used tools	Depends on code side, type and orientation	—
	IP-Rating camera head	—	—	IP67	IP64
	Supply voltage	—	24 VDC	24 VDC	5 VDC
	Image processing tools	App. 70 processing tools for object or defect recognition, measure- ments, calculations, input/output, display and more. Includes also character recognition and high pre- cision edge code inspection tools.	App. 80 processing tools for object or defect recognition, measure- ments, calculations, input/output, display and more. Includes also character recognition and high pre- cision edge code inspection tools. Enhanced image and data logging functions	Data Matrix, ECC200, 10x10 to 64x64, 8x18 to 16x48, QR Code (Models 1, 2), 21x21 to 57x57 (Versions 1 to 10)	Data Matrix, ECC200, 10x10 to 64x64, 8x18 to 16x48, QR Code (Models 1, 2), 21x21 to 57x57 (Versions 1 to 10)
	Image preprocessing	Smoothing, edge enhancement, edge extraction, erosion, dilation, median, background suppression - multiple passes, configurable	—	Smoothing, Dilation, Erosion, and Median.	—
	Optional macro programming interface	■	■	—	—
Communication	User interface	—	point to point GUI	—	—
	Optional PC configuration software	—	Yes, via Ethernet	—	—
	Security tools	—	Yes, user log in, 3 user levels, change history log, etc., via optional PC software	—	—
	RS-232C	■	■	■	—
Communication	USB	—	■	—	—
	Ethernet	—	10/100 Base T/TX	—	—
	Number of digital I/O	13 in/22 out	11 in/21 out	—	—
Page		260	261	262	263

■ Standard

— No/not available





Easy vision – teach & go

The ZFV proves that vision sensors can be "teach&go". Parameter settings are available at the touch of a button. A smart user interface allows intuitive configuration using a built-in colour monitor. In Run-mode, the display gives live feedback showing results and images in real time.

- Intuitive - "teach&go" user interface
- Live - LCD display for setup and live inspection feedback
- Versatile - Up to seven inspection tools included
- Scalable - Add controllers to add functionality
- Flexible - Adjustable working distance and area

Ordering information

Sets of sensor head and amplifier unit

Type	Order code	
	NPN	PNP
Narrow view/Single function	ZFV-R1010	ZFV-R1015
Narrow view/Standard	ZFV-R1020	ZFV-R1025
Wide view/Single function	ZFV-R5010	ZFV-R5015
Wide view/Standard	ZFV-R5020	ZFV-R5025

Sensor heads

Type	Working length	Sensing area	Order code
Narrow view	34 to 49 mm (variable)	5x4.6 mm (HxV) to 9x8.3 mm (HxV)	ZFV-SR10
Wide view	38 to 194 mm (variable)	10x9.2 mm (HxV) to 50x46 mm (HxV)	ZFV-SR50

Amplifier units

Type	Power supply	Output type	Order code
Single function	24 VDC ±10%	NPN	ZFV-A10
		PNP	ZFV-A15
Standard		NPN	ZFV-A20
		PNP	ZFV-A25

Specifications

Sensor heads

Item	ZFV-SR10 (Narrow view)	ZFV-SR50 (Wide view)
Setting distance (L)	34 to 49 mm	38 to 194 mm
Detection range (HxV)	5x4.6 mm to 9x8.3 mm	10x9.2 mm to 50x46 mm
Guide light	Provided (center, sensing area)	
Built-in lens	Focus: f15.65	Focus: f13.47
Object lighting method	Pulse lighting	
Object light source	Eight red LEDs	
Sensing element	1/3-inch CCD, partial scan	
Shutter	Electronic shutter, shutter time: 1/1,000 to 1/4,000	
Degree of protection	IEC60529, IP65	

Amplifier units

Item	Single function models		Multi function models	
	ZFV-A10	ZFV-A15	ZFV-A20	ZFV-A25
Output method	NPN	PNP	NPN	PNP
Inspection items	Pattern (PTRN), Brightness (BRGT)		Patterns (PTRN), Brightness (BRGT), Area (AREA), Width (WID), Position (POS), Count (CNT), Characters (CHAR)	
Teaching area	Rectangular, one area			
Teaching area size	<ul style="list-style-type: none">• Pattern (PTRN), Brightness (BRGT): Any rectangular area (256x256 max.)• Area (AREA), Width (WID), Position (POS), Count (CNT), Characters (CHAR): Any rectangular area (full screen max.)			
Sensing area	Full screen			
Resolution	468Hx432V max.			
Bank selection	Supported for 8 banks.			
Response time	Pattern (PTRN), Brightness (BRGT): High-speed: 4 ms, Standard: 8 ms, High-precision: 12 ms (not using partial scan) Area (AREA), Width (WID), Position (POS), Count (CNT), Characters (CHAR): 128x128: 15 ms max.			
Other functions	Control output switching: ON for OK or ON for NG ON delay/OFF delay, One-shot output, 'ECO' mode			
Output signals	(1) Control output (OUTPUT), (2) Enable output (ENABLE), (3) Error output (ERROR)			
Input signals	(1) Simultaneous measurement input (TRIG) or continuous measurement input (TRIG), switched by using menu. (2) Bank selection inputs (BANK1 to BANK3) (3) Workpiece still teaching (TEACH) or workpiece moving teaching (TEACH), switched by using menu.			

Item	Single function models		Multi function models	
	ZFV-A10	ZFV-A15	ZFV-A20	ZFV-A25
Connecting to ZS-DSU	Image logging trigger	Stores NG images or all images.		
	Sampling rate	ZFV measurement cycle * ¹		
	Number of logged image	Logs up to 128 images in series		
	Number of connected	15 max. (ZFV: 5 Units max., ZS-LDC: 9 Units max., ZS-MDC * ² : 1 Unit max.)		
	External bank function	Amplifier unit setting data can be saved to the memory card as bank data. Reading bank data enables bank switching.		
Sensor head interface	Digital interface			
Image display	Compact TFT 1.8-inch LCD (Display dots: 557x234)			
Indicators	● Judgement result indicator (OUTPUT) ● Inspection mode indicator (RUN)			
Operation interface	● Cursor keys (up, down, left, right) ● Setting key (SET) ● Escape key (ESC) ● Operating mode switching (slide switch) ● Menu switching (slide switch) ● Teaching/Display switching key (TEACH/VIEW)			
Power supply voltage	20.4 to 26.4 VDC (including ripple)			
Current consumption	600 mA max. (with sensor head connected)			

^{*1} This is the sampling rate when logging images. To log measurement data only, use the ZS-DSU settings.

^{*2} Image logging is not possible when the ZS-MDC is connected.



Easy Vision – Teach & Go – In Colour

The ZFV colour comes with the same intuitive user interface as the grey scale version. But by using the colour information in the image, it adds more security and reliability to your application. More sensor heads and communication options make it more versatile.

- Intuitive - "teach&go" user interface
- Live - LCD display for setup and live inspection feedback
- Versatile - 8 inspection tools included
- Scalable - Add controllers to add functionality
- Flexible - Adjustable working distance and area

Ordering information

Sensor heads

Type	Setting distance	Sensing area	Order code
Narrow view	39 to 49 mm (variable)	5x4.6 mm to 9x8.3 mm (variable)	ZFV-SC10
Standard view	31 to 187 mm (variable)	10x9.2 mm to 50x46 mm (variable)	ZFV-SC50
Wide view	66 to 141 mm (variable)	50x46 mm to 90x83 mm (variable)	ZFV-SC90
Ultra-wide view	114 to 226 mm (variable)	90x83 mm to 150x138 mm (variable)	ZFV-SC150

Amplifier Units ZFV Color Series

Power supply	Output type	Order code
24 VDC	NPN	ZFV-CA40
	PNP	ZFV-CA45

Accessories ZFV Color Series (order separately)

Data Storage Units

Power supply	Output type	Order code
24 VDC	NPN	ZS-DSU11
	PNP	ZS-DSU41

Controller Link Unit

Type	Order code
Controller Link Unit	ZS-XCN

External lightning

Type	Order code
Bar lightning	ZFV-LTL01
Bar double lightning	ZFV-LTL02
Bar low-angle lightning	ZFV-LTL04
Light source for through-beam lightning	ZFV-LTF01

Sensor Head Extension Cable

Cable length	Order code
3 m	ZFV-XC3B ^{*1}
8 m	ZFV-XC8B

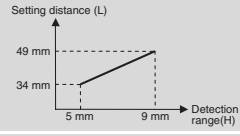
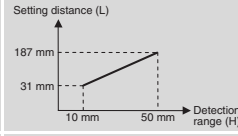
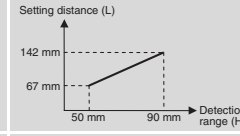
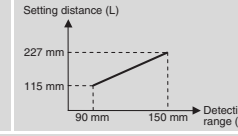
^{*1} ZFV-XC3BR Robot Cable is also available.

Panel-mounting Adapter

Type	Order code
First Unit	ZS-XOM1
Additional Units (for expansion)	ZS-XPM2

Specifications

Sensor heads

Item	ZFV-SC10 (Narrow View)	ZFV-SC50/SC50W (Wide View)	ZFV-SC90/SC90 (Wide view)	ZFV-SC150/SC150W (Ultra wide view)
Setting distance (L)	34 to 49 mm (variable)	31 to 187 mm (variable)	67 to 142 mm (variable)	115 to 227 mm (variable)
Sensing range (HxV)	5x4.6 mm to 9x8.3 mm (variable)	10x9.2 mm to 50x46 mm (variable)	50x46 mm to 90x83 mm (variable)	90x83 mm to 150x183 mm (variable)
Relation between setting distance and detection range				
Built-in lens	Focus: f15.65	Focus: f13.47	Focus: f6.1	
Object lighting method	Pulse lighting			
Object light source	8 white LEDs	36 white LEDs	20 white LEDs	72 white LEDs
Sensing element	1/3-inch CCD			
Shutter	Electronic shutter, shutter time: 1/500 to 1/8,000			
Power supply voltage	15 VDC (Supplied from Amplifier Unit.)	15 VDC, 48 VDC (Supplied from Amplifier Unit.)		
Degree of protection (IEC 60529)	IP65	ZFV-SC__ :IP65 ZFV-SC__ W: IP67		

Amplifier units

Item	ZFV-CA40	ZFV-CA45
Output specifications	NPN open collector, 30 VDC 50 mA max., residual voltage 1.2 V max.	PNP open collector, 50 mA max., residual voltage 1.2 V max.
Inspection items	PATTERN, AREA, HUE (Color), WIDTH, POSITION, COUNT, BRIGHT, CHARA	
Teaching area	Rectangular, one area	
Sensing area	Full screen	
Resolution	468x432 (HxV) max.	
Bank switching	Supported for 8 banks.	
Response time	13 ms (Standard), 8 ms (1/2 for partial scan), 5 ms (1/4 for partial scan)	
Other functions	Control output switching: ON for OK or ON for NG, ON delay/OFF delay, One-shot output, "ECO" mode	
Output signals	(1) Control output (OUTPUT) (2) Enable output (ENABLE) (3) Error output (ERROR)	
Input signals	(1) Sync measurement input (TRIG)/Continuous measurement input (TRIG); switched from menu (2) Bank selection input (BANK1-3) (3) Object stationary teaching (TEACH)/Object motion teaching (TEACH); switched from menu	
Sensor head interface	Digital interface	
Image display	TFT 1.8-inch LCD (Display dots: 557x234)	
Indicators	<ul style="list-style-type: none"> Judgment result indicator (OUTPUT, Color: orange) Inspection mode indicator (RUN, Color: green) Error indicator (ERR, Color: red) Ready status indicator (READY, Color: blue) 	
Operation interface	<ul style="list-style-type: none"> Cursor keys (up, down, left, right) Setting key (SET) Escape key (ESC) Operating mode switching (slide switch) Menu switching (slide switch) Teaching/Display switching key (TEACH/VIEW) Function keys (A to D, 4 inputs) 	
Power supply voltage	20.4 to 26.4 VDC (including ripple)	
Current consumption	800 mA max. (with sensor head connected)	



Easy Vision – Touch, Connect & Go

The new ZFX bundles advanced functionality with an intuitive user interface. The 3.5" touch screen offers an easy access to the ZFX. Auto-adjustment functions hide the complexity of the vision task and guide the user to solve the application. Features such as multiple inspections, position correction, intelligent image filtering and Ethernet communication make the ZFX a valuable partner for challenging applications.

The ZFX comes with color and monochrome functionality and best in class cameras.

- Easy vision – intuitive teach & go user interfaces
- Live – built-in LCD touch monitors for setup and immediate feedback
- Communication – centralized setup & inspection via Ethernet
- Versatile – app. 20 tools, 32 inspections per image
- Simplicity – auto-adjustment functions for easy image setup
- Hybrid concept – Color and monochrome functionality in one

Ordering information

Controllers

Power supply	Circuit type	Order code
DC21.6 to 26.4V	NPN	ZFX-C10
	PNP	ZFX-C15

Cameras

Type		Setting distance	Setting area	Order code
Camera with lighting	Monochrome type	34 to 49 mm	5×4.9 mm to 9×8.9 mm (variable)	ZFX-SR10
		38 to 194 mm	10×9.8 mm to 50×49 mm (variable)	ZFX-SR50
	Color type	34 to 49 mm	5×4.9 mm to 9×8.9 mm (variable)	ZFX-SC10
		31 to 187 mm	10×9.8 mm to 50×49 mm (variable)	ZFX-SC50
		67 to 142 mm	50×49 mm to 90×89 mm (variable)	ZFX-SC50W (IP67)
		115 to 227 mm	90×89 mm to 150×148 mm (variable)	ZFX-SC90
Camera only				ZFX-SC90W (IP67)
				ZFX-SC150
				ZFX-SC150W (IP67)
	Monochrome type	The CCTV lens is selected according to the range of detection and the installation distance.		ZFX-S
	Color type			ZFX-SC

Cables

Type		Cable length	Order code
Camera cable *1	Normal type	3 m, 8 m	ZFX-VS
	Robot cable type	3 m	ZFX-VSR
Camera extension cable	Normal type	3 m	ZFX-XC3A
		8 m	ZFX-XC8A
	Robot cable type	3 m	ZFX-XC3AR
Parallel I/O cable		2 m, 5 m	ZFX-VP
RS-232C cable		2 m	ZFX-XPT2A
RS-422 cable		2 m	ZFX-XPT2B
Monitor cable		2 m, 5 m	FZ-VM

*1 Required only for camera types ZFX-S or ZFX-SC.

Accessories

Type		Order code
Console		ZFX-KP (2 m/5 m)
LCD monitor		FZ-M08
Panel mount adapters		ZFX-XPM
Optional lighting	Bar lighting	ZFV-LTL01
	Bar double-lighting	ZFV-LTL02
	Bar low-angle lighting	ZFV-LTL04
	Light source for through beam	ZFV-LTF01

Specifications

Controller

Item		ZFX-C10	ZFX-C15
Number of connected cameras		1	
Connectable camera		ZFX-SR_/SC_/S/SC	
Processing resolution		When ZFX-SR_/SC_ is connected: 468(H)×464(V) When ZFX-S/SC is connected: 608(H)×464(V)	
Display	LCD monitor	3.5" TFT color LCD (320×240 pixels)	
	Indicator	„Measuring“ indicator (color: green): RUN Trigger indicator (color: blue): ENABLE Judgment indicator (color: orange): OUTPUT Error indicator (color: red): ERROR	
External I/F	Parallel interface	Input	12 points (RESET, DSA, DIO to 8, TRIG)
		Output	22 points (OR, ERROR, RUN, ENABLE, GATE, STGOUT0, D00 to 15)
		Circuit type	NPN PNP
	Serial interface	USB2.0	1 port, FULL SPEED, MINI-B connector
		RS-232C	1 port, max. 115.200 bps (cannot be used simultaneously with RS-422 interface)
		RS-422	1 port, max. 115.200 bps (cannot be used simultaneously with RS-232C interface)
	Network communications	Ethernet	1 port, 100BASE-TX/10BASE-T (to be expanded in the future)
	Monitor output		Analog RGB output, 1 ch (resolution VGA: 640×480)
Memory card I/F		SD card slot 1 ch	
Operation I/F		Touch panel, key operation, console connection	
Main functions	Number of registered banks		32 banks
	Number of setup items		32 items/1 bank
	Measurement items	Shape inspection	Pattern search, sensitive search
		Size inspection	Area
		Edge inspection	Position, width, count
		Brightness/Color inspection	Brightness, HUE
		Application-based inspection	Defects
	Position correction		1 model search, 2 model search, position, area
Support	Image memory function		Max. 100 images
Ratings	Power supply voltage		21.6 to 26.4 VDC (including ripple)
	Current consumption		1.5 A max.

Camera

Item		ZFX-SR10	ZFX-SR50	ZFX-SC10	ZFX-SC50/ SC50W	ZFX-SC90/ SC90W	ZFX-SC150/ SC150W	ZFX-S (monochrome type)	ZFX-SC (color type)	
Detection range (H×V)		5×4.9 mm to 9×8.9 mm (variable)	10×9.8 mm to 50×49 mm (variable)	5×4.9 mm to 9×8.9 mm (variable)	10×9.8 mm to 50×49 mm (variable)	50×49 mm to 90×89 mm (variable)	90×89 mm to 150×148 mm (variable)			
Setting distance (L)		34 to 49 mm	38 to 194 mm	34 to 49 mm	31 to 187 mm	67 to 142 mm	115 to 227 mm			
Relationship between setting distance and detection range										
Image capture element		All-pixel capture inter-line transfer type 1/3" CCD (monochrome)			All-pixel capture inter-line transfer type 1/3" CCD (color)			All-pixel capture inter-line transfer type 1/3" CCD (monochrome)	All-pixel capture inter-line transfer type 1/3" CCD (color)	
Lens mount								C mount		
Lighting	Lighting method	Pulse lighting						—		
	LED	Red LED			White LED					
Ratings	Power supply voltage (supplied from controller)	15 VDC			15 VDC, 48 VDC			15 VDC, 48 VDC		
Operation environment robustness	Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)								
	Ambient atmosphere	No corrosive gases allowed								
	Degree of protection	IP65 (IEC60529)			ZFX-SC__ :IP65 (IEC60529), ZFX-SC__ W: IP67 (IEC60529)				IP20 (IEC60529)	
	Dielectric strength	1.000 VAC 50 Hz/60 Hz 1 min								
	Vibration resistance (durability)	10 to 150 Hz single-amplitude 0.35 mm 10 times for 8 min each in X, Y and Z directions								
	Shock resistance (destructive)	150 m/s ² 3 times each in 6 directions (up/down, left/right, forward/backward)								
Connection method		Cable built-in type (cable length: 2)						Connector connection type (camera cable ZFX-VS/VSR required)		



Intelligent Sensor with high speed image processing

The F160 offers all features of the F150, including quick start-up, simple operation and an excellent price/value ratio. The main difference is that image capture and processing are accelerated many times. New functions include OCR, rotation search, customizable display and many more

- Two camera connections - High-speed image acquisition
- Accelerated processing algorithms for all inspection tools
- Optical character recognition/verification tool
- Compact flash slot for storage of data and images
- Configurable user interface and monitor output



Ordering information

Name		Remarks	Order code
Controller		NPN input/output	F160-C10E-2
		PNP input/output	F160-C15E-2
Double-speed camera	Camera with intelligent lighting	Field of view 20 mm ² , adjustable	F160-SLC20
		Field of view 50 mm ² , adjustable	F160-SLC50
	Camera only	659x494 pixel (HxV)	F160-S1
		With partial scan function.	F160-S2
Compatible F150 cameras	Camera with intelligent lighting	Field of view 20 mm ² , adjustable	F150-SLC20
		Field of view 50 mm ² , adjustable	F150-SLC50
	Camera with light	Field of view 20 mm ²	F150-SL20A
		Field of view 50 mm ²	F150-SL50A
	Camera only	659Hx494V pixel	F150-S1A
Console		Console with additional function keys	F160-KP
		Standard console	F150-KP
Color LCD monitor		5.5" color TFT LCD	F150-M05L
Memory card		Memory capacity 64 MB	F160-N64S(S)
Camera cable		For double-speed camera and compatible F150 cameras. Cable length: 3 m *1	F150-VS
Monitor cable		Cable length: 2 m *1	F150-VM
Parallel cable		Loose-wire cable for parallel I/O connectors. Cable length: 2 m	F160-VP

*1 Other length on request

Specifications

Controller: F160-C10E-2/-C15E-2

Connectable cameras	F150-S1A/SL20A/SL50A/SLC20/SLC50, F160-S1/S2/SLC20/SLC50, etc.	
Number of cameras connectable	1	2
Number of pixels	512Hx484V	
Number of scenes	32 scenes (Expansion possible using memory card)	
Image storage function	Maximum of 35 images stored	
Filtering	Smoothing (strong/weak), edge enhancement, edge extraction (horizontal, vertical, both horizontal and vertical), dilation, erosion, median, background suppression	
Position displacement compensation	Compensation directions: X, Y, and θ (360°) directions Detection methods: Binary center of gravity, axis angle, labeling, rotation search, gray search, edge position	
Number of measurement regions	32 regions per scene	
Measurement data	Gravity and area, gravity and axis, gray search, precise search, rotation search, flexible search, relative search, defect, area (variable box), defect (variable box), edge position, edge pitch, edge width, density average, labeling, OCR for 1 character, classification	
Data operation functions (expressions)	Number: 32 expressions can be set for judgements, data, and variables used in other expressions. Operations: Arithmetic operations, square root, absolute value, remainder, distance, angle, maximum, minimum, SIN, COS, ATAN, AND, OR, NOT	
Functions for customizing operations	Menu masking, password setting, shortcut keys	
Functions for customizing screens	Display items: Character strings (measured values, judgement results, times, user-specified characters, measurement region names) Specified parameters: Display color, position, size	
Number of slots for memory cards	1	
Monitor interface	1 channel (color, monochrome)	
Serial communications	RS-232C/22A 1 channel 13 inputs and 22 outputs including control I/O points	
Power supply voltage	20.4 to 26.4 VDC	



Compact hardware, high end software

The F210 contains powerful algorithms such as Edge Code, Fine Matching and OCR/OCV. Inspection tasks can be configured easily via the user-friendly GUI. A Macro Function for OEMs and system integrators allows customization through which nearly every system function can be manipulated.

- Enhanced flexibility using branching and conditional operations
- Two camera connections
- Fine Matching tool-for-print quality inspection
- Edge Code (EC) technology for high-precision inspections
- High-speed Character Recognition/Verification tool



Ordering information

Name		Remarks	Order code
Controller		NPN input/output	F210-C10
		PNP input/output	F210-C15
Double-speed camera	Camera with intelligent lighting	Field of view 20 mm ² , adjustable	F160-SLC20
		Field of view 50 mm ² , adjustable	F160-SLC50
	Camera only	659Hx494V pixel	F160-S1
		With partial scan function.	F160-S2
Compatible F150 cameras	Camera with intelligent lighting	Field of view 20 mm ² , adjustable	F150-SLC20
		Field of view 50 mm ² , adjustable	F150-SLC50
	Camera with light	Field of view 20 mm ²	F150-SL20A
		Field of view 50 mm ²	F150-SL50A
	Camera only	659Hx494V pixel	F150-S1A
Console		Console with additional function keys	F160-KP
		Standard Console	F150-KP
Color LCD monitor		5.5" color TFT LCD	F150-M05L
Memory card		Memory capacity 64 MB	F160-N64S(S)
Camera cable		For double-speed camera and compatible F150 Cameras. Cable length: 3 m ^{*1}	F150-VS
Monitor cable		Cable length: 2 m ^{*1}	F150-VM
Parallel cable		Loose-wire cable for parallel I/O connectors. Cable length: 2 m	F160-VP
Application software		with macro function	F500-UM3ME
		without macro function	F500-UM3FE

^{*1} Other length on request.

Specifications

Controller: F210-C10/-15

Connectable cameras	F150-S1A/-SL20A/-SL50A/-SLC20/-SLC50, F160-S1/-S2/-SLC20/-SLC50, F300-S2R/-S3DR, etc.
Number of cameras connectable	2
Number of pixels	512Hx484V
Number of scenes	32 (Expansion possible using memory cards.)
Image storage function	Maximum of 35 images stored
Filtering	Smoothing (strong, weak), edge enhancement, edge extraction (horizontal, vertical, both), dilation, erosion, median, background suppression
Operation and settings	Installing measurement items using application software, and combining and setting measurement items by menu operations
Trend monitor function	Supported
Memory card slots	1
Monitor interface	1 channel
Serial communications	RS-232C/22A: 1 channel
Parallel I/O	13 inputs and 22 outputs
Strobe interface	2 channels (included in parallel outputs)
Power supply voltage	20.4 to 26.4 VDC



Ultimate power - high resolution, network - ready vision system

The F500/F210ETN are network ready, digital vision systems. The optional software VisionComposerNET allows configuration and maintenance of a vision network from a central PC. For documentation or later audits, the system provides tools for logging images and results for later analysis.

- Two digital camera ports, high resolution (1K x 1K) with F500ETN
- Advanced real time data logging and storage functions
- 10/100 Base TX Ethernet Port, USB, RS232/422, 33 digital I/O
- Optional VisionComposerNET for remote configuration/maintenance
- Security tools, audit trail creation in security sensitive environment

Ordering information

Name	Remarks	Order code
Controller	Standard resolution NPN input/output	F210-C10-ETN
	Standard resolution PNP input/output	F210-C15-ETN
	High resolution NPN input/output	F500-C10-ETN
	High resolution PNP input/output	F500-C15-ETN
Camera	250 K Pixel	F210-S1
	1 M Pixel	F500-S1
Monitor	5.5" color TFT LCD	F150-M05L
	10.4" color TFT LCD	F500-M10L
Console	Standard console	F150-KP
	Console with additional function keys	F-160-KP
Memory cards	Memory capacity 64 MB	F160-N64S(S)
	Memory capacity 256 MB	F160-N256S
PC-Software	Optional remote configuration software (via ETN)	F500-CD
Application software	With macro function	F500-UM3ME
	Without macro function	F500-UM3FE
High precision lenses	focal length 16 mm	F500-LE16
	focal length 25 mm	F500-LE25
	focal length 50 mm	F500-LE50
Camera cable	Available length 2 m, 5 m, 10 m	F500-VS2
Monitor cable	Cable length 2 m	F500-VM
Parallel cable	Loose-wire cable for parallel I/O connectors. Cable length	F160-VP

Specifications

Item	F210-C10-ETN/-C15-ETN	F500-C10-ETN/-C15-ETN
Connected camera	F210-S1	F500-S1
No. of connectable cameras	2	2
Processing resolution	512Hx484V	1024Hx1024V
No. of scenes	32 (can be increased using Memory Cards.)	
Image memory function	35 images max.	
Storage	64 MB non-volatile memory	256 MB non-volatile memory
Operation and settings	Measurement items installed using Applications Software. Menu operations used to combine measurement items. Vision Composer Net can be used for operation and settings.	
Serial communications	USB series B: 1 channel, RS-232C/22: 1 channel	
Network communications	Ethernet 100Base-TX/10Base-T	
Parallel I/O	11 inputs, 22 outputs	
Monitor interface	Composite video output: 1 channel, S-VIDEO output: 1 channel	
Memory card interface	Compact Flash card slot, 1 channel	
Power supply voltage	20.4 to 26.4 VDC	

System requirements for F500-CD3E Vision composer net

CPU		Pentium III 600 MHz min.(Pentium III 1 GHz min. recommended)
OS		Windows 2000 Professional, Service Pack 4 or higher Windows XP Home Edition, Service Pack 2 or higher Windows XP Professional, Service Pack 2 or higher
Memory		192 MB min. (256 MB min. recommended)
Hard disk		300 MB min. available space
Monitor		Resolution: 1,024x768 min. Display colors: High Color (16-bit) min. (True Color (32-bit) min. recommended)
Network		10BaseT-compliant network(100Base-TX recommended)
Vision sensor	Controller	F210-C10-ETN/F210-C15-ETN, F500-C10-ETN/F500-C15-ETN
	Applications software	F500-UM Version 3.00 or later



V400-F – Fixed 2D Code Reader – One step to read the Code

The V400-F achieves highest 2D Code reading performance on challenging materials and environmental conditions. In combination with the easy and intuitive usage, the V400-F makes the difference. Pressing the teach button once is sufficient, to automatically adjust the settings for light and filter. This enables V400-F to read any Code correctly, independent of the quality or changing environment. V400-F is a compact system, which is available with integrated lense and lighting or as C-Mount variant.

- Easy adjustment of parameters
- Accurate reading of Codes
- Direct print marks on any material
- Eliminate the effects of print quality and work piece changes

Ordering information

2D Code Readers

Name	Field of vision	Order code
Special Lighting Lens	14×18 mm	V400-F250
	31×42 mm	V400-F350
C-Mount	Changes according to the lens	V400-F050

Accessories (order separately) and cables

Name	Cable length	Remarks	Order code
Communications cable	5 m	For connection to SYSMAC Series PLC (includes power line)	V400-W23 (NPN)
			V400-W23P (PNP)
		For connection to an IBM PC/AT or compatible (includes power line)	V400-W24 (NPN)
Monitor cable			V400-W24P (PNP)
		—	V400-WM0

Monitor

Name	Order code
LCD Monitor	F150-M05L-2D ^{*1}

^{*1} There is no need for an external power supply when this monitor is used. (Power is supplied from the V400-F).

Specifications

Item	V400-F050	V400-F250	V400-F350
Dimensions	40×50×75.3 mm	40×50×97.1 mm	
Working distance (WD)	Depends on the lens.	Approx. 100 mm	Approx. 200 mm
Field of vision	Depends on the lens.	Approx. 14×18 mm	Approx. 31×42 mm
Lighting	Up to two can be directly powered.	Red LED	
Image sensor	1/3" CCD		
Effective pixels	640×480 pixels		
Power supply voltage	24 VDC ±10%		
Power consumption	0.5 A max.		
Insulation resistance	20 MΩ min.		
Withstand voltage	1,000 VAC for 1 min.		
Leakage current	0.25 mA max.		
Noise resistance	Power line: 2 kVp-p, Pulse width: 50 ns, Rise time: 5 ns, Consecutive burst time: 15 ms, Cycle: 300 ms		
Applicable standards	CE: EN 61326:1997, +A1:1998, +A2:2001 (EMI: Class A)		
Vibration resistance	10 to 150 Hz, 0.35-mm half-amplitude (maximum acceleration: 50 m/s ²), 10 times for 8 minutes each in 3 directions		
Shock resistance	150 m/s ² 3 times each in 6 directions		
Ambient humidity	Operating: 0 to 45°C, Storage: -25 to 65°C		
Ambient temperature	Operating/storage: 25% to 85% (with no icing or condensation)		
Ambient environment	No corrosive gases		
Degree of protection	None	IEC 60529 IP67	
Weight	Approx. 130 g	Approx. 150 g	



V400-H – Handheld 2D Code Reader

Target, Touch & Go

The V400-H combines highest reading performance and ease of operation for mobile applications. The built-in LCD monitor helps to target the right position for V400-H in order to read the code and to display the measurement result immediately. Thanks to the excellent reading performance, direct marked or strongly degraded codes can be identified. The read 2D code can be stored on SD card or exported to a PC for further processing. The V400-H supports the traceability of components in assembly lines, where fixed readers do not fit.

- Easy to use – Target, Touch & Go
- Built-in LCD monitor for immediate display of results
- Accurate – reading of direct print marks
- Variable field of view

Ordering information

Name	Specifications		Remarks	Order code
	Communications interface	Field of vision		
2D Code Reader	RS-232C	5×5 to 10×10 mm	–	V400-H101
2D Code Reader	RS-232C	15×15 to 30×30 mm	–	V400-H201
Name	Communications interface	Cable length	Remarks	Order code
Communications cable	RS-232C	2 m	For SYSMAC Series connection (with power cord)	V400-W20-2M
Communications cable	RS-232C	2 m	For SYSMAC Series connection (with power cord)	V400-W21-2M
Contactator	–	–	Contactator for positioning (detachable)	V400-AC1
Stand	–	–	–	V400-AS1

Ratings and Specifications

Item	Model	V400-H101	V400-H201
Performance	Field of vision	5×5 to 10×10 mm	15×15 to 30×30 mm
	Minimum cell size	70 μm	200 μm
	Working distance	40 mm	
	Illumination	LED control	
	Applicable codes	Data Matrix, ECC200, 10×10 to 64×64, 8×18 to 16×48, QR Code (Models 1,2) Versions 1 to 10	
	Reading direction	360°	
	Interface	RS-232C	
	Input (TRIGGER)	TRIGGER buttons (both sides)	
	Aiming method	Aimed by viewing the LCD monitor, or using the Contactator	
Ordinary specifications	Outputs	Operating display LED, LCD display (1.8-inch color LCD), and buzzer	
	Ambient operating temperature	0 to 40 °C	
	Ambient operating humidity	35 to 85% (with no condensation)	
	Ambient storage temperature	-25 to 60°C	
	Ambient storage humidity	35 to 85% (with no condensation)	
	Dimensions	50×42×170 mm	
	Degree of protection	IEC 60529 IP64	
	Materials	Case: ABS; optical surface: PC; display surface: PMMA	
	Power supply voltage	5 VDC ±10% (with maximum 2-m cable length)	
	Current consumption	1.0 A max.	
	Weight	Approx. 200 g	

THE NEW BEST-IN-CLASS FIBER OPTIC AMPLIFIERS

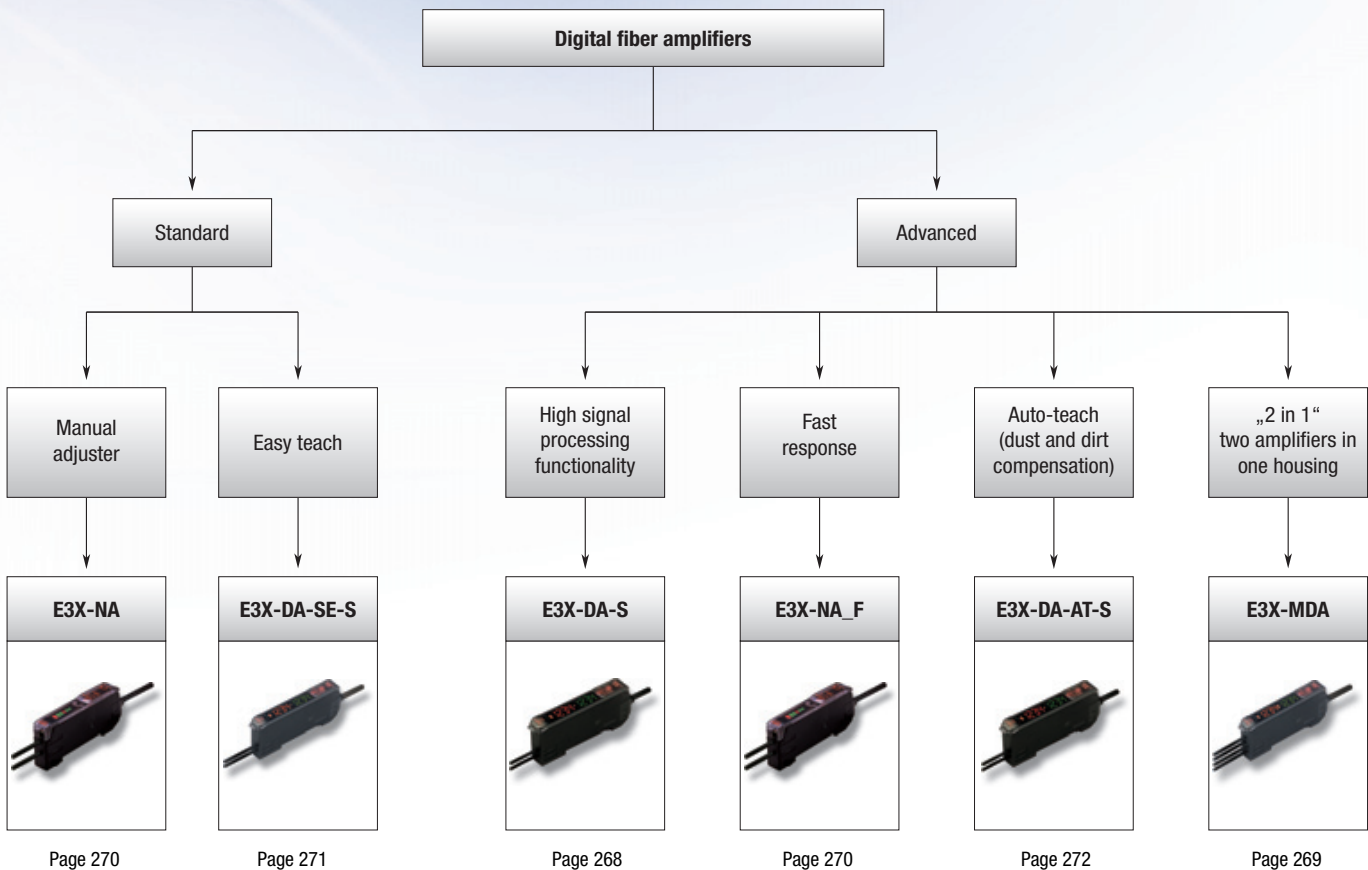
Reduce sensor set-up and maintenance time compared with traditional solutions

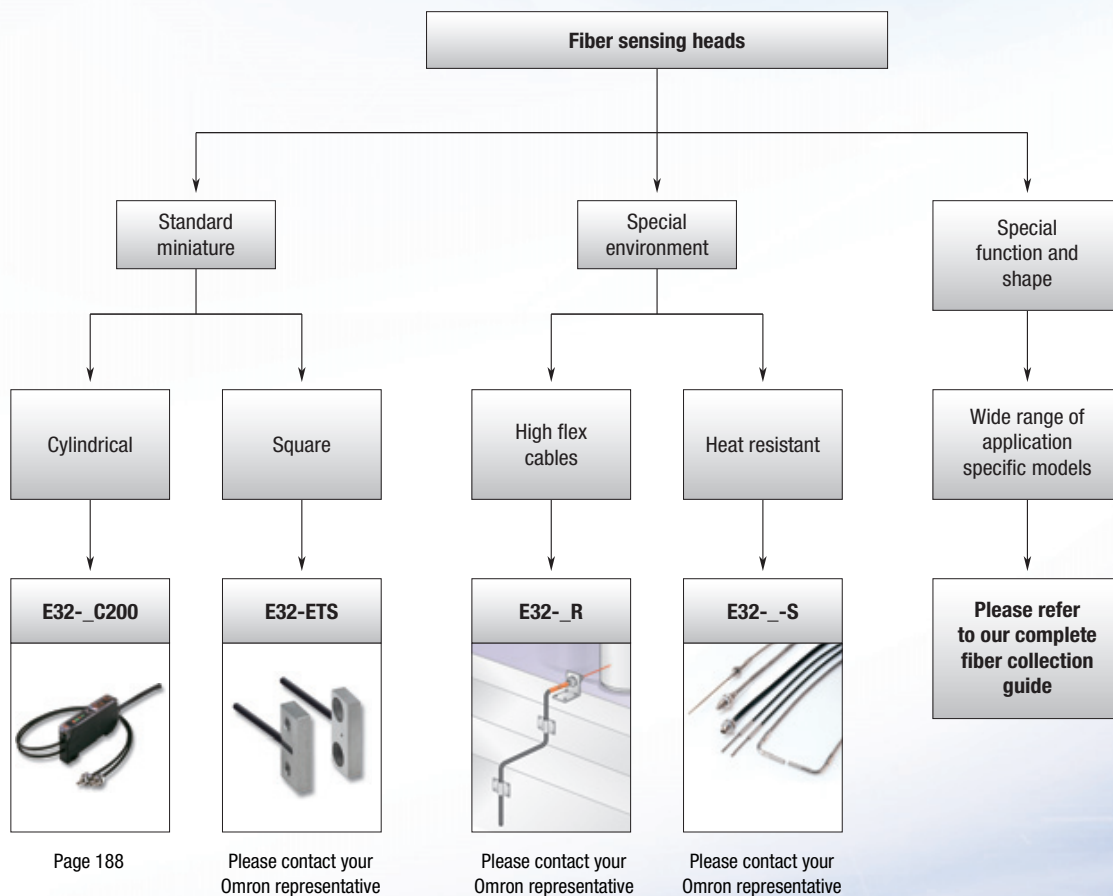
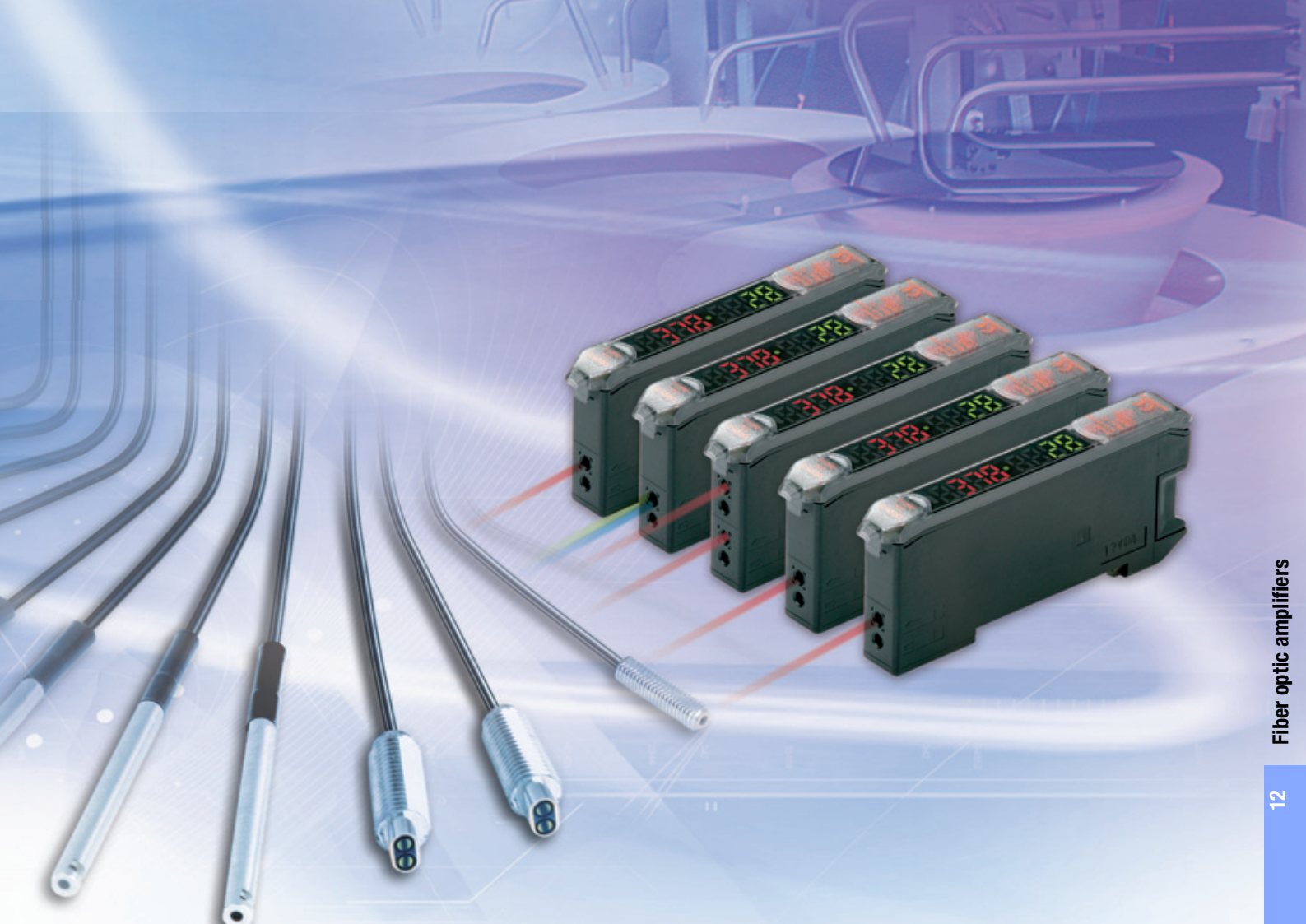
With the E32 the sensing information is transported from all places to one central location. All settings operations and functional checks can be carried out with ease from this location, reducing the time for sensor set-up drastically.

- Easy one-button teaching
- Power tuning and active threshold control
- Comprehensive fiber optic portfolio
- Wiring cost saving




Request your fiber selection catalogue for free at:
www.omron-industrial.com/fibre







Selection table

Category		Premium Line – Easy teach amplifier	Premium line – double amplifier	Basic line	Basic line – Fast response
					
Model		E3X-DA-S	E3X-MDA	E3X-NA	E3X-NA-F
Key features		Extended signal processing capabilities	Space saving 2 in 1 functionality	Potentiometer for manual adjustment	Response time 20 µs
Sensing adjustment	Teach button	■	■	–	–
	Manual adjustment	–	–	■	■
Special features	Power tuning	■	■	–	–
	Auto power control APC	■	■	–	–
	Active threshold ATC	–	–	–	–
Network communication	DeviceNet	■	□	–	–
Communication with mobile console		E3X-MC11/-SV2	E3X-MC11/-SV2	–	–
Display	Dual digital display	■	■	–	–
	LED bargraph	□	□	■	■
Light sources types	Red LED	■	■	■	■
	Green LED	■	–	■	■
	Blue LED	■	–	–	–
	Infrared	■	–	–	–
Voltage range		12 VDC to 24 VDC	12 VDC to 24 VDC	12 VDC to 24 VDC	12 VDC to 24 VDC
Power consumption	(at 24 VDC, without load)	<45 mA	<45 mA	<35 mA	<35 mA
Control output/input	PNP	■	■	■	■
	NPN	■	■	■	■
	Twin output	■	■ /2 Chn.	–	–
	Alarm/Error output	–	–	■	■
	Remote input	■	–	–	–
Mode selection	Dark on/Light on	■	■	■ /switch	■ /switch
Response time (min.)		48 µs	130 µs	200 µs	20 µs
Connection	Cable type (prewired)	■	■	■	■
	Omron connector type	■	■	■	■
	M8 Pigtail	■	■	■	■
Enclosure rating		IP50	IP50	IP50/IP66	IP50/IP66
Ambient temperature		-25 to 55°C	-25 to 55°C	-25 to 55°C	-25 to 55°C
Housing material	Case	PBT	PBT	PBT	PBT
	Cover	PC	PC	PC/PES	PC/PES
ROHS conformity		■	■	■	■
Page		268	269	270	Please contact your Omron representative

Item	Shape	Cable length	No. of conductors	Order code
Master connector		2 m	3	E3X-CN11
			4	E3X-CN21
Slave connector			1	E3X-CN12
			2	E3X-CN22

Category		Premium Line – Easy teach amplifier	Premium line – auto compensation		
					
Model		E3X-DA-SE-S	E3X-DA-AT-S		
Key features		Simplified one button-teach for minimal setup time	ATC for enhanced signal stability		
Sensing adjustment	Teach button	■	■		
	Manual adjustment	–	–		
Special features	Power tuning	■	■		
	Auto power control APC	■	■		
	Active threshold ATC	–	■		
Network communication	DeviceNet	□	□		
Communication with mobile console		E3X-MC11/-SV2	E3X-MC11/-SV2		
Display	Dual digital display	■	■		
	LED bargraph	□	□		
Light sources types	Red LED	■	■		
	Green LED	–	–		
	Blue LED	–	–		
	Infrared	–	–		
Voltage range		12 VDC to 24 VDC	12 VDC to 24 VDC		
Power consumption	(at 24 VDC, without load)	<40 mA	<45 mA		
Control output/input	PNP	■	■		
	NPN	■	■		
	Twin output	–	–		
	Alarm/Error output	–	□		
	Remote input	–	–		
Mode selection	Dark on/Light on	■ /switch	■		
Response time (min.)		1 ms	80 μs		
Connection	Cable type (prewired)	■	■		
	Omron connector type	■	■		
	M8 Pigtail	■	■		
Enclosure rating		IP50	IP50		
Ambient temperature		-25 to 55°C	-25 to 55°C		
Housing material	Case	PBT	PBT		
	Cover	PC	PC		
ROHS conformity		■	■		
Page		271	272		

■ Standard

□ Available

– No/not available



High Accuracy Double Display Digital Fiber Amplifier

Superior digital fiber optic amplifier allowing easy user setting with power tuning*. Two large displays are in favour of excellent visibility even from a distance.

A convincing range of advanced and useful functions help you solving almost every sensing task.

- User-friendly power tuning function allows easy sensor settings
- High resolution for long sensing distances and accurate settings
- Short turn on time of only 50µs for fast sensing processes
- 4 element LED and Auto Power Control for high and long-term stability
- Mutual interference suppression for simultaneous sensor operations

* Power tuning is a beneficial function to set the amplification and LED power to a certain target value. This allows a quick and reliable amplifier setup for e.g. transparent object detection.

Ordering information

Amplifier units with cables

Item		Functions	Order code	
			NPN output	PNP output
Standard models		–	E3X-DA11-S	E3X-DA41-S
Mark-detecting models	Green LED	–	E3X-DAG11-S	E3X-DAG41-S
	Blue LED	–	E3X-DAB11-S	E3X-DAB41-S
	Infrared LED	–	E3X-DAH11-S	E3X-DAH41-S
Advanced models	Twin-output models	Area output, self-diagnosis, differential operation	E3X-DA11TW-S	E3X-DA41TW-S
	External-input models	Remote setting, counter, differential operation	E3X-DA11RM-S	E3X-DA41RM-S

Amplifier units with connectors

Item		Functions	Order code	
			NPN output	PNP output
Standard models		–	E3X-DA6-S	E3X-DA8-S
Mark-detecting models	Green LED	–	E3X-DAG6-S	E3X-DAG8-S
	Blue LED	–	E3X-DAB6-S	E3X-DAB8-S
Advanced models	Twin-output models	Area output, self-diagnosis, differential operation	E3X-DA6TW-S	E3X-DA8TW-S
	External-input models	Remote setting, counter, differential operation	E3X-DA6RM-S	E3X-DA8RM-S

Please select either E3X-CN11 (3-pole) or E3X-CN21 (4-pole) Master system connector, depending on output-type, for installation of single amplifier connector types (also refer to page 266 for further information).

Specifications

Amplifier units with cables

Item			Standard models	Mark-detecting models			Advanced, twin-output models	Advanced, external-input models
Output		NPN output	E3X-DA11-S	E3X-DAG11-S	E3X-DAB11-S	E3X-DAH11-S	E3X-DA11TW-S	E3X-DA11RM-S
		PNP output	E3X-DA41-S	E3X-DAG41-S	E3X-DAB41-S	E3X-DAH41-S	E3X-DA41TW-S	E3X-DA41RM-S
Light source (wavelength)			Red LED (650 nm)	Green LED (525 nm)	Blue LED (470 nm)	Infrared LED	Red LED (650 nm)	
Supply voltage			12 to 24 VDC ±10%, ripple (p-p) 10% max.					
Response time	Super-high-speed mode	NPN	48 μs for operation and 50 μs for reset				80 μs for operation and reset respectively	48 μs for operation and 50 μs for reset ^{*1}
		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					
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, area output, or self-diagnosis.)	External input setting (Select from teaching, power tuning, zero reset, light OFF, or counter reset.)
Digital display			Select from the following: 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					Select from same displays as given at the left or a counter display.
Size in mm (HxWxD)			70x32x10					

^{*1} When counter is enabled: 80 µs for operation and reset respectively.



2- in -1 Digital Double Head Advanced Fiber Optic Amplifier

E3X-MDA is the innovative consequence incorporating 2 digital fiber amplifiers in one slimline housing. Many sensing applications require a signal to detect the presence of the object and another to check some part of that object which has been realized by this fiber optic amplifier.

- Two digital amplifiers in one slimline housing
- Short turn on time of 130 μ s
- Power tune function for easy and accurate setting
- Parallel display of light intensity and switch point value
- Twin output models – on/off or area (between two threshold values)

Ordering information

Amplifier units with cables

Item	Functions	Order code	
		NPN output	PNP output
2-channel models	AND/OR output	E3X-MDA11	E3X-MDA41

Amplifier units with connectors

Item	Functions	Order code	
		NPN output	PNP output
2-channel models	AND/OR output	E3X-MDA6	E3X-MDA8

Please select either E3X-CN11 (3-pole) or E3X-CN21 (4-pole) Master system connector, depending on output-type, for installation of single amplifier connector types (also refer to page 266 for further information).

Specifications

Item			2-channel models		
Output		NPN output	E3X-MDA11		E3X-MDA6
		PNP output	E3X-MDA41		E3X-MDA8
Light source (wavelength)			Red LED (650 nm)		
Supply voltage			12 to 24 VDC ±10%, ripple (p-p) 10% max.		
Response time	Super-high-speed mode	NPN	130 μs ^{*1} for operation and reset respectively		
		PNP			
	Standard mode		1 ms for operation and reset respectively		
	High-resolution mode		4 ms for operation and reset respectively		
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)		
	Mutual interference prevention		Possible for up to 9 Units (18 channels) ^{*2, *3}		
	I/O settings		Output setting (select from channel 2 output, AND, OR, leading edge sync, falling edge sync, or differential output)		
Digital display			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		
Enclosure rating			IEC 60529 IP50 (with Protective Cover attached)		
Connection method			Prewired cable		Standard connector
Materials	Case	Polybutylene terephthalate (PBT)			
	Cover	Polycarbonate (PC)			
Size in mm (HxWxD)			70x32x10		

^{*1} When differential output is selected for the output setting, the second channel output is 200 μ s for operation and reset respectively.

^{*2} Communications are disabled if the detection mode is selected during super-high-speed mode, and the communications functions for mutual interference prevention and the mobile console will not function.

^{*3} Mutual interference prevention can be used for up to 5 units (10 channels) if power tuning is enabled.



Digital Amplifier with manual adjuster

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

- Easy adjustment with potentiometer
- Short turn on time of only 20 μ s (NA-F types)
- Mutual interference suppression
- Water resistant models, green or red LED types for colour mark detection

Ordering information

Pre-wired

Item	Control output	Order code	
		NPN output	PNP output
Standard models	ON/OFF output	E3X-NA11	E3X-NA41
High-speed detection models		E3X-NA11F	E3X-NA41F
Mark-detecting models		E3X-NAG11	E3X-NAG41
Water-resistant models		E3X-NA11V	E3X-NA41V

Note: Alarm output models also available.

Connector type

Item	Applicable connector (order separately)		Control output	Order code	
				NPN output	PNP output
Standard models	Master	E3X-CN11	ON/OFF output	E3X-NA6	E3X-NA8
	Slave	E3X-CN12			
Water-resistant models (M8 connector)	XS3F-M421-40 _A XS3F-M422-40 _A			E3X-NA14V	E3X-NA44V

Please select either E3X-CN11 (3-pole) or E3X-CN21 (4-pole) Master system connector, depending on output-type, for installation of single amplifier connector types (also refer to page 266 for further information)

Specifications

Item		Pre-wired				Connector type	
		Standard models	High-speed detection models	Mark-detecting models	Water-resistant models	Standard models	Water-resistant models (M8 connector)
Output	NPN output	E3X-NA11	E3X-NA11F	E3X-NAG11	E3X-NA11V	E3X-NA6	E3X-NA14V
	PNP output	E3X-NA41	E3X-NA41F	E3X-NAG41	E3X-NA41V	E3X-NA8	E3X-NA44V
Light source (wave length)		Red LED (680 nm)		Green LED (520 nm)	Red LED (680 nm)		
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p): 10% max.					
Control output		Load current 50 mA (residual voltage 1 V max. each) Open collector output type (depends on the NPN/PNP output format) Light-ON/Dark-ON switch selectable					
Response time		Operation or reset: 200 μs max.* ¹	Operating: 20 μs max. Reset: 30 μs max.	200 μs max. for operation and reset respectively* ¹			
Sensitivity adjustment		8-turn endless adjuster (with indicator)					
Timer function		OFF-delay timer: 40 ms (fixed)					
Ambient temperature		Operating: Groups of 1 to 3 amplifiers: -25 to +55°C, Groups of 4 to 11 amplifiers: -25 to +50°C, Groups of 12 to 16 amplifiers: -25 to +45°C Storage: -30 to +70°C (with no icing and condensation)					
Protective structure		IEC 60529 IP50 (with protective cover attached)			IEC 60529 IP66 (with protective cover attached)	IEC 60529 IP50 (with protective cover attached)	IEC 60529 IP66 (with protective cover attached)
Connection method		Pre-wired models (standard length: 2 m)				Connector type	M8 connector
Size in mm (HxWxD)		64,3x31,5x10			81,5x33x12	64,3x31,5x10	81,5x33x12

*¹ If 8 or more Units are installed side-by-side, the response time will be 350 μ s max.

Digital fiber optic amplifier with one button teaching



E3X-DA-SE-S is the right answer for a quick one key setting of an advanced fiber optical amplifier incorporating almost all the same beneficial features as its big brother "E3X-DA-S".

- Time saving one key teaching or manually
- Digital double display for incident level and threshold
- High resolution 12 bit A/D converter (4000 digits)
- Mutual interference protection for alignment of 10 fiber amplifiers
- Object or 2-point teaching within a few seconds

Ordering information

Type	Order code	
	NPN output	PNP output
Pre-wired models	E3X-DA11SE-S	E3X-DA41SE-S
Connector models	E3X-DA6SE-S	E3X-DA8SE-S

Please select either E3X-CN11 (3-pole) or E3X-CN21 (4-pole) Master system connector, depending on output-type, for installation of single amplifier connector types (also refer to page 266 for further information).

Specifications

Item		Digital fiber sensor	
Output	NPN output	E3X-DA11SE-S	E3X-DA6SE-S
	PNP output	E3X-DA41SE-S	E3X-DA8SE-S
Light source (wave length)		Red LED (650 nm)	
Power supply voltage		12 to 24 VDC $\pm 10\%$, ripple (p-p): 10% max.	
Power consumption		960 mW max. (Power supply: 24 V, current consumption: 40 mA max.)	
Control output		Load power supply: 26.4 VDC max., open-collector output, Load current: 50 mA max. (residual voltage: 1 V max.)	
Protective circuits		Power supply reverse polarity protection, output short-circuit protection	
Response time		Operate or reset: 1 ms	
Sensitivity setting		Teaching or manual adjustment	
Functions	Auto power control	High-speed control method for emission current	
	Mutual interference prevention	Optical communications sync, possible for up to 10 Units	
Indicators		Operation indicator (orange)	
Digital displays		Twin digital displays (incident level + threshold)	
Size in mm (HxWxD)		70x32x10	

Note: Basic performance is the same as the E3X-DA-S Series. Refer to the E3X-DA-S Datasheet (E336) for details.



Digital Fiber Amplifier with active threshold for dust and dirt compensation

The active threshold E3X-DA-AT-S digital fiber amplifier ignores a certain level of dirt or pollution and makes readjustments of thresholds unnecessary. Combined with APC* function you can always be assured of stable sensing characteristics.

- Active threshold control for high stability
- Area detection function for quality inspection or sensing range control
- Power tuning for accurate level control
- Short response time of only 80 μ s (turn on time)
- Alarm output for maintenance warning

* APC: Auto Power Control = Regulator for constant optic LED output power

Ordering information

Digital fiber sensor

Type	Functions	Order code	
		NPN output	PNP output
Pre-wired models	ATC	E3X-DA11AT-S	E3X-DA41AT-S
Connector models	ATC error output Alarm output	E3X-DA6AT-S	E3X-DA8AT-S


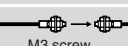




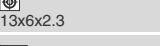
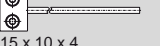

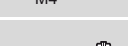





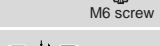

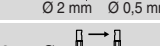


Please select either E3X-CN11 (3-pole) or E3X-CN21 (4-pole) Master system connector, depending on output-type, for installation of single amplifier connector types (also refer to page 266 for further information).

Specifications

Item		Digital fiber sensor	
Output	NPN output	E3X-DA11AT-S	E3X-DA6AT-S
	PNP output	E3X-DA41AT-S	E3X-DA8AT-S
Response time	Super-high-speed mode	Operate or Reset: 80 μ s	
	High-speed mode	Operate or reset: 250 μ s	
	Standard mode	Operate or reset: 1 ms	
	High-resolution mode	Operate or reset: 4 ms	
Functions	ATC	Active threshold control (used for output 1)	
	I/O settings	The signal that is output can be selected (used for output 2): ATC error output	
	Startup operation	The operation when power is turned ON can be selected: No operation, PT, or PT + ATC	
Size in mm (HxWxD)		70x32x10	

Note: Basic performance is the same as the advanced twin-output sensors. Refer to E3C-LDA datasheet (E338) and E3X-DA-S datasheet (E336) for details.
Only differences from the advanced twin-output sensors have been given above.

Fiber sensing heads

Shape	Key feature	Type		Order code	
				Standard fiber	High flex fiber
 M4 screw	M4 screw	Through beam	Cylindrical miniature	E32-TC200	E32-ET11R
 M3 screw	M3 screw			E32-TC200E	E32-T21R
 M6 Screw	M6 screw	Diffuse reflective		E32-DC200	E32-ED11R
 M3 screw	M3 screw			E32-DC200E	E32-ED21R
 15x8x3	Flat shape	Through beam	Square miniature	—	E32-ETS20R
 13x6x2.3	Flat shape, side view			—	E32-ETS24R
 15 x 10 x 4	Flat shape	Diffuse reflective		—	E32-ETS10R
 13x6x2.3	Flat shape, side view			—	E32-ETS14R
 M4	Heat-resistance up to 150°C	Through beam	Heat-resistance up to 150°C	E32-ET51	—
 M6	Heat-resistance up to 150°C	Diffuse reflective		E32-ED51	—
 M4	Heat-resistance up to 350°C	Through beam	Heat-resistance up to 350°C	E32-T61S	—
 M6	Heat-resistance up to 350°C	Diffuse reflective		E32-D61S	—
 6 dia.	Fluoroplastic (PTFE) cover, chemical resistant	Diffuse reflective	Chemical resistant	E32-D12F	—
	Small level differences, high power, side view	Limited reflective	Special beam models	E32-L25	—
 M6 screw	coaxial M6	Diffuse reflective, coaxial beam		E32-CC200	—
 30 mm	30 mm area width	Through beam, area sensing		—	E32-T16WR
 Ø 2 mm Ø 0,5 mm	Dia. 2 mm (0.5 dia, sleeve)	Diffuse reflective, sub miniature	Special application models	E32-D331	—
 3-mm Ø	Opening angle: 1,5° (optical axis adjusted before delivery)	Through beam, wafer mapping		E32-A03	—
	Slot sensor (no adjustment for optical axis required)	Through beam, mark sensing		E32-G14	—
	Heat resistance up to 200°C, Fluoroplastic (PTFE) cover, liquid level detection	Diffuse reflective, liquid level detection		E32-D82F1	—

Note: For the complete range of fiber sensing heads please see www.omron-industrial.com or contact your Omron sales representative.