

P H O T O E L E C T R I C A N D
F I B E R O P T I C S E N S O R S**Photoelectric Sensors**

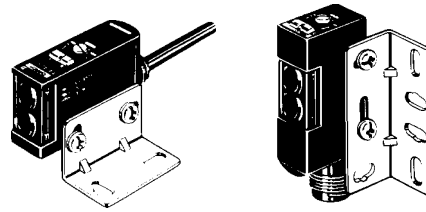
For most packaging, material handling, and industrial applications, Omron's general-purpose photoelectric sensors can solve your detection problem. These versatile sensors simplify your selection and stocking because a single part number can give you all the options needed for the job.

For tough application problems, Omron offers the industry's widest range of specially-designed sensors. These sensors include miniature sensors, mark detection sensors, area focusable and pinpoint focusable, color mark, grooved head and slotted sensors, transparent object and harsh environment models.

Fiber-optic Photoelectric Sensors

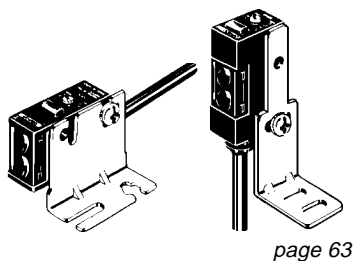
No space is too small for an Omron fiber-optic photoelectric sensor. When electrical noise and high temperatures prove too hostile for electronics, fiber-optic sensors provide the solution. They are ideal for small object detection, inspection and assembly, and on robotic arms and other flexing machinery.

Quick Reference for Photoelectric and Fiber Optic Sensors	6
Photoelectric and Fiber Optic Sensors Selection Guide	8

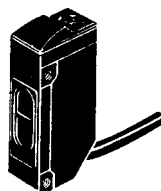


page 45

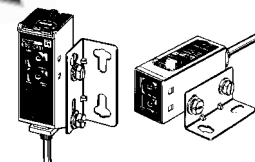
MODEL		E3S-A
Dimensions		22.3 H x 12.4 W x 44 D mm (0.88 x 0.49 x 1.73 in)
Application		—
Amplifier Type		—
Features		<ul style="list-style-type: none"> ■ Fast response time for high-speed sensing ■ Alarm output signals deteriorating sensing conditions ■ User-friendly features for easy installation and use include turbo aiming guide ■ Choose connector-ready models for convenience or prewired models ■ Built-in OFF-delay timer, 0 to 100 ms range ■ Models with combination of timer, self-diagnostic alarm and turbo aiming guide are prewired ■ Switch selectable Light-ON/Dark-ON operation ■ Watertight, meets NEMA types 4X and 6
Detection Method and Sensing Distances	Through-beam Type	7 m (23 ft) E3S-AT□□
	Retroreflective	Polarized: 0.1 to 2 m (0.33 to 6.56 ft) E3S-AR□□
	Diffuse Reflective	0.1 to 20 cm (0.04 to 7.87 in) E3S-AD□1, E3S-AD□6 0 to 70 cm (0 to 27.56 in) E3S-AD□2, E3S-AD□7 10 cm (3.94 in) E3S-AD
Supply Voltage		10 to 30 VDC
Control Outputs	AC	—
	DC	NPN transistor, 100 mA, 30 VDC max. E3S-A□1□, E3S-A□2□, E3S-A□6□, E3S-A□7□ E3S-AD1□, E3S-AD2□, E3S-AD6□, E3S-AD7□ PNP transistor, 100 mA, 30 VDC max. E3S-A□3□, E3S-A□4□, E3S-A□8□, E3S-A□9□ E3S-AD3□, E3S-AD4□, E3S-AD8□, E3S-AD9□
	Alarm	NPN, 50 mA max. E3S-A□2□, E3S-A□7□ PNP, 50 mA max. E3S-A□4□, E3S-A□9□
Response Time		0.5 ms max.
Materials		Plastic body
Enclosure Rating		NEMA 4X, 6; IP67



page 63

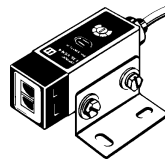
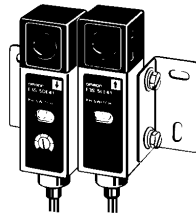


page 73

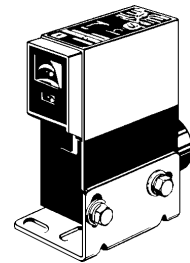


page 87

E3S-B		E3V3	E3S-C	
17.3 H x 10 W x 32 D mm (0.68 x 0.39 x 1.26 in)	32 H x 10 W x 160 mm (1.26 x 0.39 x 0.63 in)	37.5 H x 10.4 W x 18 D mm (1.48 x 0.41 x 0.71 in)	57.5 H x 20.4 W x 23 L mm (2.24 x 0.80 x 0.91 in)	23 H x 20.4 W x 57.5 L mm (0.91 x 0.80 x 2.24 in)
—	—	—	—	—
—	—	—	—	—
<ul style="list-style-type: none"> ■ Small space-saving prewired sensor fits where other sensors cannot ■ Fast response time ■ Watertight, meets NEMA types 4X and 6 ■ Single screw mounting saves installation time ■ Switch selectable Light-ON/Dark-ON operation ■ Sensitivity adjuster and stability indicator for fine-tuning 		<ul style="list-style-type: none"> ■ Built-in amplifier has fully encapsulated circuit ■ Fast, 1 ms response time ■ Polarized retroreflective type ideal for detecting shiny objects ■ Two-turn sensitivity adjustment and output stability indicator fine tune performance ■ Dust-tight and water-tight to IP67 standards ■ Switch selectable Light-ON/Dark-ON operation ■ Ready-to-use: Prewired with 2 m (6.56 ft) cable, includes mounting bracket and reflector for retroreflective types 	<ul style="list-style-type: none"> ■ Rugged metal body DC sensor ■ Up to six times the sensing distance of conventional photoelectrics ■ Watertight construction ■ Heavy-duty body provides high level of shock and vibration resistance ■ Fuzzy-logic enhanced mutual interference protection ■ NPN/PNP switch-selectable output 	
2 m (6.56 ft)		7 m (22.97 ft)	30 m (98.43 ft)	
Polarized: 0.1 to 1 m (0.33 to 3.28 ft)		Polarized: 2 m (6.56 ft)	Polarized: 3 m (9.84 ft)	
0.1 to 20 cm (0.04 to 7.87 in)		0.5 to 8 cm (0.20 to 3.15 in) 70 cm (27.56 in)	70 cm (27.56 in) and 2m (6.56 ft)	
10 to 30 VDC		12 to 24 VDC	10 to 30 VDC	
—		—	—	
NPN transistor, 100 mA, 30 VDC E3S-B□11, E3S-B□61 PNP transistor, 100 mA, 30 VDC E3S-B□31, E3S-B□81		NPN, 100 mA, 70 VDC E3V3-T61/R61/D61/D62 PNP, 100 mA, 30 VDC E3V3-T81/R81/D81/D82	NPN or PNP (selectable), open collector current output	
—		—	—	
0.5 ms max.		1 ms max.	2 ms max. (E3S-CD12 and E3S-CD62) 1 ms max. (all other models)	
Plastic body		Heat resistive ABS	Diecast zinc body	
NEMA 4X, 6; IP67		IP67	NEMA 1,4X, 6P, 12, 13 IP67	

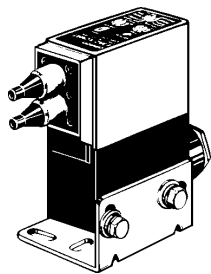


page 103

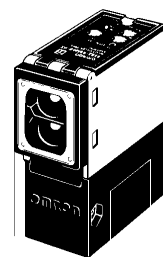


page 111

MODEL		E3S	E3A2
Dimensions		74.6 H x 20 W x 23 D mm (2.94 x 0.79 x 0.91 in)	23 H x 20.4 W x 66.6 D mm (0.91 x 0.80 x 2.62 in)
Application		—	—
Amplifier Type		—	—
Features		<ul style="list-style-type: none"> ■ Small prewired DC sensor available in horizontal and vertical mounting styles ■ Wire selectable Light-ON/Dark-ON operation ■ Sensitivity adjuster and stability indication allow fine-tuning of sensor to installation ■ Rugged diecast metal body ■ Fast response time 	<ul style="list-style-type: none"> ■ Universal AC/DC supply voltage ■ Plug-in interchangeable outputs include relay (supplied) or optional SCR AC output and NPN or PNP DC output ■ Switch selectable Light-ON/Dark-ON operation ■ Built-in timer models provide ON-delay, OFF-delay and one-shot ■ Polarized retroreflective type detects shiny objects
Detection Method and Sensing Distances	Through-beam Type	5 m (16.4 ft) in metal body E3S-5□4□	10 m (32.8 ft) E3A2-10M4(T)(D)
	Retroreflective	2 m (6.6 ft) in metal body E3S-R2□4□	Polarized: 3 m (9.8 ft) E3A2-R3M4(T)(D)
	Diffuse Reflective	30 cm (11.8 in) in metal body E3S-DS30□4□	70 cm (27.6 in) E3A2-DS70M4(T)(D)
Supply Voltage		12 to 24 VDC	24 to 240 VAC, 50/60 Hz 12 to 240 VDC
Control Outputs	AC	—	Relay, 3 A, 250 VAC/30 VDC (supplied) SCR, 200 mA, 250 VAC (G3K-2R2P-1 optional)
	DC	NPN, 80 mA max. load, 1.5 to 4 mA constant current source, 24 VDC E3S-□□E4□ PNP, 100 mA max. load 24 VDC E3S-□□B4□	Complementary NPN, 200 mA, 30 VDC (G3KD-YR2P-1 optional) Complementary PNP, 200 mA, 30 VDC (G3KD-YR2P-2 optional)
	Alarm	—	—
Response Time		3 ms max. (through-beam types) 1 ms max. (reflective types)	15 ms max. (relay) 30 ms max. (SCR) 1 ms max. (transistor)
Materials		Diecast zinc body	Plastic
Enclosure Rating		IP67 (metal)	IP66

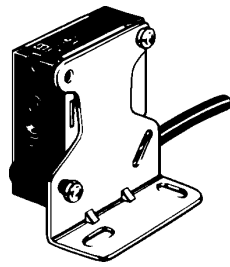


page 117

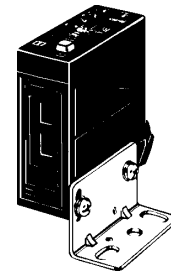


page 117

E3A2-X (fiber-optic amplifier)	E3B2
75 H x 26 W x 75.3 D mm (2.95 x 1.02 x 2.95 in)	90.3 H x 36 W x 80.3 D mm (3.56 x 1.42 x 3.16 in)
Most E32-Series cables	—
Built-in AC/DC amplifier	—
<ul style="list-style-type: none"> ■ Universal supply voltage for AC/DC operation ■ Plug-in, interchangeable outputs for easy maintenance ■ Built-in timers available include ON-delay, OFF-delay, and one-shot (E3A2-XCM4T) or independently adjustable ON-delay and OFF-delay (E3A2-XCM4D) ■ Switch selectable Light-ON/Dark-ON operation ■ Sensitivity adjuster and stability indication allow fine-tuning of sensor to the application ■ Ready to use: includes 3 A relay and mounting bracket ■ 1/2-14 NPT conduit opening 	<ul style="list-style-type: none"> ■ Universal AC/DC power supply ■ Long sensing distance for reflective sensors ■ Built-in independent ON- and OFF-delay timers available ■ Polarized retroreflective type detects shiny objects ■ Easy-to-service plug-in construction ■ Access cover protects settings ■ Switch selectable Light-ON/Dark-ON operation ■ Enhanced mutual interference protection for side-by-side mounting
—	—
—	Polarized: 5 m (16.40 ft) E3B2-R5M4□-US Long-distance: 7 m (22.97 ft) E3B2-R7M4□-US
Red LED	2 m (6.56 ft) E3B2-D2M4□-US
24 to 240 VAC, 50/60 Hz 12 to 240 VDC	24 to 240 VAC, 50/60 Hz 12 to 240 VDC
SPDT relay, 3 A, 250 VAC (E3A2-XCM4□□) SCR, 200 mA, 250 VAC (G3K-2R2P-1 optional)	Contact: SPDT, 3 A, 250 VAC
NPN, 200 mA, 30 VDC (G3KD-YR2P-1 optional) PNP, 200 mA, 30 VDC (G3KD-YR2P-2 optional)	—
—	—
30 ms max. (AC); 1 ms max. (DC)	30 ms max. without timers 0.5 to 20 sec with timers (E3B2-□□M4D-US) 0.05 to 0.5 sec (E3B2-□□M4D-US-3)
Plastic	Plastic
IP66	IP66

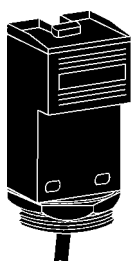


page 127

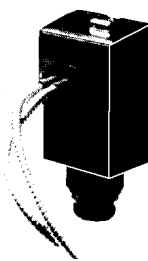


page 135

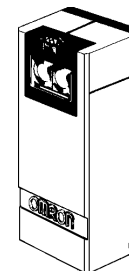
MODEL		E3JK	E3JM
Dimensions		50 H x 17.6 W x 50 D mm (1.97 x 0.69 x 1.97 in)	65 H x 25 W x 75 D mm (2.56 x 0.98 x 2.95 in)
Application		—	—
Amplifier Type		—	—
Features		<ul style="list-style-type: none"> ■ Complementary relay output provides both NO and NC from a single sensor ■ Universal AC/DC supply voltage ■ Slim, small housing fits narrow installation spaces ■ Polarized retroreflective types accurately detects shiny objects ■ Separate models for Light-ON/ Dark-ON operation 	<ul style="list-style-type: none"> ■ Universal AC/DC supply voltage ■ Easy-to-wire terminal block ■ Built-in multifunction timer module provides selectable ON-delay, OFF-delay and one-shot output with 0.1 to 5 sec. range ■ Switch selectable Light-ON/ Dark-ON operation ■ Polarized retroreflective types accurately detect shiny objects
Detection Method and Sensing Distances	Through-beam Type	5 m (1.64 ft) E3JK-5M□□	10 m (32.8 ft) E3JM-10□4(T)-US
	Retroreflective	Polarized: 2.5 m (8.2 ft) E3JK-R2M□ Long distance: 4 m (13.12 ft) E3JK-R4M□	Polarized: 4 m (13.1 ft) E3JM-R4□4(T)-US
	Diffuse Reflective	30 cm (11.8 in) E3JK-DS30M□	70 cm (2.3 ft) E3JM-DS70□4(T)-US
Supply Voltage		24 to 240 VAC, 50/60 Hz 12 to 240 VDC	24 to 240 VAC, 50/60 Hz 12 to 240 VDC
Control Outputs	AC	SPDT relay, 3 A, 250 VAC, (E3JK-□□M□)	SPDT relay, 3 A, 250 VAC, (E3JM-□□M4□-US)
	DC	NPN and PNP complementary outputs E3JK-R2H□-G	NPN open collector (E3JM-□□S4□US) PNP open collector (E3JM-□□R4□-US)
	Alarm	—	—
Response Time		30 ms max. (relay) 3 ms max. (transistor)	5 ms max. without timer 0.1 to 5 sec. (adjustable) with timer (E3JM-□□4T-US)
Materials		Plastic	Plastic
Enclosure Rating		IP64	IP66



page 143

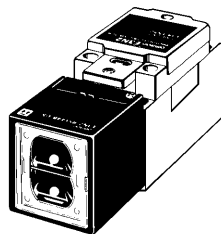


page 151

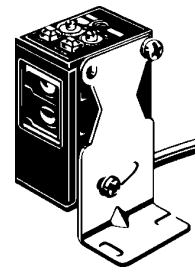


page 163

E3JU	E3JU-X/XR	E3K
69.5 H x 45.6 W x 36 L mm (2.74 x 1.80 x 1.42 in)	73.5 H x 45.6 W x 36.0 D mm (2.89 x 1.80 x 1.42 in)	186 H x 89 W x 63 D mm (7.32 x 3.50 x 2.48 in)
—	Most E32-Series cables	—
—	Built-in AC/DC amplifier	—
<ul style="list-style-type: none"> ■ Universal power AC/DC power supply ■ Sensitivity adjustment standard on all models ■ Wired cable or connector types ■ UL/CSA certified ■ NEMA 4X, IP67 rated ■ Wide selection of timing options ■ FET output allows for solid state switching of AC or DC 	<ul style="list-style-type: none"> ■ Universal AC/DC power supply ■ Flexible M30 or direct body mounting ■ Cable or connector types ■ Sensitivity adjustment ■ Wide selection of timing options ■ UL/CSA certified ■ NEMA 4X, IP66 rated ■ Light source: Infrared LED, Red LED 	<ul style="list-style-type: none"> ■ Long sensing distances with enhanced mutual interference protection ■ Plug-in interchangeable outputs and timer modules ■ Includes DPDT relay output with 10 amp switching capacity ■ Clean, easy-to-wire interior ■ Switch selectable Light-ON/ Dark-ON operation
25 m (85 ft) E3JU-25□4□-□	—	—
5 m (16.4 ft) E3JU-R5□4□-□	—	10 m (32.8 ft) E3K-R10K4
1 m (3.3 ft) E3JU-D1□4□-□	—	2 m (6.56 ft) E3K-D2K4
24 to 240 VDC, 24 to 240 VAC	24 to 240 VAC, 50/60 Hz 12 to 240 VDC	42 to 240 VAC, 50/60 Hz 24 to 240 VDC
Contact: SPDT Relay, Solid State Power MOSFET Relay	Contact: SPDT, 3A, 250 VAC Mostly relay, 400 mA AC/DC	DPDT relay, 10 A, 240 VAC (supplied)
—	—	—
—	—	—
12 ms ON, 12 ms OFF, Models with timer: 0.1 to 10 sec (adjustable), ON-delay, OFF-delay, ON/OFF delay, one-shot, delayed one-shot; Solid State models with 8 ms ON, 12 ms OFF	Contact: 24 ms max without timers Mostly relays: 20 ms max without timers, 0.1 to 10 sec with timers	30 ms max. (AC)
Lens: Plastic PMMA; Case: ABS/ Polycarbonate blend, Case Cover: Polycarbonate	Plastic	Plastic
NEMA 1, 2, 3, 4X, 5, 12 IP67	NEMA 1, 2, 3, 4X, 5, 12, IP66	IP67

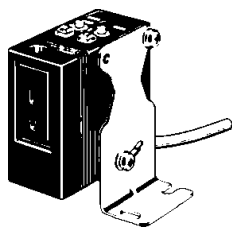


page 169

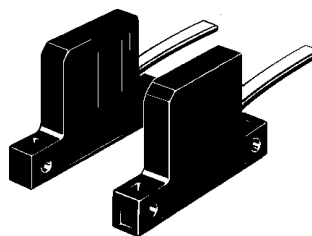


page 181

MODEL	E3N2	E3SA (analog)	
Dimensions	50 H x 40 W x 115 D mm (1.97 x 1.58 x 4.53 in)	40 H x 20.4 W x 30 D mm (1.57 x 0.80 x 1.18 in)	
Application	—	Analog output for measurement, inspection	
Amplifier Type	—	Built-in amplifier	
Features	<ul style="list-style-type: none"> ■ Limit switch style with plug-in construction and rotatable sensing head for easy installation ■ Optional plug-in timer units for ON-delay, OFF-delay, one-shot, delayed one-shot and independent ON-delay and OFF-delay ■ Long sensing distances ■ Enhanced mutual interference protection and short-circuit protection all models ■ Unstable switching condition alarm output on DC types 	<ul style="list-style-type: none"> ■ Ideal for analog detection of position, size and surface characteristics and color changes ■ Fast 1 ms response time ■ Small prewired DC sensor has built-in amplifier that provides both analog and ON/OFF outputs simultaneously ■ 4-turn controls allow fine adjustments in sensitivity and output operating point ■ 2 to 5 cm (0.79 to 1.97 in) with Red LED E3SA-VS5RC43A 	
Detection Method and Sensing Distances	Through-beam Type	50 m (164 ft) E3N2-50□4-US	30 cm (11.81 in) with slit or 2 m (6.56 ft) E3SA-2C43A
	Retroreflective	Polarized: 5 m (16.4 ft) E3N2-R5□4-US	Polarized: 20 to 50 cm (7.87 to 19.69 in) E3SA-RS50C43A
	Diffuse Reflective	2 m (6.56 ft) E3N2-D2□4-US	5 to 50 cm (1.97 to 19.69 in) E3SA-DS5RC43A
	Color Sensing	—	2 to 5 cm (0.79 to 1.97 in) with Red LED E3SA-VS5RC43A
Supply Voltage	100 to 120 VAC, 50/60 Hz 10 to 30 VDC	12 to 24 VDC	
Control Outputs	AC	SCR-SPST, 300 mA max. (E3N2-□□Y4□B-US)	—
	DC	NPN-SPST with pull-up resistor, 200 mA (E3N2-□□E4□-US) PNP-SPST, 200 mA (E3N2-□□B4-US)	Analog, 4 to 20 mA NPN open collector, 100 mA, 30 VDC
	Alarm	DC NPN open collector, 20 mA DC PNP open collector, 20 mA	—
Response Time	5 ms max. (transistor) 30 ms max. (SCR)	1 ms max.	
Materials	Plastic	Plastic	
Enclosure Rating	IP67	IP66	

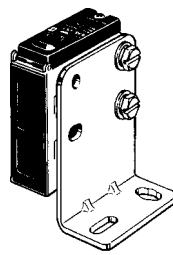


page 191

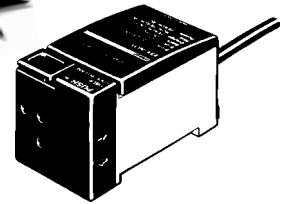


page 203

E3XA (analog fiber-optic amplifier)	E3HF
40 H x 20.4 W x 42.2 D mm (1.75 x 0.80 x 1.66 in)	28 H x 50 W x 7 D mm (1.10 x 1.97 x 0.28 in)
Most E32-Series cables	Space-confined installation
Built-in DC amplifier, analog output	Built-in amplifier
<ul style="list-style-type: none"> ■ Ideal for sensing and inspection in space-confined areas, provides analog output proportional to light received ■ Special fiber-optic cables include E32-T16 wide beam, E32-M21 with four pairs of sensing heads, and retroreflective models E32-R16 and E32-R21 ■ Use to detect positioning, size, color and surface characteristics ■ Prewired amplifier provides both analog output and ON/OFF output ■ Four-turn controls allow fine adjustment of sensitivity and operating point ■ Light source: Red LED 	<ul style="list-style-type: none"> ■ Thin, small sensor mounts to conveyor walls and other space-confined areas ■ Prewired with built-in amplifier ■ Operation indicators on all models ■ Focusing slits for separate type allow detection of objects as small as 0.5 mm (0.02 in) ■ Light-ON and Dark-ON models
—	1 m (3.28 ft) E3HF-1E□
—	—
—	5 cm (1.97 in) E3HF-DS5E□
—	—
12 to 24 VDC	12 to 24 VDC
—	—
4 to 20 mA analog NPN open collector, 100 mA 30 VDC	NPN, 80 mA with 1.5 to 3 mA constant current source
—	—
1 ms max.	5 ms (through-beam type) 3 ms (diffuse type)
Plastic	Plastic body
IP66	IP64

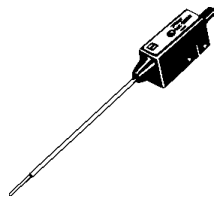
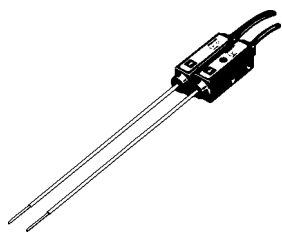
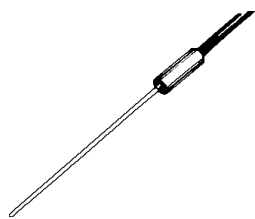


page 207

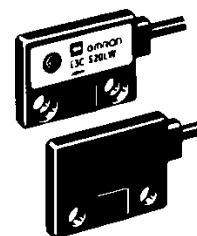


page 217

MODEL		E3S-CL	E3X-NL
Dimensions		42.6 H x 15.4 W x 40 D mm (1.68 x 0.61 x 1.57 in)	32.5 H x 32.2 W x 59 D mm (1.28 x 1.27 x 2.32 in)
Application		BGS sensor	E32-S15-Series cables
Amplifier Type		Built-in amplifier	Built-in DC amplifier
Features		<ul style="list-style-type: none"> ■ Stable detection regardless of material color or size of sensing object: 2% or less black/white error at 20 cm ■ Adjustable setting distance: 2% or less differential travel at 20 cm ■ Sensing unaffected by dirty lens ■ 6-turn potentiometer sensitivity adjustment (clutched) with indicator ■ IP67 water resistant housing ■ NPN/PNP output (switch selectable) ■ Conforms to relevant EN/IEC standards 	<ul style="list-style-type: none"> ■ Sensing of glossy objects and surfaces having varying degrees of luster ■ TEACH function ■ Mutual interference protection ■ Light source: Red LED
Detection Method and Sensing Distances	Through-beam Type	—	—
	Retroreflective	—	—
	Diffuse reflective	0.5 to 20 cm (0.20 to 7.87 in) 0.5 to 50 cm (0.20 to 19.7 in)	—
Supply Voltage		10 to 30 VDC	12 to 24 VDC
Control Outputs	AC	—	—
	DC	NPN/PNP switch selectable 100 mA max.	NPN open collector, 100 mA, 30 VDC
	Alarm	—	—
Response Time		1 ms max.	1 ms
Materials		Diecast zinc body	Plastic
Enclosure Rating		—	IP50



page 237



page 241

E3C Fiber-Optic Probes

E3C (through beam)

E3C-DS1A/E3C-DM5A 8 mm dia. x 27.5 mm L (0.32 x 1.08 in) 90 mm (3.54 in) probe
 E3C-S5/E3C-DS1/E3C-DM5 11 H x 8 W x 36.4 D mm (0.43 x 0.32 x 1.43 in) 85.6 mm (3.37 in) probe
 E3C-DM2R 13 H x 10 W x 40 D mm (0.51 x 0.35 x 1.57 in) 64.5 mm (2.54 in) probe

E3C-S20W 12.5 H x 2.8 W x 18 D mm (0.49 x 0.11 x 0.71 in)

Space-confined installation with hard-to-reach sensing site

Space-confined installation

Separate amplifier (all E3C types)

Separate amplifier

- Bendable stainless steel probes retain complex shapes for detection in hard-to-reach areas
- Ideal for detection in small parts assembly and inspection
- Choose cylindrical (E3C-□□A) or rectangular housings
- Wide selection of amplifiers to choose from: AC or DC, with or without timing functions
- Red light source contained in sensor housing
- Sensing heads have shielded wiring for amplifier connections

- Miniature sensing heads fit in space confined areas
- Separate amplifiers allow remote sensitivity adjustment when the sensing head is not accessible
- Many amplifiers available, including AC and DC, with or without timing functions, prewired or socket-mount types
- Ideal for long-term maintenance with sensing heads and amplifiers that are interchangeable
- All offer selectable Light-ON/Dark-ON operation
- All sensors have Power On indicators
- Prewired amplifiers provide fine sensitivity adjustment and an alarm output for deteriorating sensing conditions

5 cm (1.97 in) E3C-S5, E3C-S5A

10 cm (3.94 in) E3C-S10, 20 cm (7.87 in) E3C-S20W, 30 cm (11.81 in) E3C-S30W, E3C-S30T, 50 cm (19.69 in) E3C-S50

—

—

1 cm (0.39 in) E3C-DS1, E3C-DS1A
 5 mm (0.20 in) E3C-DM5, E3C-DM5A
 2 mm (0.08 in) E3C-DM2R

5 cm (1.97 in) E3C-DS5W
 10 cm (3.94 in) E3C-DS10

See E3C Amplifiers

See E3C Amplifiers

See E3C Amplifiers

See E3C Amplifiers

See E3C Amplifiers

See E3C Amplifiers

See E3C Amplifiers

See E3C Amplifiers

—

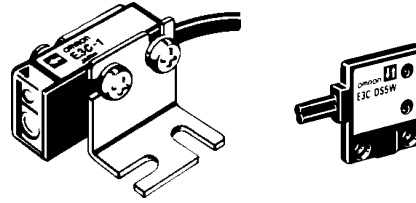
See E3C Amplifiers

Plastic

Diecast metal (E3C-2) or plastic (all others)

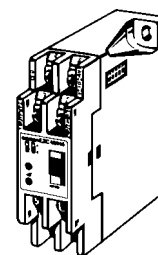
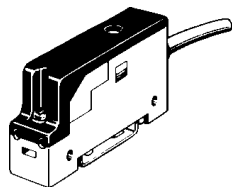
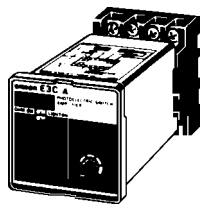
IP66 (E3C-□□□A); IP64 (all others)

IP50 (E3C-□□□W), IP66 (E3C-1, -2), IP64 all others



page 241

MODEL		E3C (through beam/diffuse reflective)								
Dimensions		<table border="0"> <tr> <td>E3C-1</td> <td>E3C-DS5W</td> </tr> <tr> <td>15 H x 10 W</td> <td>19.5 H x 2.8 W</td> </tr> <tr> <td>x 28 D mm</td> <td>x 18 D mm</td> </tr> <tr> <td>(0.59 x 0.39 x 1.10 in)</td> <td>(0.77 x 0.11 x 0.71 in)</td> </tr> </table>	E3C-1	E3C-DS5W	15 H x 10 W	19.5 H x 2.8 W	x 28 D mm	x 18 D mm	(0.59 x 0.39 x 1.10 in)	(0.77 x 0.11 x 0.71 in)
E3C-1	E3C-DS5W									
15 H x 10 W	19.5 H x 2.8 W									
x 28 D mm	x 18 D mm									
(0.59 x 0.39 x 1.10 in)	(0.77 x 0.11 x 0.71 in)									
Application		Space-confined installation								
Amplifier Type		Separate amplifier								
Features		<ul style="list-style-type: none"> ■ Miniature sensing heads fit in space confined areas ■ Separate amplifiers allow remote sensitivity adjustment when the sensing head is not accessible ■ Many amplifiers available, including AC and DC, with or without timing functions, prewired or socket-mount types ■ Ideal for long-term maintenance with sensing heads and amplifiers that are interchangeable ■ All offer selectable Light-ON/Dark-ON operation ■ All sensors have Power On indicators ■ Prewired amplifiers provide fine sensitivity adjustment and an alarm output for deteriorating sensing conditions 								
Detection Method and Sensing Distances	Through-beam Type	1 m (3.28 ft) E3C-1 2 m (6.56 ft) E3C-2								
	Diffuse Reflective	5 cm (1.97 in) E3C-DS5W 10 cm (3.94 in) E3C-DS10								
	Supply Voltage	See E3C Amplifiers								
Control Outputs	AC	See E3C Amplifiers								
	DC	See E3C Amplifiers								
Alarm		See E3C Amplifiers								
Response Time		See E3C Amplifiers								
Materials		Diecast metal (E3C-2) or plastic (all others)								
Enclosure Rating		IP50 (E3C-□□□W), IP66 (E3C-1, -2), IP64 all others								



page 241

E3C Amplifiers

E3C-A, E3C-C
48 H x 48 W
x 113.5 D mm
(1.89 x 1.89 x 4.47 in)

E3C-J□4P
30 H x 14 W
x 60 D mm
(1.18 x 0.55 x 2.36 in)

E3C-GE4
27.2 H x 20.7 W
x 35.5 D mm
(1.07 x 0.82 x 1.40 in)

E3C-WH4F
75 H x 22.5 W
x 80 D mm
(2.95 x 0.89 x 3.15 in)

Space-confined installation

—

- Slim prewired DC amplifier (E3C-J□4P) saves mounting space and provides fine sensitivity adjustment, alarm output for unstable switching conditions such as sensor misalignment or dust contamination, and a 40 ms OFF-delay for programmable controller input
- 1/16 DIN size socket mount amplifiers (E3C-A, E3C-C) provide both AC and DC outputs
- E3C-C offers built-in timing functions including ON-delay, OFF-delay and one-shot with 0.1 to 10 second timing range
- Track-mount amplifier E3C-WH4F is designed for direct connection to S3D8 sensor controller
- All offer selectable Light-ON/Dark-ON operation

Use any E3C sensing head with these amplifiers

Use any E3C sensing head with these amplifiers

100 to 240 VAC, 50/60 Hz (E3C-A, -C)
12 to 24 VDC (E3C-GE4, -J□4P, -WH4F)

SPDT relay, 1 A 240 VAC (E3C-A, -C)

Transistor, 80 mA, 1.5 to 4 mA constant current source, 24 VDC, (E3C-A, -C, -GE4)
Complementary NPN and PNP, 100 mA, 40 VDC (E3C-WH4F)
NPN, 100 mA max., 24 VDC (E3C-JC4P)
PNP, 100 mA max., 24 VDC (E3C-JB4P)

50 mA, 24 VDC (E3C-J□4P)

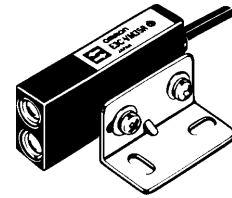
1 ms (E3C-J□4P)
1 or 2 ms, selectable (E3C-GE4, -WH4F, -A, -C)
20 ms relay (E3C-A, E3C-C)

Plastic

IP50 (E3C-J□4P), IP20 all others

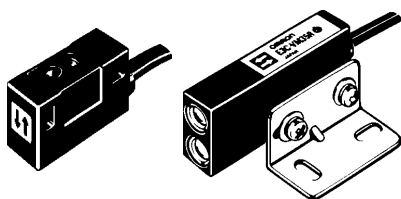


page 259

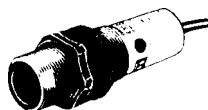


page 263

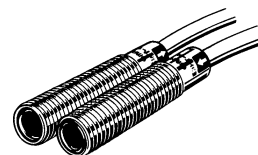
MODEL	E3C-L (convergent beam)	E3C-V (convergent beam)
Dimensions	38 H x 10 W x 18 D mm (1.50 x 0.39 x 0.71 in)	20 H x 10 W x 47 D mm (0.79 x 0.39 x 1.85 in)
Application	Background elimination	Spot sensing
Amplifier Type	Separate amplifier	Separate amplifier
Features	<ul style="list-style-type: none"> ■ Convergent beam lens arrangement eliminates background object in space-confined inspection and assembly applications ■ Separate amplifiers allow remote sensitivity adjustment when the sensing head is not accessible ■ Many amplifiers available, including AC and DC, with or without timing functions, prewired or socket-mount types ■ Prewired amplifiers provide fine sensitivity adjustment and an alarm output for deteriorating sensing conditions 	<ul style="list-style-type: none"> ■ Detect extremely small objects including 200 micron copper wire and IC chip parts, through narrow gaps in equipment ■ Inspect for color, texture or part orientation ■ Separate amplifiers allow remote sensitivity adjustment when the sensing head is not accessible ■ Many amplifiers available including AC and DC, with or without timing functions, prewired or socket-mount types ■ Prewired amplifiers provide fine sensitivity adjustment and an alarm output for deteriorating sensing conditions
Detection Method and Sensing Distances	Diffuse reflective: 3 cm ±0.3 (1.18 in) E3C-LS3R	Diffuse reflective: 2 to 8 cm (0.79 to 3.15 in) with 1 mm dia. spot (E3C-VM35R) 4 to 11 cm (1.57 to 4.33 in) with 2 mm dia. spot (E3C-VS7R)
Supply Voltage	See E3C Amplifiers	See E3C Amplifiers
Control Outputs	AC	See E3C Amplifiers
	DC	See E3C Amplifiers
Alarm	See E3C Amplifiers	See E3C Amplifiers
Response Time	See E3C Amplifiers	See E3C Amplifiers
Materials	Plastic	Plastic body, glass lens
Enclosure Rating	IP64	IP50



page 263

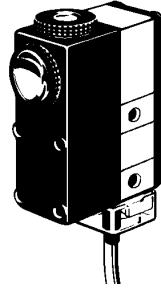


page 271

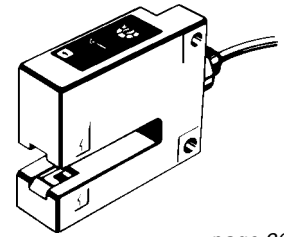


page 285

E3C-V (mark)	E3F2	E3HT
28 H x 10 W x 15 D mm (1.10 x 0.39 x 0.59 in)	18.5 dia. x 65 L mm (0.73 x 2.56 in)	8.5 dia. x 41.5 L mm (0.33 x 1.63 in)
20 H x 10 W x 47 D mm (0.79 x 0.39 x 1.85 in)		
Mark sensing	—	—
Separate amplifier	—	—
<ul style="list-style-type: none"> ■ Detect small marks on a variety of background colors ■ Ideal for packaging, sorting and labeling equipment ■ Small sensing heads fit space-confined installations ■ Separate amplifiers allow remote sensitivity adjustment when the sensing head is not accessible ■ Many amplifiers available, including AC and DC, with or without timing functions, prewired or socket-mount types ■ Prewired amplifiers provide fine sensitivity adjustment and an alarm output for deteriorating sensing conditions ■ Selectable Light-ON/Dark-ON operation 	<ul style="list-style-type: none"> ■ Easy-to-install M18 size threaded sensors with pre-wired cable ■ Diffuse reflective versions include fixed (10 cm) and adjustable (30 cm) versions ■ Watertight construction ■ Short-circuit and reverse polarity protected ■ Optional reflectors in various sizes available ■ Optional lens protector available ■ Light-ON, Dark-ON operation 	<ul style="list-style-type: none"> ■ Small M8 size threaded sensor ideal for space-confined installation ■ Cost-effective device for general detection
Diffuse reflective: 1 cm (0.39 in), green LED (E3C-VS1G) with 1 mm mark 3 cm (1.18 in), red LED (E3C-VS3R) with 2 mm mark 3.5 cm (1.38 in), red LED (E3C-VM35R) with 2 mm mark 7 cm (2.76 in), red LED (E3C-VS7R) with 2 mm mark	Through beam type: 3 m (9.84 ft) Retroreflective (with and without reflector): 2 m (6.56 ft) Diffuse reflective: 10 cm (3.94 in) or 30 cm (11.8 in)	Through beam type: 1 m (3.28 ft) E3HT-1E□ Diffuse reflective: 3.5 cm (1.38 in) E3HT-DS3E□
See E3C Amplifiers	10 to 30 VDC	12 to 24 VDC
See E3C Amplifiers	—	—
See E3C Amplifiers	NPN open collector (E3F2-□□C4-□) PNP open collector (E3F2-□□B4-□)	NPN, 80 mA with 1.5 to 3 mA constant current source
See E3C Amplifiers	—	—
See E3C Amplifiers	2.5 ms max.	5 ms max. (separate type) 3 ms max. (diffuse type)
Plastic	Plastic housing	Nickel-plated brass body
IP64 (E3C-VS1G, -VS3R) IP50 (E3C-VM35R, -VS7R)	NEMA 1, 2, 4X, 12 IP66 and 67	IP66

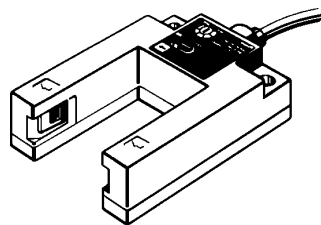


page 291

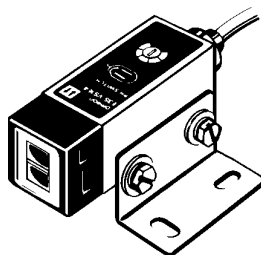


page 305

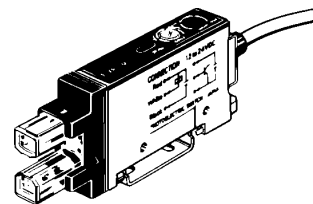
MODEL	E3ML (color mark)	E3S-GS1 (grooved head)	
Dimensions	94 H x 30.6 W x 62.4 D mm (3.70 x 1.21 x 2.46 in)	52 H x 20 W x 73 D mm (20.5 x 0.79 x 2.87 in)	
Application	Color registration mark detection	Mark sensing, edge sensing	
Amplifier Type	Built-in amplifier, optional controller	Built-in amplifier	
Features	<ul style="list-style-type: none"> ■ Ultra-fast 20 microsecond response time ■ Ideal for color registration mark detection in printing, labeling and packaging equipment ■ 99-step sensitivity adjustment and incandescent light source assure accurate detection of fine color differences ■ Fiber-optic versions available for sensing in confined spaces ■ Optional controller provides power source for lamp and switch circuit as well as timing and logic functions ■ Switch selectable timing functions include ON-delay, OFF-delay and one-shot and latch 	<ul style="list-style-type: none"> ■ Fast response time, ideal for packaging applications ■ 1 cm groove type detects marks on transparent film ■ Pre-aligned emitter and receiver simplifies installation ■ Wire selectable Light-ON/ Dark-ON operation ■ Sensitivity adjuster and stability indicator allow fine tuning of sensor to application 	
Detection Method and Sensing Distances	Diffuse reflective: 8 mm (0.32 in) E3ML-M8□4-G 20 mm (0.79 in) E3ML-S2□4-G Fiber-optic amplifier E3ML-X□4-G with cables below: Separate type: 10 mm (0.39 in) E32-TB50 Diffuse reflective: 0.5 mm (0.02 in) E23-DB8 1.2 mm (0.05 in) E32-DB50	Through-beam type mounted in a grooved head: 1 cm (0.39 in) E3S-GS1□4, green LED	
Supply Voltage	Sensor: 10 to 30 VDC Lamp: 4.5 VAC Controller: 120 VAC 50/60 Hz	12 to 24 VDC	
Control Outputs	AC	Controller: SPDT, 3 A 240 VAC (S3M-L10-US-AC120)	—
	DC	Sensor: NPN, 80 mA, 30 VDC (E3ML-□□E4-G) PNP, 80 mA, 30 VDC (E3ML-□□F4-G) Controller: NPN, 80 mA, 30 VDC (S3M-L10-US-AC120)	NPN, 80 mA, 1.5 to 4 mA constant current source, 24 VDC (E3S-GS□E4) PNP, 100 mA, 24 VDC (E3S-GS□B4)
	Alarm	—	—
Response Time	20 μs max. (solid-state output) 15 ms max. (contact output)	1 ms max.	
Materials	Sensor: Diecast metal body, glass lens Controller: Plastic body	Plastic body, lens (E3S-GS1)	
Enclosure Rating	IP67 (sensor) IP22 (controller)	IP65 (E3S-GS1)	



page 305

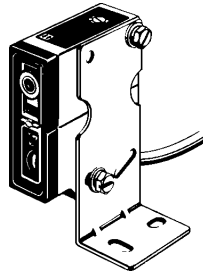


page 309

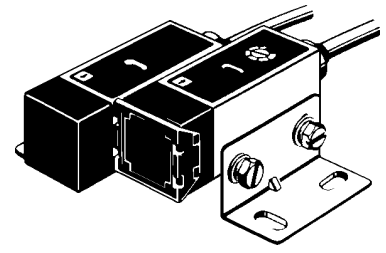


page 315

E3S-GS3 (grooved head)	E3S-VS (mark)	E3XR-GM5 (grooved head)
20 H x 52 W x 93.6 D mm (0.79 x 2.05 x 3.29 in)	23 H x 20.4 W x 66.6 D mm (0.91 x 0.80 x 2.62 in)	28.4 H x 12 W x 75.2 D mm (1.12 x 0.47 x 2.96 in)
Edge sensing, label counting	Mark sensing	Mark sensing, counting labels
Built-in amplifier	Built-in amplifier	Built-in amplifier
<ul style="list-style-type: none"> ■ Fast response time, ideal for packaging applications ■ 3 cm groove type detects edges and labels ■ Pre-aligned emitter and receiver simplifies installation ■ Wire selectable Light-ON/Dark-ON operation ■ Sensitivity adjuster and stability indicator allow fine tuning of sensor to application 	<ul style="list-style-type: none"> ■ Accurately detects register marks against different colored backgrounds ■ Choose red or green light source to detect most mark and background color combinations ■ Vertical and horizontal mounting styles ■ Wire selectable Light-ON/Dark-ON operation ■ Sensitivity adjuster and stability indicator allow fine tuning of sensor to application 	<ul style="list-style-type: none"> ■ Fast response time, ideal for high-speed packaging applications ■ Choose red or green light source ■ Slim, track-mount sensor saves space ■ Easy to install, emitter and receiver are already correctly aligned ■ Light-ON/Dark-ON operation, switch selectable ■ Sensitivity adjuster and stability indicator allow fine tuning of sensor to application ■ Ideal for edge detection
Through-beam type mounted in a grooved head: 3 cm (1.18 in) E3S-GS3□4, red LED	Diffuse reflective: 1.2 cm (0.47 in) with 2 mm mark, green LED (E3S-VS1□4□) 3.5 cm (1.40 in) with 3 mm mark, red LED (E3S-VS3□42G) 5 cm (1.97 in) with 3 mm mark, red LED (E3S-VS5□42R)	Through beam type mounted in a grooved head: 5 mm (0.20 in) groove width
12 to 24 VDC	12 to 24 VDC	12 to 24 VDC
—	—	—
NPN, 80 mA, 1.5 to 4 mA constant current source, 24 VDC (E3S-GS□E4) PNP, 100 mA, 24 VDC (E3S-GS□B4)	NPN, 80 mA, 1.5 to 4 mA constant current source, 24 VDC (E3S-VS□E□□) PNP, 100 mA, 24 VDC (E3S-VS□B□□)	NPN, 80 mA, 1.5 to 4 mA constant current source, 24 VDC (E3XR-GM5□E4) PNP, 100 mA, 24 VDC (E3XR-GM5□B4)
—	—	—
1 ms max.	1 ms max.	0.5 ms max. (red LED) E3XR-GM5R□□ 1 ms max. (green LED) E3XR-GM5G□□
Diecast metal body, plastic lens (E3S-GS3)	Diecast metal body, plastic lens	Plastic
IP67 (E3S-GS3)	IP67	IP65

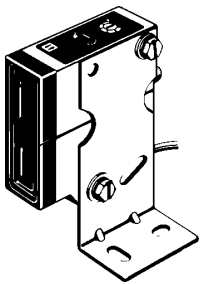


page 321

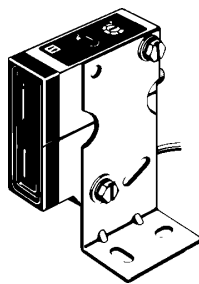


page 321

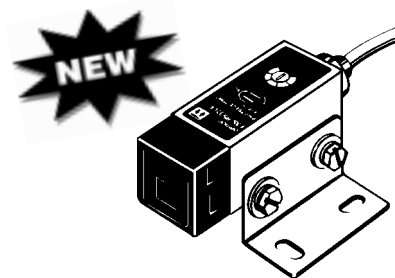
MODEL	E3L-DS50E4-50 (convergent beam)	E3L-2E4-50 (through-beam)
Dimensions	55 H x 17 W x 50 D mm (2.17 x 0.67 x 1.97 in)	20.4 H x 23 W x 55 D mm (0.80 x 0.91 x 2.17 in)
Application	Spot sensing	Minute objects at long distance
Amplifier Type	Built-in amplifier	Built-in amplifier
Features	<ul style="list-style-type: none"> ■ Laser beam provides long distance spot sensing and accurate positioning output ■ Accurately detects tiny 2 mm objects over long distances (to 50 cm) ■ FDA/IEC Class 1 laser requires no additional protective equipment ■ Sensitivity adjuster and operating stability indicator allow fine tuning to match installation ■ Alarm output signals deteriorating detection conditions ■ Automatic power control circuit maintains stable light emission levels 	<ul style="list-style-type: none"> ■ Detect very small objects up to 2 m (6.56 ft) away with highly accurate positioning ■ Apertures allow detection of objects from 0.1 to 0.5 mm diameter ■ FDA/IEC Class 1 laser requires no additional protective equipment ■ Sensitivity adjuster and operating stability indicator allow fine tuning to match installation ■ Alarm output signals deteriorating detection conditions ■ Automatic power control circuit maintains stable light emission levels
Detection Method and Sensing Distances	Diffuse reflective: 20 to 50 cm (7.9 to 19.7 in) with 2 x 2 mm object	Through-beam type: 2 m (6.56 ft) with 0.85 mm aperture using 0.5 mm dia. object 20 cm (7.9 in) with 0.1 mm aperture using 0.1 mm dia. object
Supply Voltage	12 to 24 VDC	12 to 24 VDC
Control Outputs	AC	—
	DC	NPN, 80 mA, 1.5 to 3 mA constant current source, 24 VDC
Alarm	NPN, 50 mA, 24 VDC	NPN, 50 mA, 24 VDC
Response Time	3 ms max.	1 ms max.
Materials	Diecast metal body, plastic lens	Diecast metal body, plastic lens
Enclosure Rating	IP67	IP67



page 329

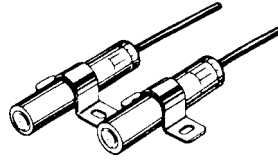


page 329

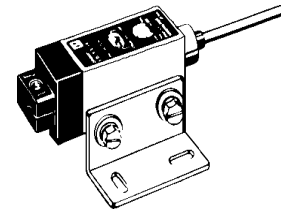


page 337

E3S-LS20X□4 (diffuse reflective)	E3S-LS10X□4 (specular reflective)	E3S-R (retroreflective)
55 H x 17 W x 56 D mm (2.17 x 0.67 x 2.20 in)	55 H x 17 W x 56 D mm (2.17 x 0.67 x 2.20 in)	Metal: 23 H x 20.4 W x 66.6 D mm (0.91 x 0.80 x 2.62 in) Plastic: 21 H x 12.4 W x 40 W (0.83 x 0.49 x 1.57 in)
Background elimination, adjustable range	Focal point sensing, adjustable	Clear bottle detection
Built-in amplifier	Built-in amplifier	Built-in amplifier
<ul style="list-style-type: none"> ■ Manually adjustable sensing range provides background elimination over a wide area ■ Less influenced by object color or surface conditions ■ Sensitivity adjuster and operating stability indicator allow fine tuning to match installation ■ Wire selectable Light-ON/ Dark-ON operation ■ Fast response time ■ Built-in amplifier, prewired for easy installation 	<ul style="list-style-type: none"> ■ Detect small objects down to 0.6 mm, screw threads, holes, level, height and marks ■ Inspect for slight surface irregularities ■ Manually adjustable optics set the spot distance ■ Sensitivity adjuster and operating stability indicator allows fine tuning to match installation ■ Wire selectable Light-ON/ Dark-ON operation ■ Fast response time ■ Built-in amplifier, prewired for easy installation 	<ul style="list-style-type: none"> ■ Detects clear glass and plastic bottles without false signals ■ Fast response time ideal for high-speed packaging equipment ■ Wire selectable Light-ON/ Dark-ON operation ■ Sensitivity adjuster and stability indicator allow fine-tuning of sensor to application ■ Choose vertical or horizontal mounting styles ■ Connector versions available ■ Metal or plastic body
Diffuse reflective: 5 to 25 cm (1.97 to 9.84 in) adjustable	Diffuse reflective: 3 to 10 cm (1.18 to 3.94 in) adjustable	Retroreflective: Metal: 30 cm (11.81 in) E3S-RS30□4-30 1 m (3.28 ft) E3S-R1□4□ Plastic: 30 cm (11.81 in) E3S-R□2, E3S-R□7; 1 m (3.28 ft) E3S-R□1, E3S-R□7
12 to 24 VDC	12 to 24 VDC	12 to 24 VDC
—	—	—
NPN, 80 mA, 1.5 to 3 mA constant current source, 24 VDC (E3S-LS20XE4) PNP, 100 mA, 24 VDC (E3S-LS20XB4)	NPN, 80 mA, 1.5 to 3 mA constant current source, 24 VDC (E3S-LS10XE4) PNP, 100 mA, 24 VDC (E3S-LS10XB4)	NPN, 80 mA, 1.5 to 4 mA constant current source, 24 VDC (E3S-R□□□E4-□□), E3S-R□1, E3S-R□6 PNP, 100 mA, 24 VDC (E3S-R□□□B4-□□), E3S-R□2, E3S-R□7
—	—	—
1 ms max.	1 ms max.	1 ms max.
Diecast metal body, plastic lens	Diecast metal body, plastic lens	Metal: Zinc diecast metal body Plastic: Polybutylene
IP67	IP67	IP67

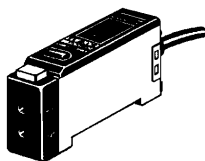


page 353

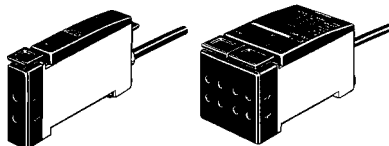


page 407

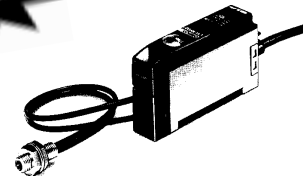
MODEL	E3HQ	E3S-X3 (fiber-optic amplifier)
Dimensions	10 Dia 51.7 L mm (0.39 x 2.04 in)	23 H x 20 W x 70.5 D mm (0.91 x 0.79 x 2.78 in)
Application	Harsh environment	All E32-Series cables
Amplifier Type	Built-in amplifier	Built-in DC amplifier
Features	<ul style="list-style-type: none"> ■ Teflon housing and cable protect sensor against harsh chemicals ■ 10 mm housing fits in tight spots ■ Built-in amplifier allows direct connection of sensor to interface ■ Stainless steel bracket provides simple, secure mounting ■ NEMA 4X, IP67 rated ■ Wide selection of timing options 	<ul style="list-style-type: none"> ■ Compact amplifier has a rugged metal housing ■ Fast response time ■ Wire selectable Light-ON/ Dark-ON operation ■ Enhanced mutual interference protection allows side-by-side mounting of sensing heads ■ Sensitivity adjuster and stability indication allow fine-tuning of sensor to the application ■ Light source: Red LED
Detection Method and Sensing Distances	Through-beam type: 80 cm (2.62 ft.)	—
Supply Voltage	12 to 24 VDC	12 to 24 VDC
Control Outputs	AC	—
	DC	NPN, transistor output with constant current source
Alarm	—	—
Response Time	5 ms max.	1 ms max.
Materials	Teflon coated sensor and cable	Diecast metal
Enclosure Rating	NEMA 1, 3, 4x, 6, 12; IP67	IP66



page 411



page 443



page 455

E3X	E3X-N	E3X-NV/NVG
30 H x 12 W x 59 D mm (1.18 x 0.47 x 2.32 in)	Single channel 33 H x 10 W x 59 L mm (1.30 x 0.39 x 2.32 in)	Four-channel 33 H x 32.2 W x 59 L mm (1.30 x 1.27 x 2.32 in)
All E32-Series cables	All E32-Series cables	All E32-Series cables
Built-in DC amplifier	Built-in DC amplifier	Built-in DC amplifier
<ul style="list-style-type: none"> ■ Slim amplifier offers fast 200 ms response time and 20 μs high-speed response model ■ Choose red or green light source for mark detection ■ Adjustable 0.01 to 0.1 sec. OFF-delay timer models available ■ Self-diagnostic models have alarm output for unstable sensing conditions, check input for receiver operation ■ Easy alignment with blinking light source set up mode ■ Light source: Red LED (E3X-A, E3X-F) Green LED (E3X-VG) 	<ul style="list-style-type: none"> ■ Sensing distance is up to 100% longer than standard amplifiers ■ Choose either single channel or four-channel models ■ TEACH features simplify set-up ■ Four amplifiers in a single housing (E3X-NM) saves space and wiring ■ Uses all E32 fiber series cables ■ Four cables can be mounted directly next to each other without mutual interference ■ Pushbutton mounting and sensitivity adjustment ■ Light source: Pulse modulated Red LED 	<ul style="list-style-type: none"> ■ Green and red LED light sources available ■ Has TEACH function ■ IP66 ■ Uses all B32 fiber series cables ■ Light source: Red LED (680 nm): NV Green LED (565 nm): NVG
—	—	—
10 to 30 VDC, E3X-A, VG 12 to 24 VDC, E3X-F	12 to 24 VDC	12 to 24 VDC
—	—	—
NPN, 100 mA, 30 VDC, A, F NPN, 100 mA, 40 VDC, VG PNP, 100 mA, 30 VDC, A, F PNP, 100 mA, 40 VDC, VG	NPN open collector, PNP open collector 100 mA, 30 VDC	NPN, open collector 100 mA load current
NPN, 50 mA, 30 VDC, -A21, 51 NPN, 50 mA, 30 VDC, -F21, 51 PNP, 50 mA, 40 VDC, E3X-VG, 21	—	—
200 ms E3X-A, VG 20 μs E3X-F	5 ms max at rated detection distance	500 μs max
Plastic	PBT plastic, Cover: Polycarbonate	PBT plastic, cover polycarbonate
IP66	IP50 (with cover on)	IP66

FIBER-OPTIC PHOTOELECTRIC CABLES

An incredible variety of E32-series fiber-optic cables are available for Omron amplifiers. A wide range of problem-solving accessories enhance the performance of fiber-optic cables. Here are some helpful considerations.

Method of detection

Through-beam type fiber-optic cables detect opaque objects that break the beam; they require mounting space for separate emitter and receiver sensing heads. Diffuse reflective fiber-optic cables reflect the light off the object to be detected. Reflective sensors deliver and receive the light in a single sensing head, however, detecting distance is reduced.

Space-confined installations

Fiber-optic sensors fit where nothing else will, but "hard-to-reach" takes many different forms. Most plastic fiber-optic cables can be cut to custom length in the field from the original 2-meter (6.56 ft) length. When threaded heads are too big to reach the detection site, consider a cable with bendable steel tubing. They can retain complex shapes and are ideal for multiple sensor inspections of minute assemblies and parts.

Long distances

If you need to extend the sensing distance of through-beam type cables, use the optional lens kit to increase by seven times the distance between emitter and receiver.

Small objects

Thinner fiber-optic cables allow detection of small objects. Needle probes may also be chosen to detect objects as small as 0.0006 inch passing flush by the fiber-optic cable lens. Side view accessories and "periscope" type needle probes provide space-efficient ways to do right angle detection.

Shiny objects

Accurate positioning for highly polished, reflective surfaces is easily achieved by using a convergent beam sensing arrangement. Omron offers cables terminated in a block, with fixed emitter and receiver mounted at a right angle, for a narrow detection zone. A convergent beam mounting accessory, for cables terminated in threaded heads, allows the angle to be adjusted for proper detection.

Protective armor

Installations that may expose the fiber-optic cables to physical damage call for protective armor. Omron offers economical armored glass cables as well as slip-on armor sheaths for plastic fiber-optic cables.

Hot environments

Most Omron fiber-optic cables tolerate temperatures from -40° to 70° C (-40° to 158° F). To detect hot parts coming out of thermoforming equipment, ovens and other high-temperature environments, choose plastic sheathed cables for temperatures to 150° C (300° F) or armored glass cables for 400° C (750° F).

Coiled cables for flexing equipment

Fiber-optic cables with a retractable coiled section are ideally suited for robot arms and other flexing equipment. They are available in both through-beam and diffuse reflective types, with and without bend-to-shape steel tubing.

Which amplifier to use

The table on the next page shows that Omron's fiber-optic cables are almost universally compatible with the full range of amplifiers.

FIBER-OPTIC CABLE	AMPLIFIERS		
PART NUMBER	E3X, E3X-N, E3XR, E3S-X3	E3A2-X	E3XA
Standard sensing head, through-beam types			
E32-TC50	•	•	•
E32-TC200	•	•	•
E32-TC500	•	•	•
E32-TC200A	•	•	•
E32-TC200C	•	•	—
E32-TC200E	•	—	•
E32-TC1000	•	•	•
E32-T11	•	•	•
E32-T11L	•	•	•
E32-T12L	•	•	•
E32-T17L	•	•	•
E32-T21	•	—	•
E32-T21L	•	—	•
E32-T22	•	—	•
E32-T22L	•	—	•
E32-UTAT1-3F	•	•	•
E32-UTAT1-6F	•	•	•
Standard sensing head, diffuse reflective type			
E32-DC50	•	•	•
E32-DC200	•	•	•
E32-DC500	•	•	•
E32-DC1000	•	•	•
E32-CC200	•	•	•
E32-DC200C	•	•	—
E32-DC200E	•	—	•
E32-D11	•	•	•
E32-D11L	•	•	•
E32-D21	•	—	•
E32-D21L	•	•	•
E32-D22L	•	—	•
E32-D32	•	—	•
E32-D32L	•	•	•
E32-UDAT1-3F	•	•	•
E32-UDAT1-6F	•	•	•
Probe sensing head, through-beam types			
E32-TC200B	•	•	•
E32-TC200B4	•	•	•
E32-TC200D	•	•	—
E32-TC200D4	•	•	—
E32-TC200F	•	—	•
E32-TC200F4	•	—	•
E32-T33-1	•	•	•

FIBER-OPTIC CABLE	AMPLIFIERS		
PART NUMBER	E3X, E3X-N, E3XR, E3S-X3	E3A2-X	E3XA
Probe sensing head, diffuse reflective types			
E32-DC200B	•	•	•
E32-DC200B4	•	•	•
E32-DC200D	•	•	—
E32-DC200D4	•	•	—
E32-DC200F	•	—	•
E32-DC200F4	•	—	•
E32-DC33	•	—	•
E32-DC9G	•	—	•
E32-DC9G4	•	—	•
Side sensing, through-beam type			
E32-T14	•	•	•
E32-T14L	•	•	•
E32-T16	•	•	•
E32-T16P	•	•	•
E32-T24	•	•	•
Side sensing, diffuse reflective type			
E32-D14L	•	•	•
E32-D24	•	—	•
High-temperature, through-beam type			
E32-T51	•	•	•
E32-T61	•	—	•
High-temperature, diffuse reflective type			
E32-D51	•	•	•
E32-D61	•	—	•
E32-D73	•	—	•
Special purpose type			
E32-D12F	•	•	•
E32-G14	•	•	•
E32-L25	•	•	•
E32-L25A	•	•	•
E32-L25L	•	•	•
E32-L24L	•	•	•
E32-M21	•	•	•
E32-T12F	•	•	•
E32-T22S	•	•	•
E32-T24S	•	•	•
Retroreflective type			
E32-R16	•	•	•
E32-R21	•	•	•

Legend: • = OK — = Not Applicable