

Special-Purpose Photoelectric Sensor

E3C-L

Miniature Convergent Beam Sensor With Separate Amplifier

- Ignores background objects to prevent false signaling in inspection and mark detection applications
- Fast, 1 ms response time
- Prewired with 2 m (6.56 ft) cable
- Choose AC or DC amplifiers
- Amplifier with built-in ON-, OFF- and one-shot timer functions available
- Prewired DC amplifiers offer fine sensitivity adjustment and diagnostic alarm output







Ordering Information

■ SENSORS

Part number	E3C-LS3R
Method of detection	Convergent beam diffuse reflective
Application	Mark detection and parts inspection
Sensing distance	3 ± 0.3 cm (1.18 ± 0.118 in)
Light source	Red LED (680 nm)

■ AMPLIFIERS

Part number	E3C-A	E3C-C	E3C-WH4F	E3C-GE4	E3C-GF4	E3C-JC4P	E3C-JB4P
Description	 Fits 1/16 DIN panel cutout		 For S3D8 Controller	 Miniature		 Slim, prewired	
Supply voltage	100 to 240 VAC, 50/60 Hz		12 to 24 VDC				
Output	Relay and NPN solid-state		NPN and PNP solid-state	NPN solid-state	PNP solid-state	NPN	PNP
Timer functions	—	ON-delay OFF-delay One-shot	—	—		40 ms OFF-delay	
Mounting style	Socket (included)		Track	Socket Track (order separately)			

■ ACCESSORIES

Description		Part number
Mounting bracket for sensor		E39-L41
Sockets required for E3C-GE4 amplifier	Bottom surface mount socket	PYF08M
	Combination bottom surface and track-mount socket	PYF08A-E
Mounting track	DIN rail, 50 cm (1.64 ft) length	PFP-50N
	DIN rail, 1 m (3.28 ft) length	PFP-100N
	End plate	PFP-M
	Spacer	PFP-S

■ REPLACEMENT PARTS

Description	Part number
Track-mount socket for E3C-A and E3C-C amplifiers	PF113A-E

Specifications

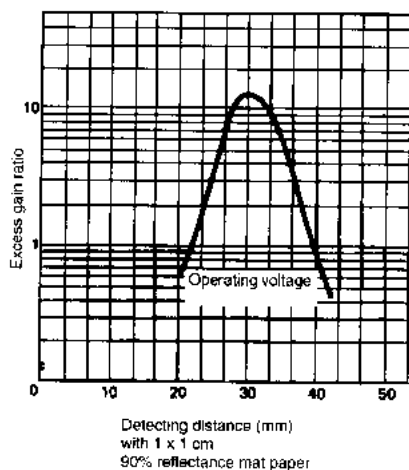
Part number		E3C-LS3R
Method of detection		Convergent beam diffuse reflective
Sensing distance		3 ±0.3 cm (1.18 ±0.118 in) with 1 x 1 cm (0.39 x 0.39 in) 90% reflectance mat paper
Light source		Pluse modulated red LED (680 nm)
Detectable object type		Opaque objects
Required amplifier		E3C-A, E3C-C, E3C-GE4, E3C-GF4, E3C-JC4P, E3C-JB4P, E3C-WH4F
Mutual interference protection		Provided
Indicators		Light incident (red LED)
Materials	Lens	Plastic
	Case	Plastic
	Cable sheath	Plastic, polyethylene
Mounting		Side surface with two through holes; Bracket E39-L41 optional. See Accessories
Connections	Prewired	4-conductor cable, 2 m (6.56 ft) length
Weight		55 g (1.9 oz.)
Enclosure ratings	NEMA	1, 2, 12
	IEC 144	IP64
Approvals	UL	Recognized
	CSA	—
Ambient temperature	Operating	-25° to 70°C (-13° to 158°F)
	Storage	-25° to 70°C (-13° to 158°F)

■ AMPLIFIERS

Refer to the E3C data sheet for details about output circuit diagrams, amplifier connections and operation.

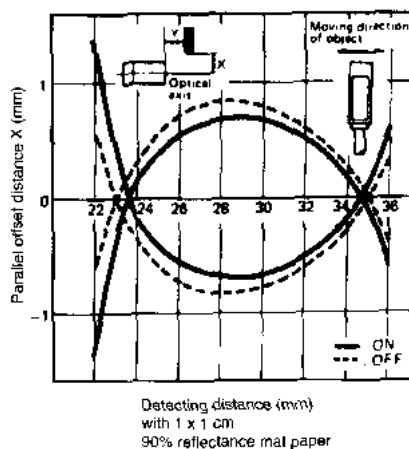
Engineering Data

■ EXCESS GAIN RATIO

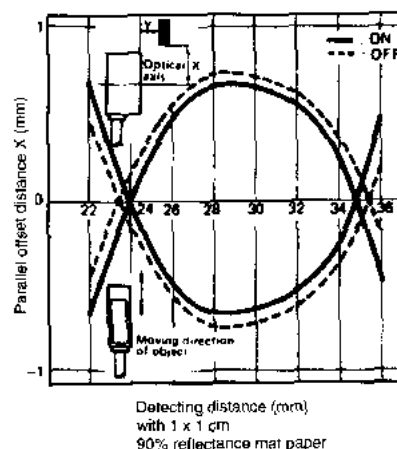


■ OPERATING RANGE

E3C-LS3R (Example 1)



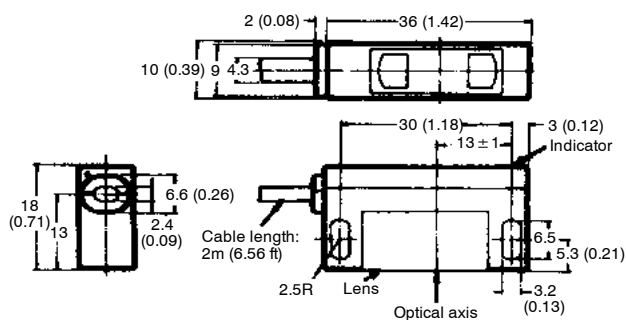
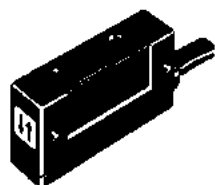
E3C-LS3R (Example 2)



Dimensions

Unit: mm (inch)

■ SENSORS



■ AMPLIFIERS, SOCKETS, MOUNTING TRACK

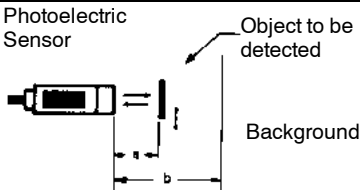


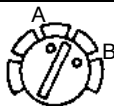
Refer to the E3C data sheet for dimensions of amplifiers, sockets, mounting track and accessories.

Operation

■ SENSITIVITY ADJUSTMENT

Select the proper sensitivity adjustment method based on the conditions listed in the table. Both methods assume the amplifier is set to DARK-ON operation mode.

Conditions	The reflection factor of the object to be detected is equal to, or higher than, that of the background object.	The reflection factor of the object to be detected is lower than that of the background object.
Adjustment method	Use Method 1.	Use Method 2.

Distance between sensor and object	Sensitivity adjuster positions		
 <p>Photoelectric Sensor</p> <p>Object to be detected</p> <p>Background</p> <p>a</p> <p>b</p>	 <p>Reference point A</p>	 <p>Reference point B</p>	 <p>Optimum setting between A and B</p>

Adjustment Method 1

- Set distance "A" between the sensor and the object to be detected to 30 mm (1.18 in)
- Set the sensitivity adjuster to the MAXIMUM position (fully clockwise) and check that both the STABILITY and LIGHT indicators of the amplifier unit light. If both indicators do not light, move the sensor back and forth within the range of 2 to 3 mm (0.079 to 0.118 in) until the indicators light.
- Remove the object to be detected and gradually turn the sensitivity adjuster counterclockwise toward MINIMUM position to find the point where the LIGHT and STABILITY indicators change from lit to dark. Assume this is reference point "B" on the sensitivity adjuster.
- Place the object to be detected in position.
- Gradually turn the sensitivity adjuster further counterclockwise toward MINIMUM position to find a point where the LIGHT and STABILITY indicators change from lit to dark. Assume this is reference point "A" on the sensitivity adjuster.
- Set the sensitivity adjuster between reference points "A" and "B" for the optimum sensitivity adjustment. Finally, confirm that the LIGHT and STABILITY indicators operate as shown in the table at the right.

Sensing condition	LIGHT indicator on amplifier	STABILITY indicator on amplifier
When the object to be detected is present	ON	ON
When only the background object is present, and the object to be detected is not present.	OFF	ON

Adjustment Method 2

- Set distance "B" between the sensor and the background object to 30 mm (1.18 in).
- Remove the object to be detected.
- Set the sensitivity adjuster to the MAXIMUM position (fully clockwise) and check that both the STABILITY and LIGHT indicators of the amplifier unit light. Gradually turn the sensitivity adjuster counterclockwise toward MINIMUM position to find the point where the LIGHT and STABILITY indicators change from lit to dark. ASSUME this is reference point "B" on the sensitivity adjuster.
- Place the object to be detected in position.
- Gradually turn the sensitivity adjuster further clockwise toward MINIMUM position to find a point where the LIGHT indicator changes from dark to lit, and the STABILITY indicator from lit to dark. Assume this is reference point "A" on the sensitivity adjuster.
- Set the sensitivity adjuster between reference points "A" and "B" for the optimum sensitivity adjustment. Finally, confirm that the LIGHT and STABILITY indicators operate as shown in the table at the right.

Sensing condition	LIGHT indicator on amplifier	STABILITY indicator on amplifier
When the object to be detected is present	OFF	ON
When only the background object is present, and the object to be detected is not present.	ON	ON

NOTE: DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters to inches divide by 25.4.

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