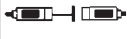







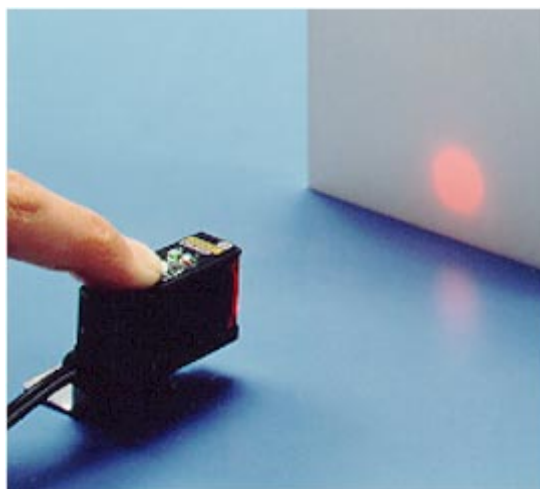
Sensing distance			Supply voltage	Output
			12 to 24 VDC	
2, 5 m	2 m	10, 30 cm		80 mA

# Photoelectric Sensor



# E3S

## General-purpose Miniature Sensors

- Short response time: 3 ms.
- Easy adjustment of sensitivity and optical axis with STABILITY and LIGHT indicators.
- Wire-selectable operation mode.
- Mutual interference protective circuit eliminates cross talk (reflective sensor only).



## Ordering Information

Appearance	Sensing method	Sensing distance	Model	
			NPN output	PNP output
<b>Horizontal</b> 	Through-beam (separate)	2 m	E3S-2E4	E3S-2B4
		5 m	E3S-5E4 E3S-5E4S E3S-5E4S1	E3S-5B4 E3S-5B4S
	Retroreflective	2 m	E3S-R2E4	E3S-R2B4
	Diffuse reflective	10 cm	E3S-DS10E4	E3S-DS10B4
		30 cm	E3S-DS30E4 E3S-DS30E4S E3S-DS30E4S1	E3S-DS30B4 E3S-DS30B4S
<b>Vertical</b> 	Through-beam (separate)	2 m	E3S-2E41	E3S-2B41
		5 m	E3S-5E41	E3S-5B41
	Retroreflective	2 m	E3S-R2E41	E3S-R2B41
	Diffuse reflective	10 cm	E3S-DS10E41	E3S-DS10B41
		30 cm	E3S-DS30E41	E3S-DS30B41

# Specifications

## ■ Ratings/Characteristics

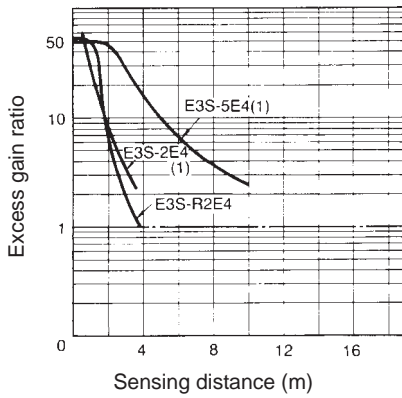
Item		E3S-2□□	E3S-5□□	E3S-R2□□	E3S-DS10□□
Power supply voltage		12 VDC -10% to 24 VDC +10%, ripple (p-p): 10% max.			
Current consumption		50 mA max.		40 mA max.	
Sensing distance		2 m	5 m	0.1 to 2 m (with E39-R1 reflector)	10 cm
Differential travel		---			20% max. of sensing distance
Standard objects		Opaque (7 mm)	Opaque (11 mm)	Opaque (30 mm)	5 x 5 cm white mat paper
Control output	DC solid-state	Load		Load current: Models with suffix -E4: 80 mA max. Models with suffix -B4: 100 mA max.	
		Voltage output		2 V max.	
Response time (ON, OFF)		3 ms max.		1 ms max.	
Operation mode		Wire-selectable			
Indicators		Light indicator (red), stability indicator (green)			
Enclosure rating	IEC 144	IP65	IP67	IP65	
	NEMA	1, 2, 12	1, 3, 4X, 6, 12	1, 2, 12	
Housing material		Plastic	Metal	Plastic	
Light source		Infrared LED			
Ambient temperature		Operating: -25 to 55 °C			

Item		E3S-DS30□□	E3S-5□4S(1)	E3S-DS30□4S(1)
Power supply voltage		12 VDC -10% to 24 VDC +10%, ripple (p-p): 10% max.		
Current consumption		40 mA max.	70 mA max.	
Sensing distance		30 cm	5 m	30 cm
Differential travel		20% max. of sensing distance	---	20% max. of sensing distance
Standard objects		10 x 10 cm white mat paper	Opaque (11 mm)	10 x 10 cm white mat paper
Control output	DC solid-state	Load		Load current: Models with suffix -E4: 80 mA max. Models with suffix -B4: 100 mA max.
		Voltage output		2 V max.
Response time (ON, OFF)		1 ms max.	3 ms max.	1 ms max.
Operation mode		Wire-selectable	Switch selectable	
Indicators		Light indicator (red), stability indicator (green)		
Enclosure rating	IEC 144	IP67		
	NEMA	1, 3, 4X, 6, 12		
Housing material		Metal		
Light source		Infrared LED		
Ambient temperature		Operating: -25 to 55 °C		

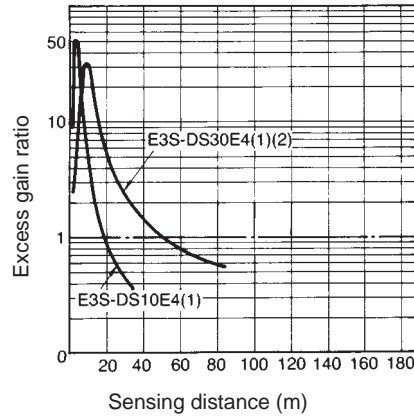
# Engineering Data

## Excess Gain Ratio

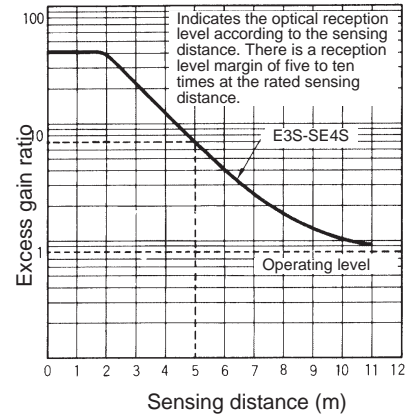
E3S-2E4(1), E3S-5E4(1), E3S-R2E4



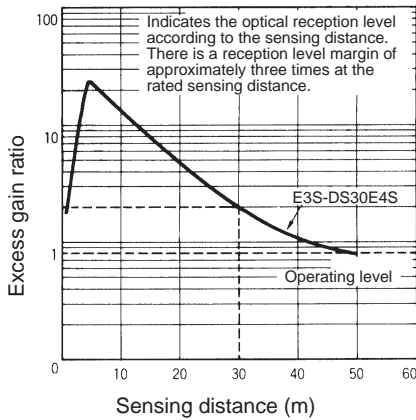
E3S-DS10E4(1), E3S-DS30E4(1)(2)



E3S-5E4S(1)

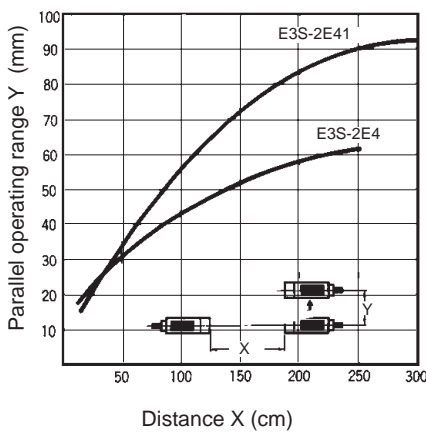


E3S-DS30E4S(1)

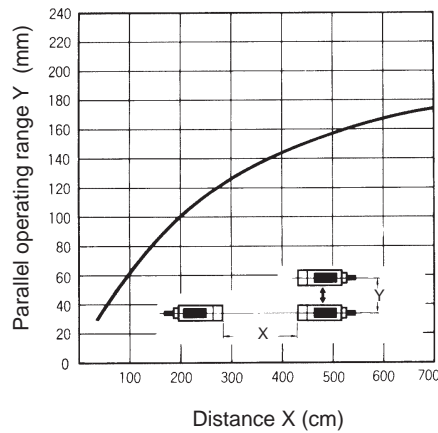


## Parallel Operating Range

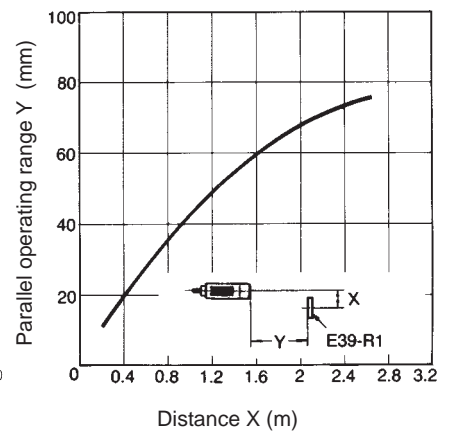
E3S-2E4(1)



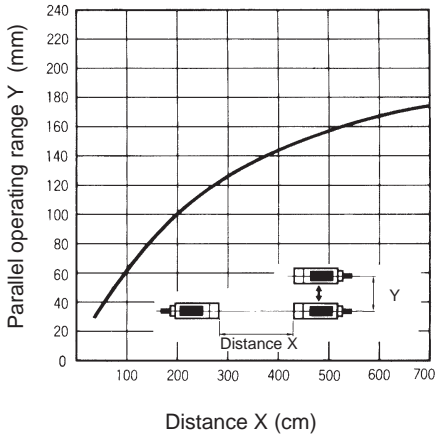
E3S-5E4(41)(42)



E3S-R2E4(1)

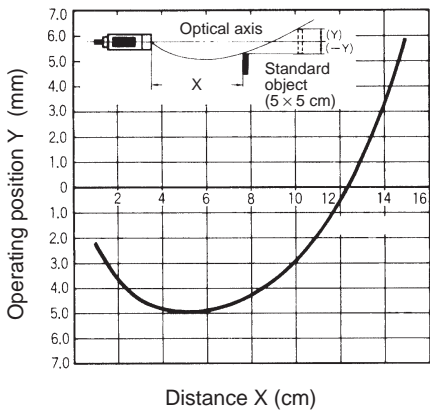


**E3S-5E4S(1)**

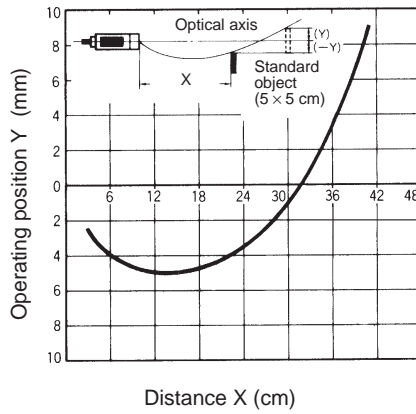


**Operating Range**

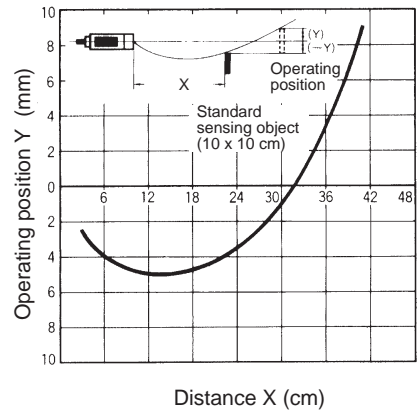
**E3S-DS10E4(1)**



**E3S-5E4(41)(42)**

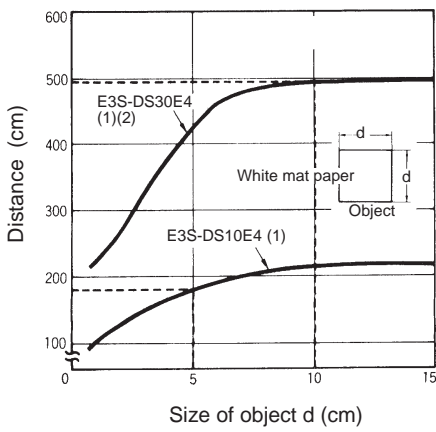


**E3S-R2E4(1)**



**Sensitivity**

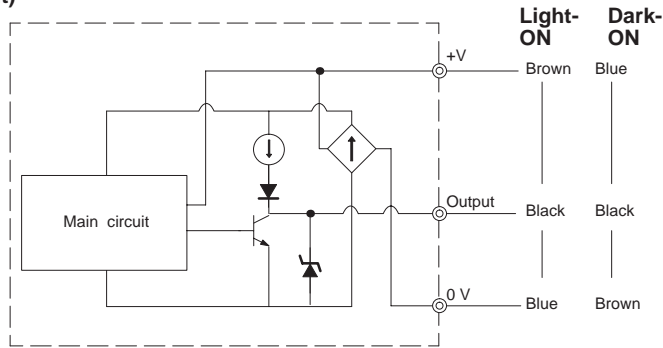
**E3S-DS30E4(1)(2), E3S-DS10E4(1)**



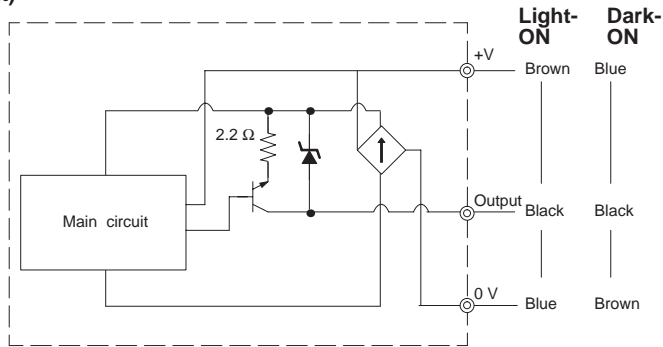
# Operation

## ■ Output Circuits

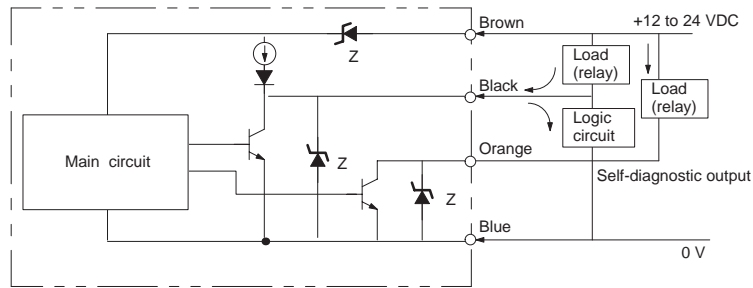
### -E4 Type (NPN Output)



### -B4 Type (PNP Output)



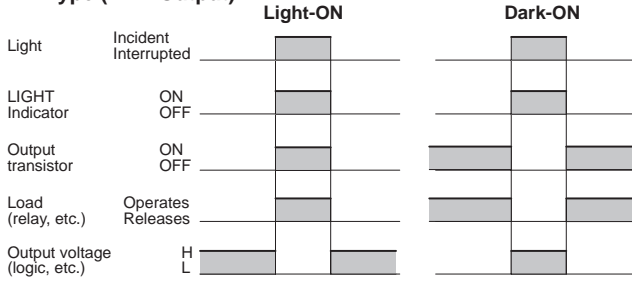
### -E4S(1) Type



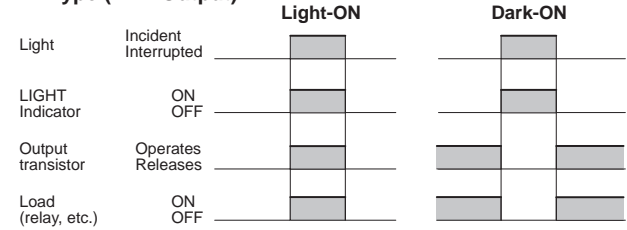
Z: Zener diode  
 \*The color of the code for the self-diagnostic output is orange for models whose model number suffix is S1.

■ Timing Chart

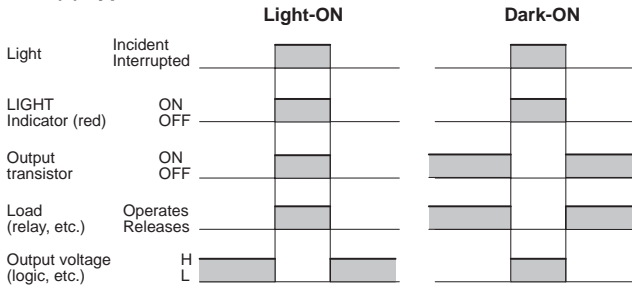
-E4 Type (NPN Output)



-B4 Type (PNP Output)



-E4S(1) Type



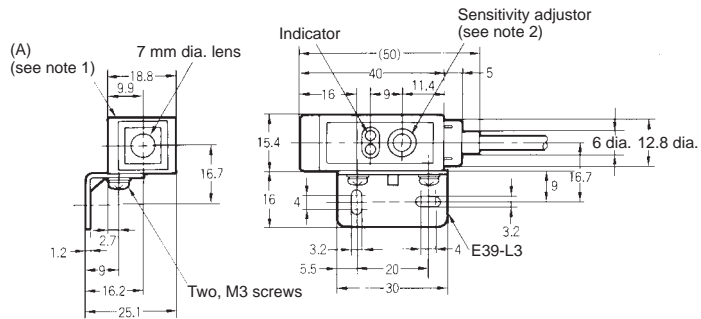
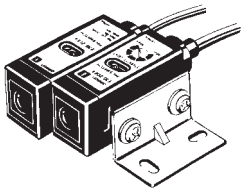
(Between brown (red) and black (white) lines)  
(Blue brown (black) and black (white) lines)

Dimensions

Note: All units are in millimeters unless otherwise indicated.

E3S-2E(B)4

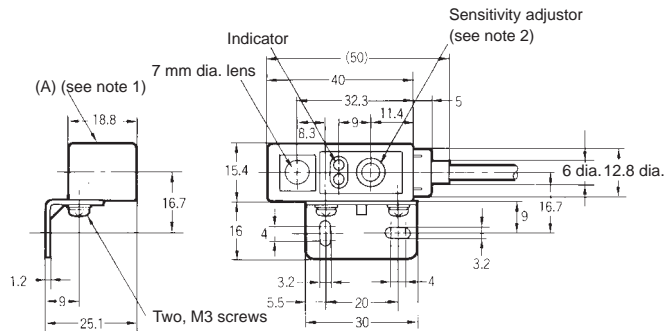
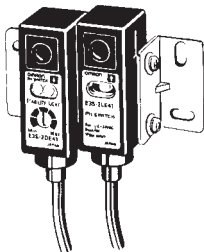
Cord: 4-mm dia., 18/0.12, 3-conductor  
Standard length: 2 m  
Weight: approx. 80 g each for emitter and receiver



Note: 1. A mounting bracket can be attached to side A.  
2. Receiver only.

E3S-2E(B)41

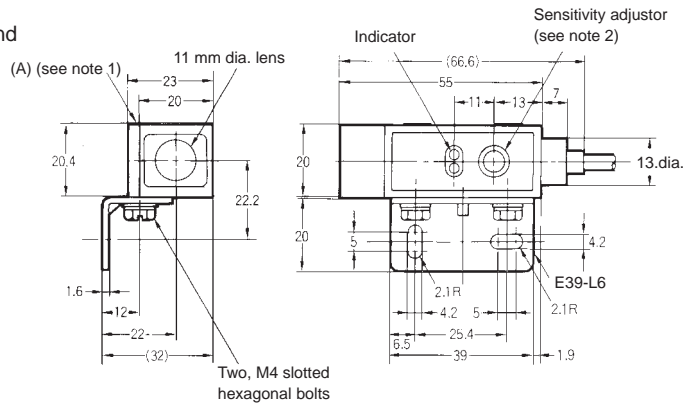
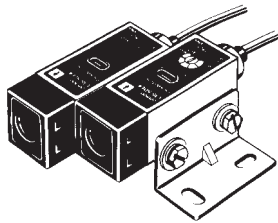
Cord: 4-mm dia., 18/0.12, 3-conductor  
Standard length: 2 m  
Weight: approx. 80 g each for emitter and receiver



Note: 1. A mounting bracket can be attached to side A.  
2. Receiver only.

**E3S-5E(B)4**

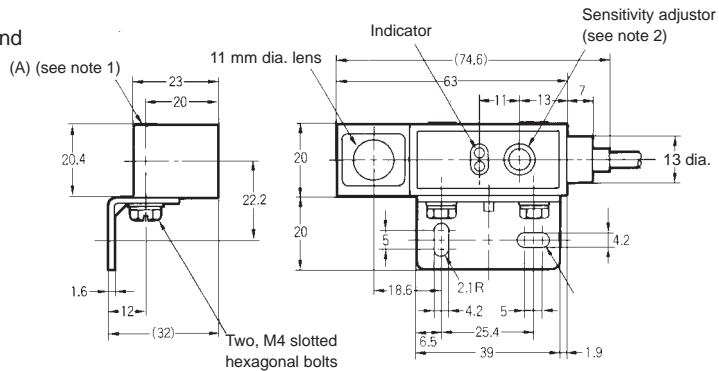
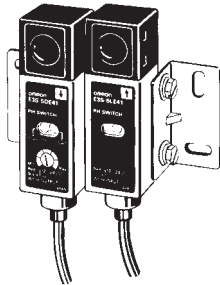
Cord: 4-mm dia., 18/0.12, 3-conductor  
 Standard length: 2 m  
 Weight: approx. 155 g each for emitter and receiver



- Note:** 1. A mounting bracket can be attached to side A.  
 2. Receiver only.

**E3S-5E(B)41**

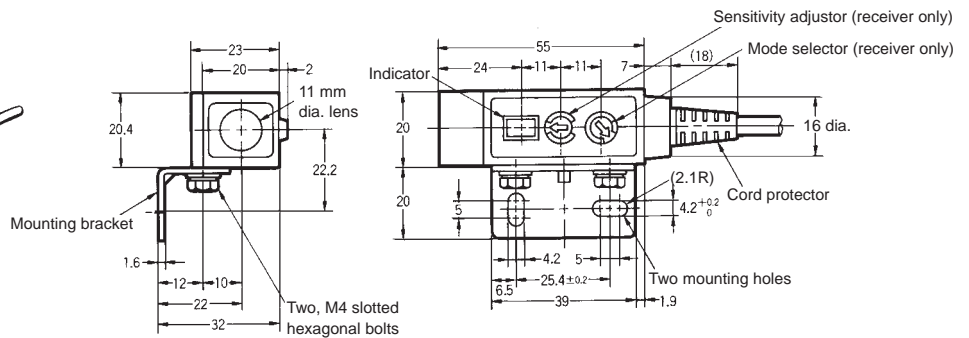
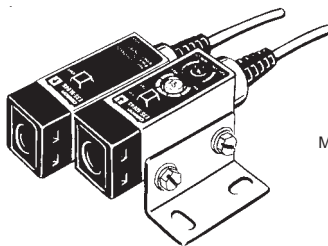
Cord: 4-mm dia., 18/0.12, 3-conductor  
 Standard length: 2 m  
 Weight: approx. 165 g each for emitter and receiver



- Note:** 1. A mounting bracket can be attached to side A.  
 2. Receiver only.

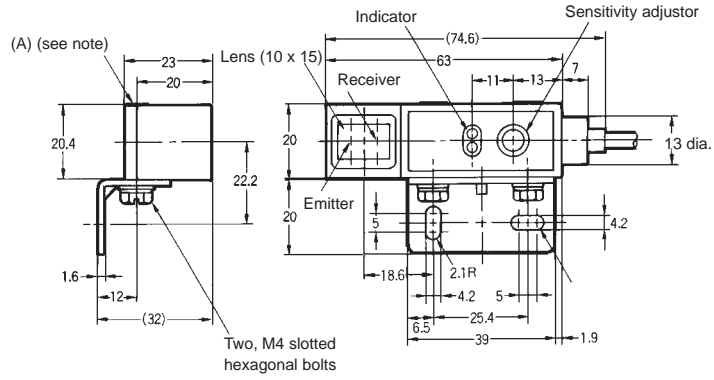
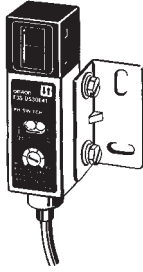
**E3S-5E(B)4S(1)**

Cord: 4.5-mm dia., 18/0.12, 4-conductor  
 Standard length: 2 m  
 Weight: approx. 155 g



**E3S-R2E(B)41  
E3S-DS30E(B)41**

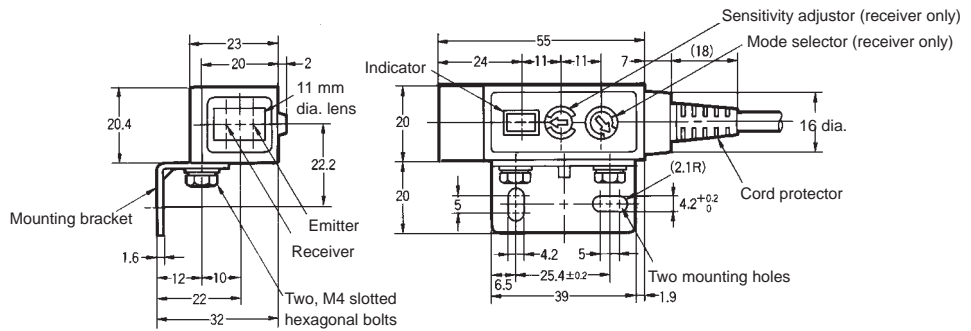
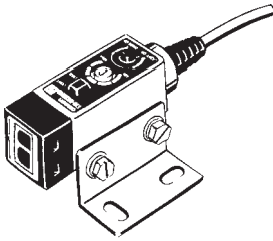
Cord: 4-mm dia., 18/0.12, 3-conductor  
Standard length: 2 m  
Weight: approx. 165 g



**Note:** A mounting bracket can be attached to side A.

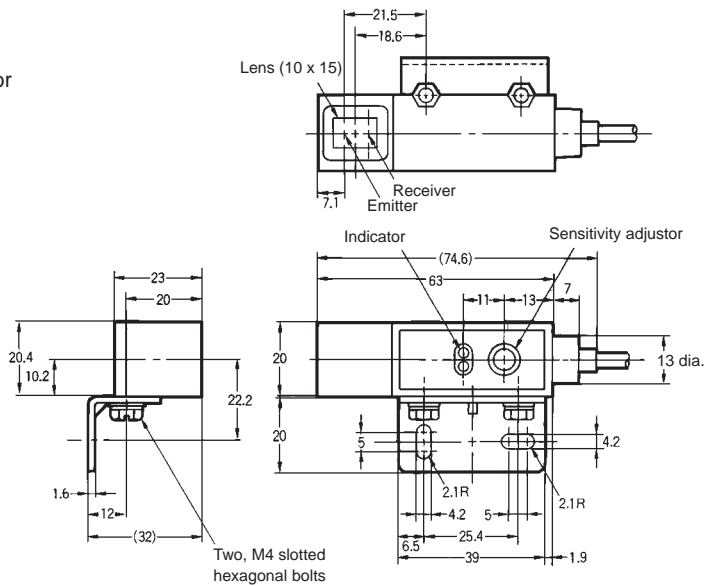
**E3S-DS30E(B)4S(1)**

Cord: 4.5-mm dia., 18/0.12, 4-conductor  
Standard length: 2 m  
Weight: approx. 155 g



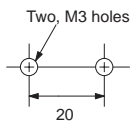
**E3S-R2E42  
E3S-DS30E42**

Cord: 4-mm dia., 18/0.12, 3-conductor  
Standard length: 2 m  
Weight: approx. 165 g

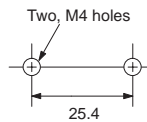


**Mounting Holes**

**E3S-2LE(B)4, E3S-2DE(B)4  
E3S-2LE(B)41, E3S-2DE(B)41  
E3S-DS10E(B)4, E3S-DS10E(B)41**



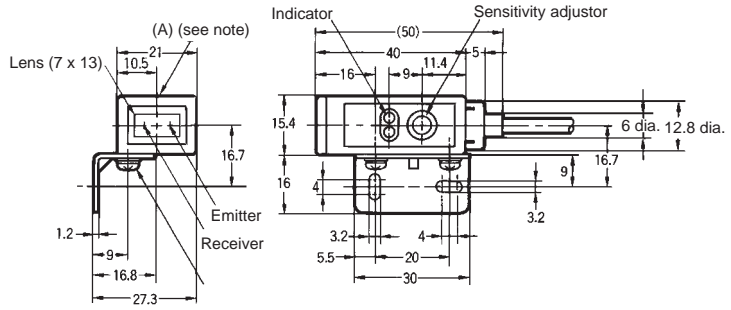
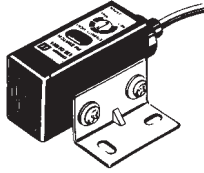
**E3S-5LE(B)4(1), E3S-5DE(B)4(1), E3S-5E4S(1)  
E3S-DS30E(B)4, E3S-R2E(B)4, E3S-R2E42  
E3S-DS30E(B)41, E3S-R2E(B)41  
E3S-DS30E42, E3S-DS30E4S(1)**





**E3S-DS10E(B)4**

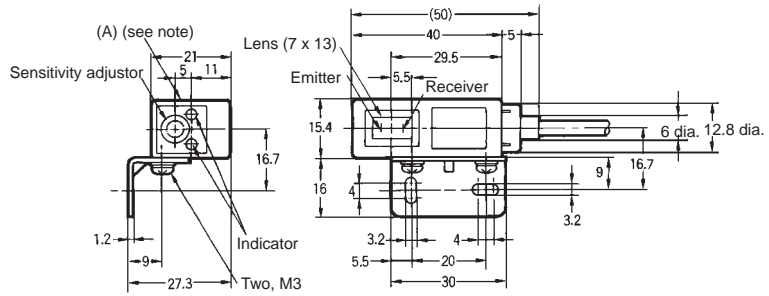
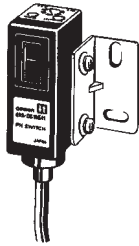
Cord: 4-mm dia., 18/0.12, 3-conductor  
 Standard length: 2 m  
 Weight: approx. 80 g



**Note:** A mounting bracket can be attached to side A.

**E3S-DS10E(B)41**

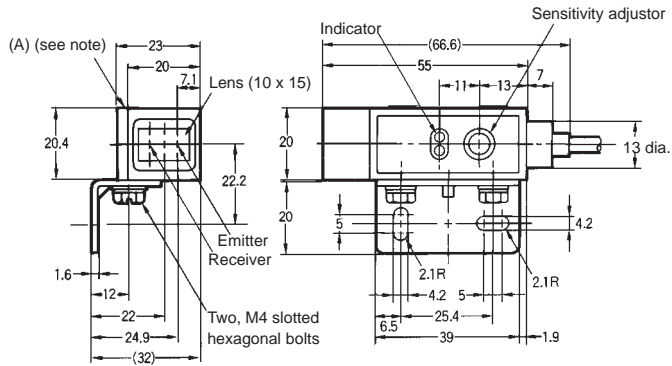
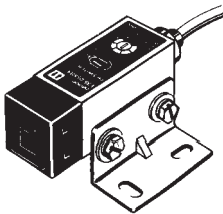
Cord: 4.5-mm dia., 18/0.12, 3-conductor  
 Standard length: 2 m  
 Weight: approx. 80 g



**Note:** A mounting bracket can be attached to side A.

**E3S-R2E(B)4  
 E3S-DS30E(B)4**

Cord: 4-mm dia., 18/0.12, 3-conductor  
 Standard length: 2 m  
 Weight: approx. 165 g

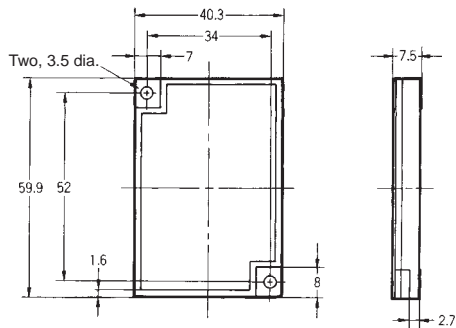
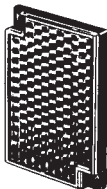


**Note:** A mounting bracket can be attached to side A.

**Accessories (Order Separately)**

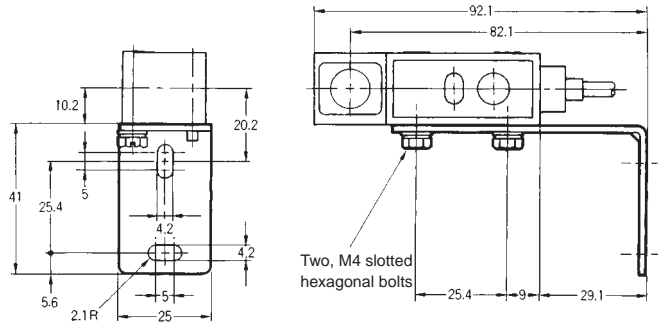
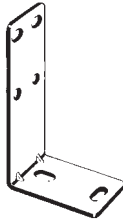
**E39-R1 Retroreflector**

(Supplied with E3S-R2E(B)4(1))



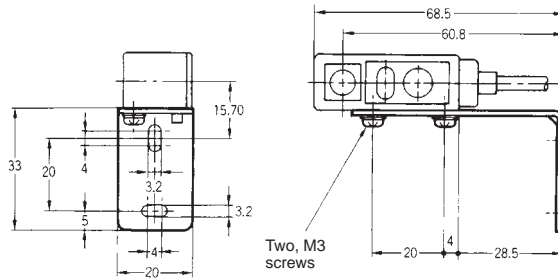
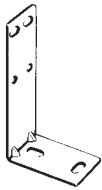
**E39-L2 Mounting Bracket**

Applicable Photoelectric Sensors:  
E3S-5E41, E3S-R2E41,  
E3S-DS30E41



**E39-L4 Mounting Bracket**

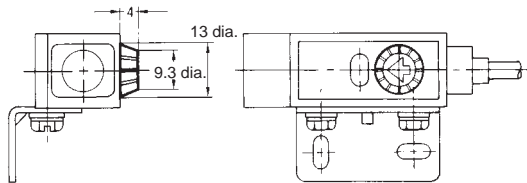
Applicable Photoelectric Sensors:  
E3S-2E41, E3S-DS10E41



**E39-G1 Sensitivity Adjuster Knob**

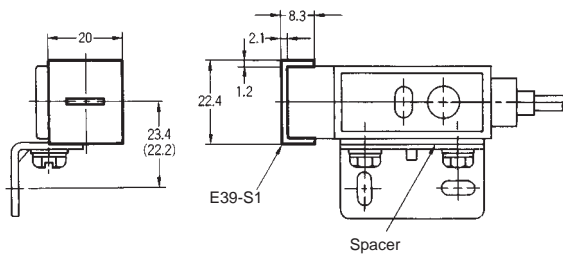
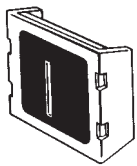
This accessory is attached to the following models:  
E3S-5E4(41), E3S-DS30E4(41), E3S-R2E4(41),  
E3S-LS10XE4, E3S-LS20XE4, E3S-GS1E4, E3S-GS3E4

**Note:** This adjuster cannot be used with Models  
E3S-2DE4(41) and E3S-DS10E4(41).



**E39-S1 Slit**

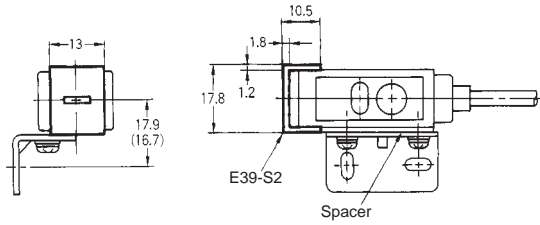
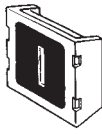
Applicable Photoelectric Sensors:  
E3S-5E4, E3S-5E41 (see note 3)



- Note:**
1. Model E39-S2 can have any of four different dimensions:  
11 x 0.5 mm, 11 x 1 mm, 11 x 2 mm, and 11 x 4 mm.
  2. Two slits (one for the emitter and the other for the receiver) are used in pairs.
  3. Dimensions in parentheses are without the Spacer.  
Use the Spacer with the E3S-2E4(41) as shown above to prevent the supporter and mounting bracket from touching each other when the optical axis is adjusted. The Spacer is not usually necessary with the E3S-5E4(41) unless the E3S-2E4(41) and E3S-5E4(41) are directly mounted together.

### E39-S2 Slit

Applicable Photoelectric Sensors:  
E3S-2E4, E3S-2E41



- Note:**
1. Model E39-S2 can have any of three different dimensions:  
6.5 x 0.5 mm, 6.5 x 1 mm, and 6.5 x 2 mm.
  2. Two slits (one for the emitter and the other for the receiver) are used in pairs.

### Sensing Distance with Slit

Photoelectric sensor	E3S-5E4, E3S-5E4□, E3S-5B4, E3S-5B4□				E3S-2E4, E3S-2E41, E3S-2B4, E3S-2B41		
Slit	E39-S1				E39-S2		
Width of slit	0.5 mm	1 mm	2 mm	4 mm	0.5 mm	1 mm	2 mm
Sensing distance	23 cm	58 cm	1.2 m	2.5 m	17 cm	42 cm	82 cm
Sensing object	0.5 mm	1 mm	2 mm	4 mm	0.5 mm	1 mm	2 mm

**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. E01-E1-11 **In the interest of product improvement, specifications are subject to change without notice.**

## **OMRON Corporation**

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Osaka 540 Japan  
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Printed in Japan  
1194-0.5M (1194) a