Thin, Compact Head Saves Space and Mounts Closely. Built-in Interference Protection Provided.

• Input indicator on the Sensor Unit simplifies settings.

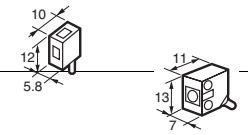
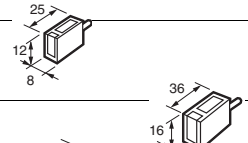
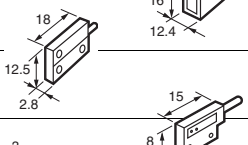
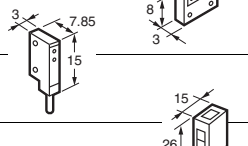
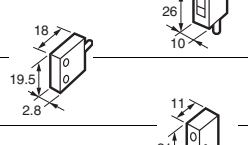
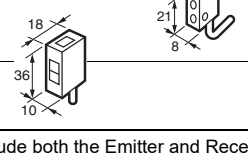
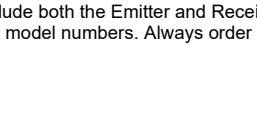
⚠ Be sure to read *Safety Precautions* on page 8.

Ordering Information

Sensors

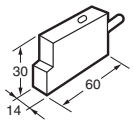
Sensor Units [Refer to *Dimensions* on page 9.]

Red light Infrared light

Sensing method	Application	Appearance	Sensing distance	Model
Through-beam (Emitter + Receiver)	Small type		100 mm	**E3C-S10 2M** *1 Emitter E3C-S10L 2M Receiver E3C-S10D 2M
			500 mm	**E3C-S50 2M** *1 *2 Emitter E3C-S50L 2M Receiver E3C-S50D 2M
			1 m	**E3C-1 2M** *1 Emitter E3C-1L 2M Receiver E3C-1D 2M
			2 m	**E3C-2 2M** *1 Emitter E3C-2L 2M Receiver E3C-2D 2M
	Slim type		200 mm	**E3C-S20W 2M**
			300 mm	**E3C-S30W 2M**
	Side-view			**E3C-S30T 2M**
Diffuse-reflective	Small type		100 mm	**E3C-DS10 2M**
	Slim type		50 mm	**E3C-DS5W 2M**
	Side-view		100 mm	**E3C-DS10T 2M**
Convergent-reflective	Small type		30±3 mm	**E3C-LS3R 2M**

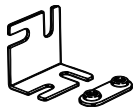
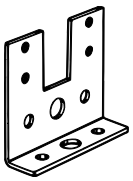
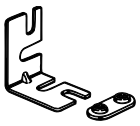
*1. Through-beam Sensors are normally sold in sets that include both the Emitter and Receiver.
*2. You cannot order the Emitter and Receiver with separate model numbers. Always order them together using the model number for the set (E3C-S50 2M).

Amplifier Units [Refer to *Amplifier Units* on page 12.]

Power supply	Application	Appearance	Functions	Model
DC	Slim type		Self diagnostic	**E3C-JC4P 2M**

Accessories (Order Separately)

Mounting Brackets [Refer to *E39-L/E39-S/E39-R* for Dimensions.]

Appearance	Model	Quantity	Remarks
	**E39-L41**	2	Provided with the E3C-1.
	**E39-L42**	2	Provided with the E3C-2. Can be used with the E3C-DS10.
	**E39-L127-T1**	1	Can be used with the E3C-S10.
	E39-L127-T2	1	
	E39-L127-T3	1	
	**E39-L31**	1*	Can be used with the E3C-S50.

Note: Refer to *E39-L/E39-S/E39-R* for Dimensions.
* When using through-beam models, order one bracket for the Receiver and one for the Emitter.

Ratings and Specifications

Sensors

Sensing method	Through-beam					
Item / Model	E3C-S10	E3C-S20W	E3C-S50	E3C-S30T E3C-S30W	E3C-1	E3C-2
Sensing distance	100 mm	200 mm	500 mm	300 mm	1 m	2 m
Standard sensing object	Opaque, 2-mm dia. min.		Opaque, 3-mm dia. min.	Opaque, 1.5-mm dia. min.	Opaque, 4-mm dia. min.	Opaque, 8-mm dia. min.
Directional angle	Emitter/Receiver: 10 to 60° each		Emitter/Receiver: 10 to 40° each		Emitter/Receiver: 3 to 20° each	Emitter/Receiver: 3 to 15° each
Light source (wavelength)	Infrared LED (950 nm)			Infrared LED (940 nm)	Infrared LED (950 nm)	
Ambient illuminance (Receiver side)	Incandescent lamp: 3,000 lx max., Sunlight 10,000 lx max.					
Ambient temperature range	Operating/Storage: –25 to 70°C (with no icing or condensation)					
Ambient humidity range	Operating/Storage: 35% to 85%RH (with no condensation)					
Insulation resistance	20 MΩ min. at 500 VDC					
Dielectric strength	500 VAC at 50/60 Hz for 1 minute					
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	IEC 60529 IP64 Limited to indoor use	IEC 60529 IP50 Limited to indoor use	IEC 60529 IP64 Limited to indoor use	IEC 60529 IP60 Limited to indoor use	IEC 60529 IP66 Limited to indoor use	
Connection method	Pre-wired models (standard length: 2 m)					
Weight (packed state)	Approx. 50 g			Approx. 24 g	Approx. 60 g	Approx. 120 g
Material: Case	Polycarbonate		ABS	Polycarbonate		Zinc die-cast
Material: Lens	Polycarbonate		Acrylics	Polycarbonate		
Material: Mounting Brackets	---				Steel	
Accessories	Instruction manual	Phillips screw M2×8, spring washer, flat washer, M2 nut, instruction manual	Instruction manual	Phillips screw M2×8, spring washer, flat washer, nut M2, instruction manual	Mounting Bracket (with screws), instruction manual	Mounting Bracket (with screws), instruction manual

Sensing method	Diffuse-reflective			Convergent-reflective
Item / Model	E3C-DS5W	E3C-DS10T	E3C-DS10	E3C-LS3R
Sensing distance	50 mm (White paper 100 × 100 mm)	100 mm (White paper 100 × 100 mm)	100 mm (White paper 50 × 50 mm)	30 ± 3 mm (White paper 10 × 10 mm)
Differential travel	20% max. of sensing distance		10% max.	±3% max.
Light source (wavelength)	Infrared LED (950 nm)	Infrared LED (950 nm)		Red LED (680 nm)
Ambient illuminance (Receiver side)	Incandescent lamp: 3,000 lx max., Sunlight 10,000 lx max.			
Ambient temperature range	Operating/Storage: –25 to 70°C (with no icing or condensation)			
Ambient humidity range	Operating/Storage: 35% to 85%RH (with no condensation)			
Insulation resistance	20 MΩ min. at 500 VDC			
Dielectric strength	500 VAC at 50/60 Hz for 1 minute			
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	IEC 60529 IP50 (Limited to indoor use)		IEC 60529 IP64 (Limited to indoor use)	
Connection method	Pre-wired models (standard length: 2 m)			
Weight (packed state)	Approx. 50 g			Approx. 55 g
Material: Case	Polycarbonate			
Material: Lens	Polycarbonate			
Accessories	Phillips screw M2×8, spring washer, flat washer, M2 nut, instruction manual	Instruction manual		

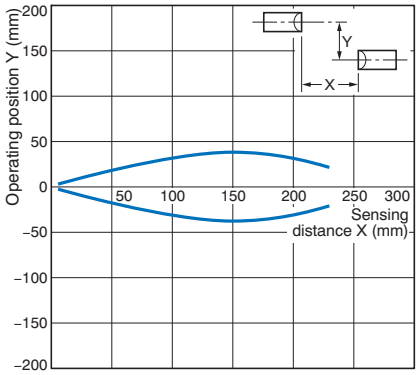
Amplifier Units

Item / Model		E3C-JC4P
Power supply voltage		12 to 24 VDC±10%, ripple (p-p): 1 V max.
Power (current) consumption		40 mA max.
Control output		Load power supply voltage: 24 VDC max., load current: 100 mA max., NPN open collector output type (residual voltage: 1 V max.) Light-ON/Dark-ON switch selectable
Timer function		OFF-delay 0/40 ms (switch selectable)
Ambient temperature range		Operating: –10° to 55°C, Storage: –25° to 70°C (with no icing or condensation)
Ambient humidity range		Operating: 35% to 85%, Storage: 35% to 85% (with no condensation)
Insulation resistance		20 MΩ min. at 500 VDC
Dielectric strength		1,000 VAC at 50/60 Hz for 1 minute
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: 300 ms^2 three times in each of X, Y and Z directions
Degree of protection		IEC IP40 (limited to indoor use)
Protection		Reverse polarity protection, output short-circuit protection, mutual interference prevention
Response time		Operate or reset: 1 ms max.
Connection method		Terminal block input cable pullout (standard cable length: 2 m)
Weight (packed state)		Approx. 80 g
Material	Case	ABS
	Mounting Brackets	Iron
Accessories		Mounting Bracket, Adjustment screwdriver, Caution label, Instruction manual

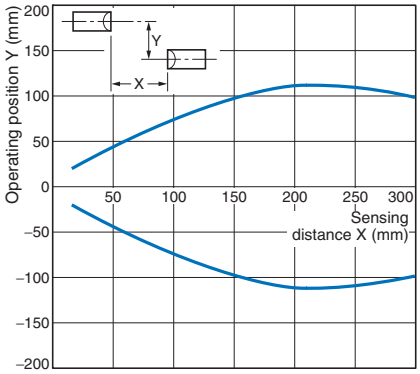
Engineering Data (Reference Value)

Parallel Operating Range

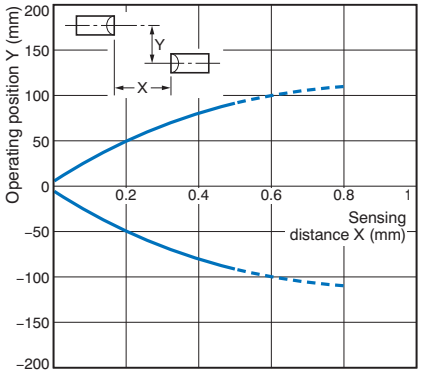
Through-beam
E3C-S10



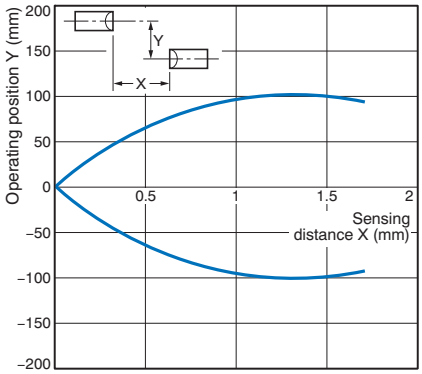
Through-beam
E3C-S20W



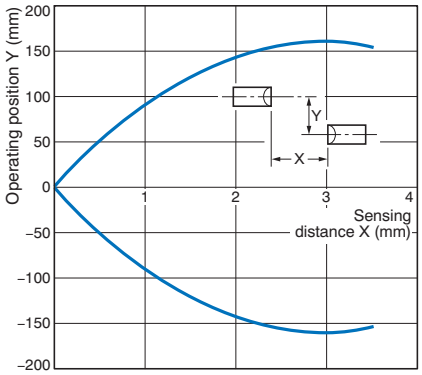
Through-beam
E3C-S50



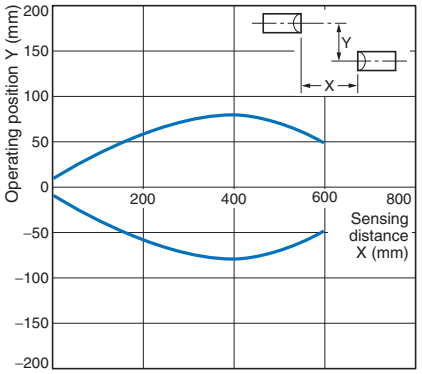
Through-beam
E3C-1



Through-beam
E3C-2

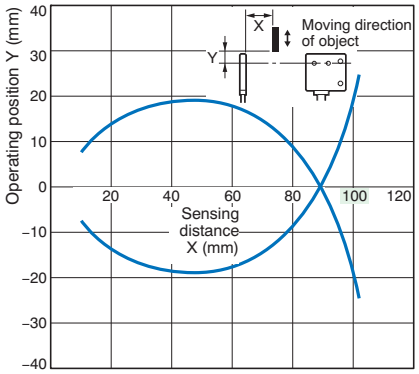


Through-beam
E3C-S30T/-S30W

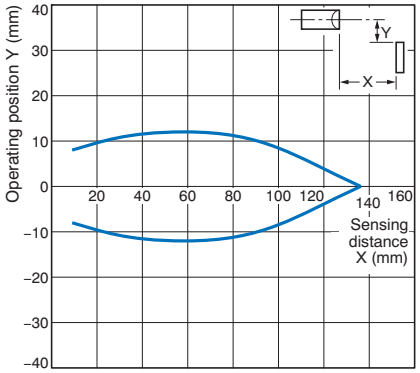


Operating Range

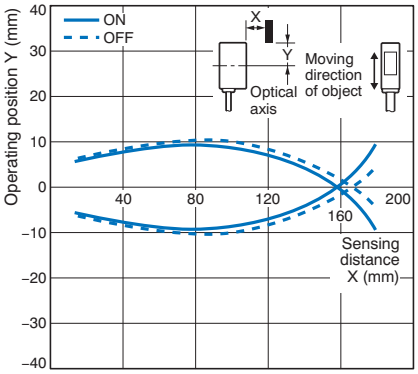
Diffuse-reflective
E3C-DS5W



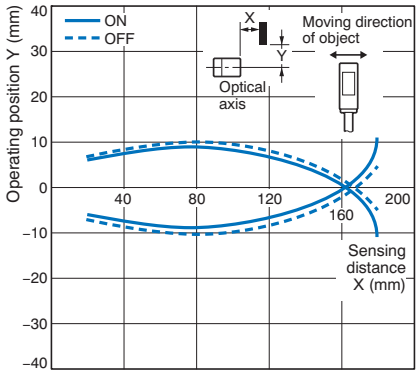
Diffuse-reflective
E3C-DS10T



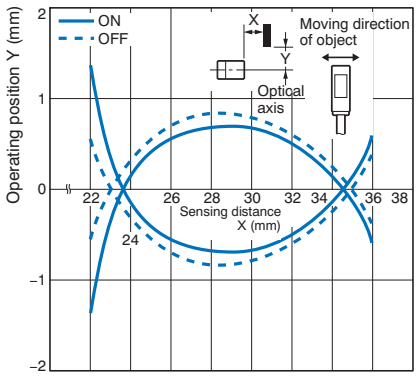
Diffuse-reflective
E3C-DS10 (Example 1)



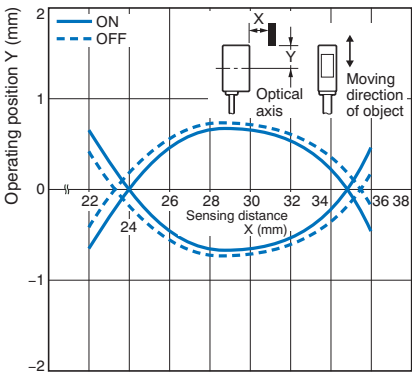
Diffuse-reflective
E3C-DS10 (Example 2)



Convergent-reflective
E3C-LS3R (Example 1)

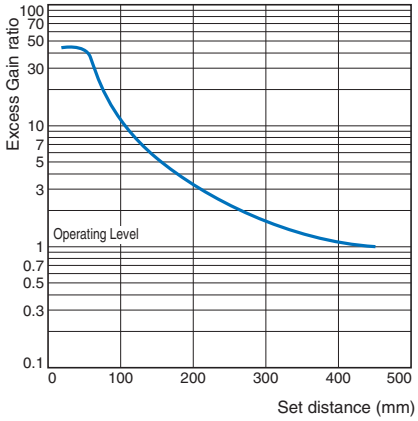


Convergent-reflective
E3C-LS3R (Example 2)

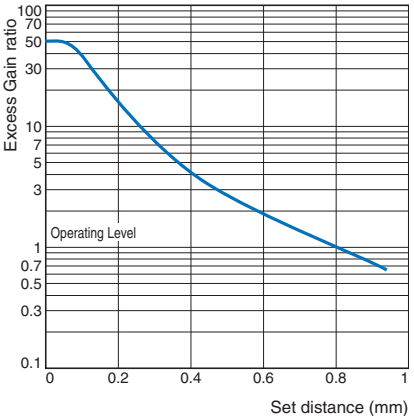


Excess Gain vs. Set Distance

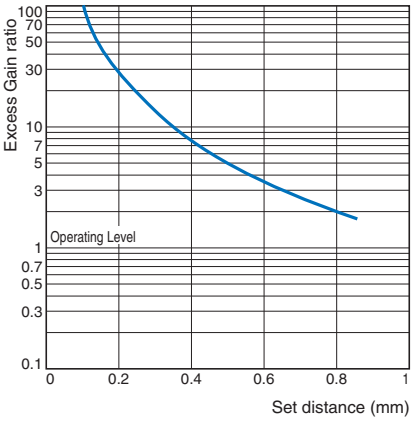
E3C-S20W



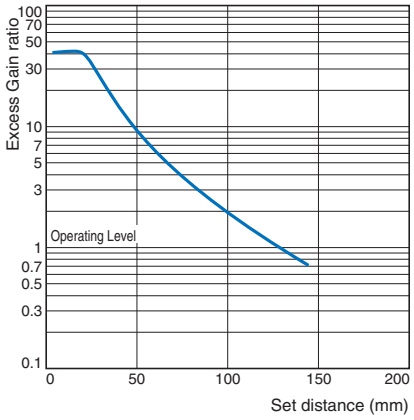
E3C-S30T/-S30W



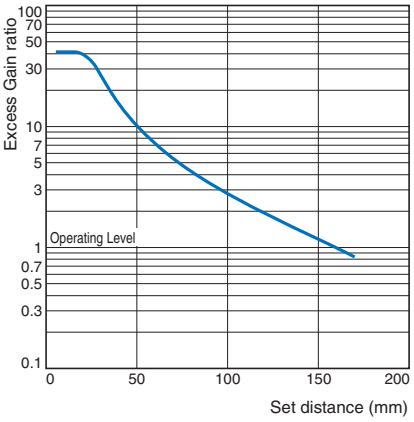
E3C-S50



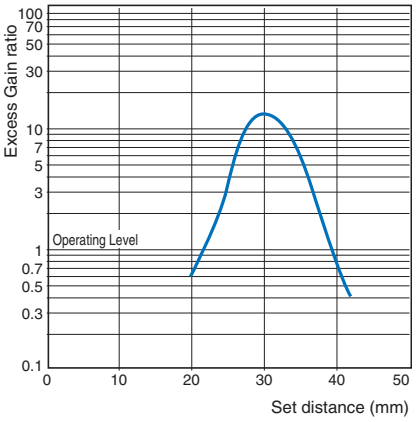
E3C-DS5W



E3C-DS10T

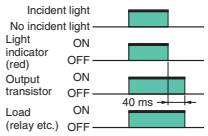
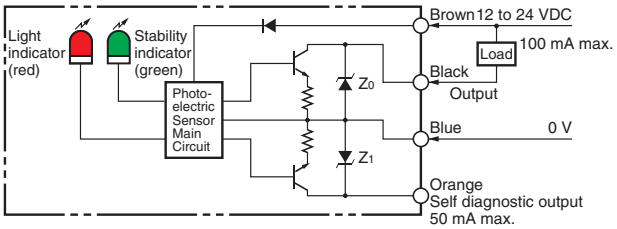
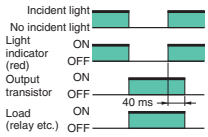


E3C-LS3R

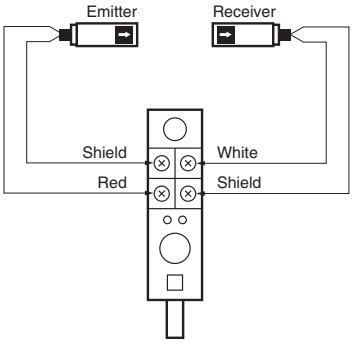
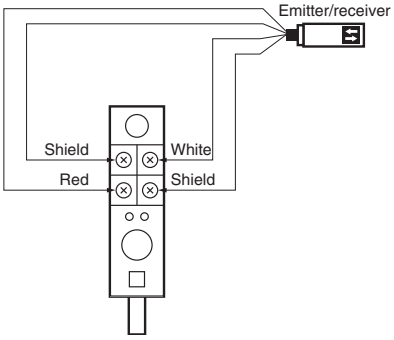


I/O Circuit Diagrams

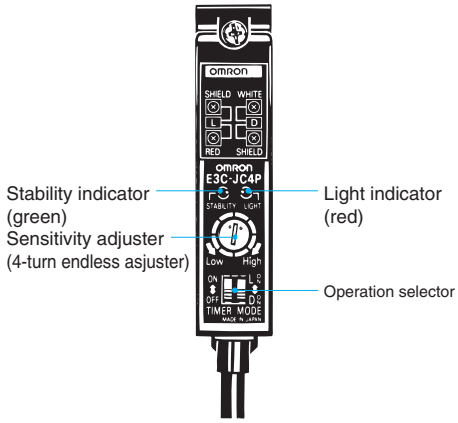
NPN output

Model	Operation mode	Timing charts	Operation selector	Output circuit
E3C-JC4P	Light-ON		L-ON (LIGHT ON)	
	Dark-ON		D-ON (DARK ON)	

Connection

Amplifier Units	Connected to the through-beam model	Connected to the reflective model	Note
E3C-JC4P			Note: 1. The strip-off length of the shielded cable should always be 20 mm max. on the Receiver side (white) and 50 mm max. on the Emitter side (red).

Nomenclature/Settings

Amplifier Units	Nomenclature
E3C-JC4P	

Safety Precautions

Refer to *Warranty and Limitations of Liability*.

⚠ WARNING

This product is not designed or rated for ensuring safety of persons either directly or indirectly. Do not use it for such purposes.

Precautions for Correct Use

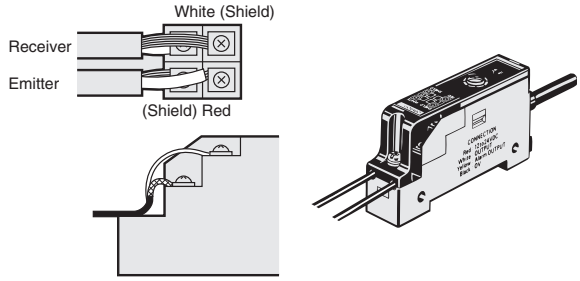
Do not use the product in atmospheres or environments that exceed product ratings.

Amplifier Units

● **Wiring**

Connection of Amplifier Unit and Sensor

Always run the shielded wires of the Emitter and Receiver separately. Also, route the sensor cable along the cable grooves of the cover and sensor and fix it with the cover.

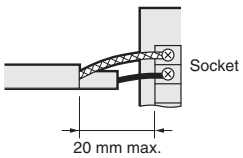


Sensor Units

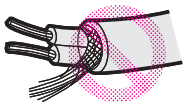
● **Wiring**

Extension Cable

- The extension distance of the sensor connection cable should be within 10 m including sensor cable.
- The strip-off length of the core in the connection cable should be 20 mm max. on the Receiver side and 50 mm max. on the Emitter side, and the core should be as short as possible. Avoid using the joint terminal and connector.

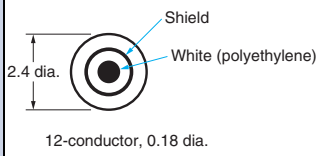
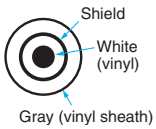
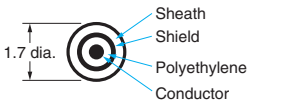
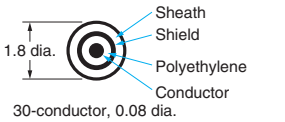


- Use independent shielded wires for the Emitter and Receiver. Using a common shielded wire can cause a malfunction.

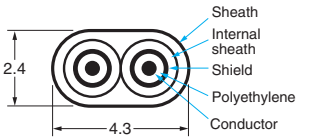
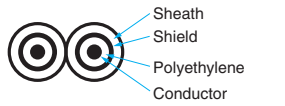


Extension Cable

Through-beam

Model \ Cable	Specified cable	Replacement cable
E3C-S10 **E3C-1** **E3C-2** **E3C-S50**	Polyethylene insulation shield Round cable  12-conductor, 0.18 dia.	1-conductor shield/ vinyl wire, conductor cross section: 0.3 mm² min. 
E3C-S20W	Vinyl insulation shield round cable  12-conductor, 0.18 dia.	1-conductor shield/ vinyl wire, conductor cross section: 0.3 mm² min.
E3C-S30T **E3C-S30W**	Vinyl insulation shield round cable (robot cable)  30-conductor, 0.08 dia.	

Reflective model

Model \ Cable	Specified cable	Replacement cable
E3C-DS10 **E3C-DS10T** **E3C-LS3R**	Vinyl insulation shielded parallel cable  12-conductor, 0.18 dia.	When there is no1-conductor shielded, vinyl cable (parallel wire), use two 1-conductor shielded, vinyl wires.
E3C-DS5W	Vinyl insulation shielded parallel cable  7-conductor, 0.18 dia.	When there is no1-conductor shielded, vinyl cable (parallel wire), use two 1-conductor shielded, vinyl wires.

● **Others**

When the E3C is used in a place where high-frequency noise will be generated, e.g. ultrasonic welder, grounding the 0-V terminal (on the shield side of the connection cable) of the Receiver may avoid a malfunction caused by induction.

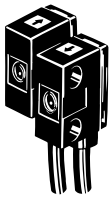
Dimensions

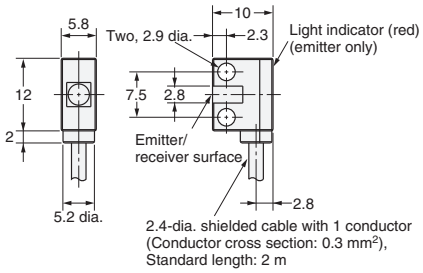
(Unit: mm)
Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

Sensors

Sensor Units

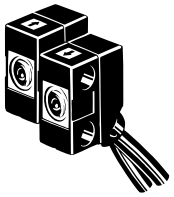
E3C-S10

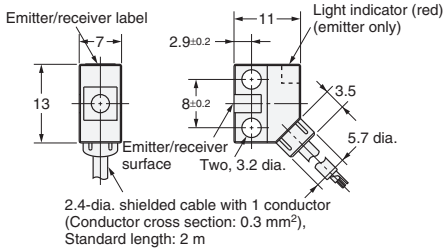




Emitter: E3C-S10L
Receiver: E3C-S10D

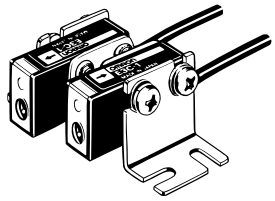
E3C-S50

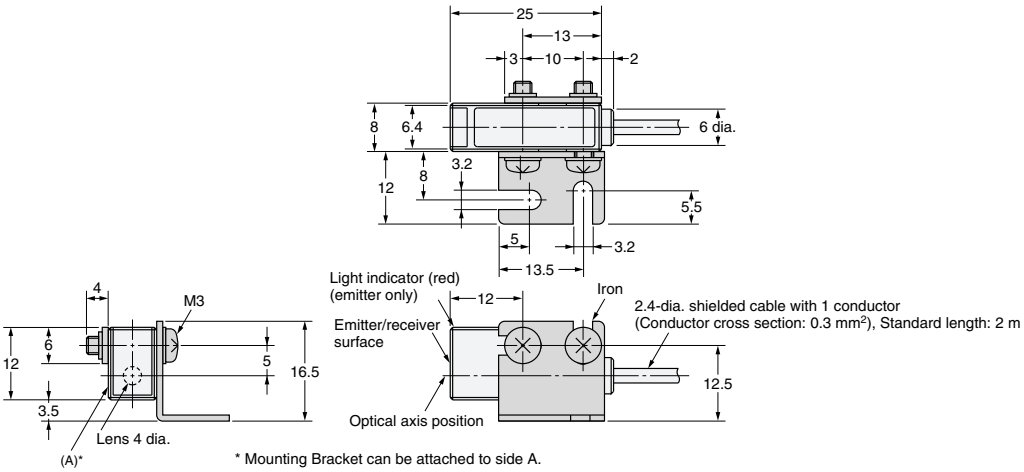




Emitter: E3C-S50L
Receiver: E3C-S50D

E3C-1

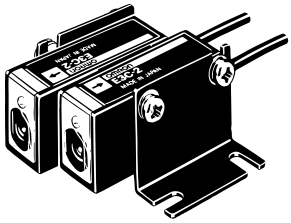


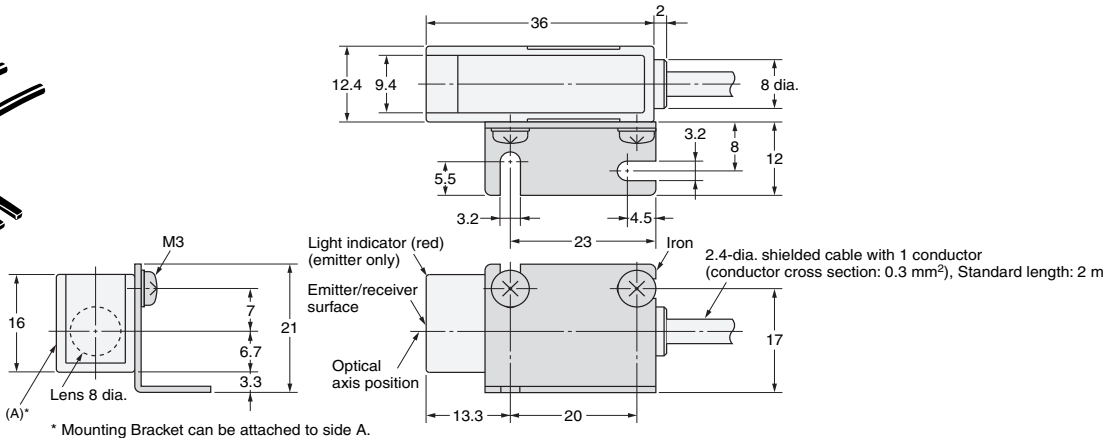


* Mounting Bracket can be attached to side A.

Emitter: E3C-1L
Receiver: E3C-1D

E3C-2

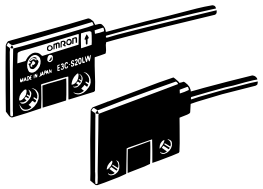




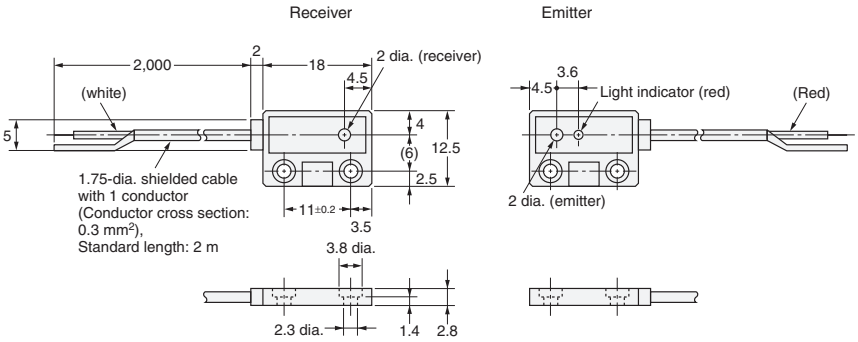
* Mounting Bracket can be attached to side A.

Emitter: E3C-2L
Receiver: E3C-2D

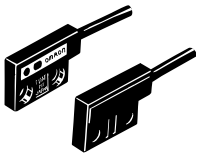
E3C-S20W



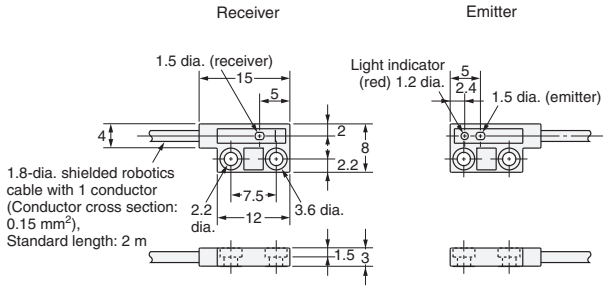
Emitter: E3C-S20LW
Receiver: E3C-S20DW



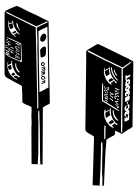
E3C-S30W



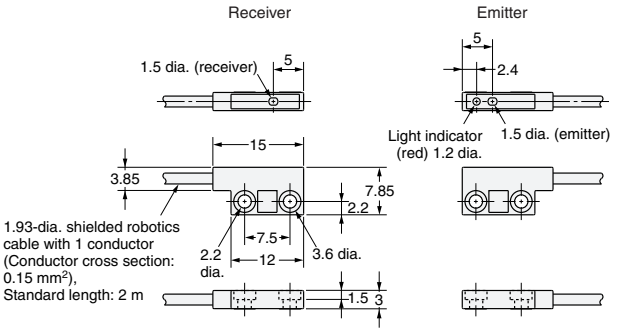
Emitter: E3C-S30LW
Receiver: E3C-S30DW



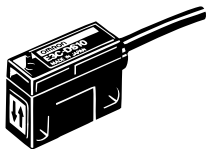
E3C-S30T

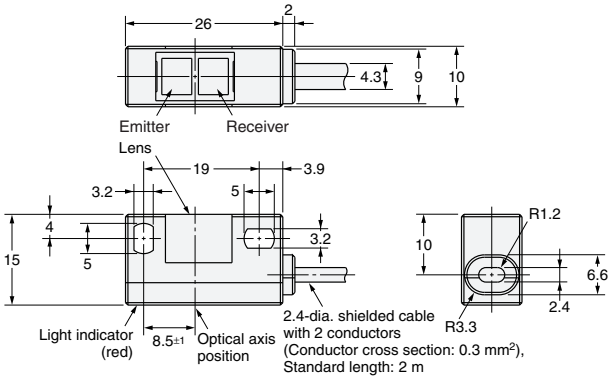


Emitter: E3C-S30LT
Receiver: E3C-S30DT

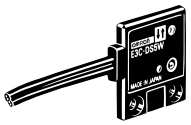


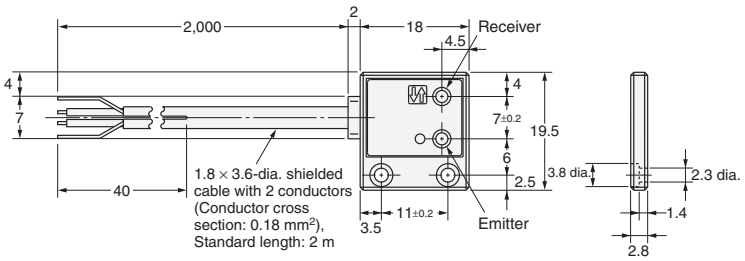
E3C-DS10



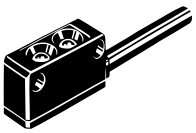


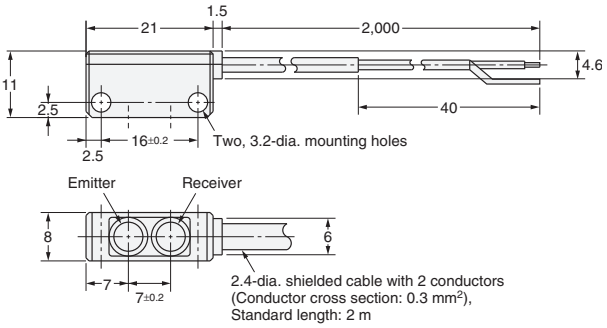
E3C-DS5W



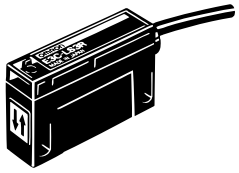


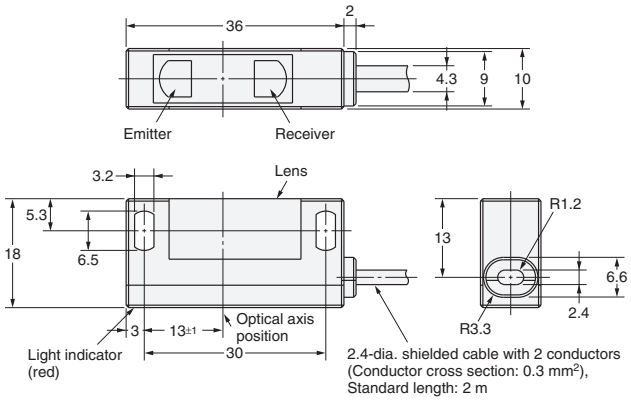
E3C-DS10T





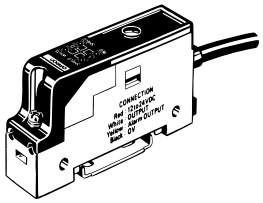
E3C-LS3R



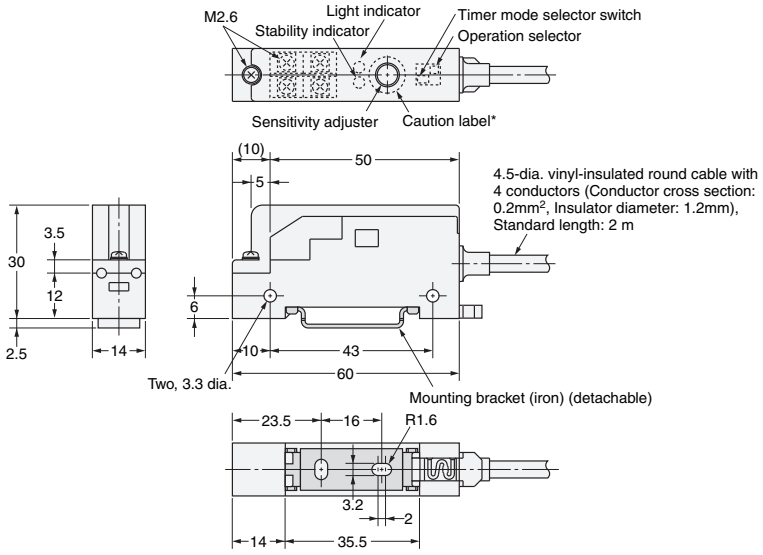


Amplifier Units

E3C-JC4P



With Mounting Bracket Attached



*After adjusting the sensitivity, attach the caution label at the location indicated by ◌ above to prevent malfunction.

Accessories (Order Separately)

Mounting Brackets

Refer to *E39-L/E39-S/E39-R* for details.

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2024.10

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