Built-in Power Supply Photoelectric Sensor

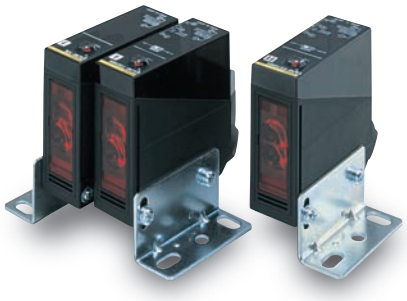
E3JM

CSM_E3JM_DS_E_12_1

Model Contribute to Overall Cost Reduction

E3JM Terminal Block Models

- Easy to wire and adjust.



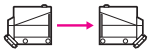
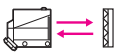
For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

Be sure to read *Safety Precautions* on page 7.

Ordering Information

Sensors (Refer to *Dimensions* on page 9.)

Red light Infrared light

Sensing method	Appearance	Connection method	Sensing distance	Operation mode	Output configuration	Functions	Model
Through-beam (Emitter + Receiver) *		Terminal block	 10 m	Light-ON Dark-ON (switch selectable)	Relay	---	**E3JM-10M4-N** Emitter: E3JM-10L-N Receiver: E3JM-10DM4-N
						Timer	**E3JM-10M4T-N** Emitter: E3JM-10L-N Receiver: E3JM-10DM4T-N
					DC SSR	---	**E3JM-10S4-N** Emitter: E3JM-10L-N Receiver: E3JM-10DS4-N
						Timer	**E3JM-10S4T-N** Emitter: E3JM-10L-N Receiver: E3JM-10DS4T-N
Retro-reflective with MSR function	 E39-R1 (provided)		 4 m		Relay	---	**E3JM-R4M4**
						Timer	**E3JM-R4M4T**
					DC SSR	---	**E3JM-R4S4**
						Timer	**E3JM-R4S4T**
Diffuse-reflective			 700 mm		Relay	---	**E3JM-DS70M4**
						Timer	**E3JM-DS70M4T**
					DC SSR	---	**E3JM-DS70S4**
						Timer	**E3JM-DS70S4T**

*Through-beam Sensors are sold in sets that include both the Emitter and Receiver. An order for the Emitter or Receiver alone cannot be accepted.
Note: UL-listed models have the -US suffix. The model number for an E3JM Through-beam Sensor ends in "-US" (and not in "-N"). (Example: E3JM-10M4-US).
Tightening nuts, washers, and rubber bushings are not provided with these models.
Change: Shape of the E3JM conduit socket

Accessories (Order Separately)

Slit **(A Slit is not provided with the Sensor for through-beam. Order a Slit separately if required.)** **(Refer to *Dimensions* on page 9.)**

Slit width	Sensing distance		Minimum detectable object (reference value)	Model	Quantity	Remarks
1 mm × 20 mm	E3JM-10□4(T)-N	1.2 m	1-mm dia.	**E39-S39**	1 Slit each for the Emitter and Receiver (2 Slits total)	(Seal-type long slit) Can be used with the E3JM-10□4(T)-N Models.

Reflectors **(A Reflector is required for each Retro-reflective Sensor.)**

The E39-R1 Reflector is provided with the Sensor. Order other Reflectors separately if required. **(Refer to *Dimensions* on *E39-L/E39-S/E39-R*.)**

Name	Sensing distance		Model	Quantity	Remarks
Reflectors	E3JM-R4□4(T)	4 m	**E39-R1**	1	Provided with the E3JM-R4□4(T)

Note: Refer to *Reflectors* on *E39-L/E39-S/E39-R* for details.

Mounting Bracket

Some Mounting Brackets are provided with the Sensor. Order other Mounting Brackets separately if required. **(Refer to E39-L/E39-S/E39-R)**

Appearance	Model	Quantity	Remarks
	**E39-L53**	1	Provided with the E3JM.
	**E39-L51**	1	Mounting Bracket designed for changing from he E3A-M, E3A2, E3A3, OA-5, or OA-5N to the E3JM.

Note: 1. When using a Through-beam Sensor, order one Connector for the Receiver and one for the Emitter.
2. Refer to *Mounting Brackets* on *E39-L/E39-S/E39-R* for details.

Ratings and Specifications

Sensing method		Through-beam model	Retro-reflective model (with MSR function)	Diffuse-reflective model
Item / Model		E3JM-10□4(T)-N	E3JM-R4□4(T)	E3JM-DS70□4(T)
Sensing distance		10 m	4 m (When using E39-R1)	White paper (200 × 200 mm): 700 mm
Standard sensing object		Opaque: 14.8-mm dia. min.	Opaque: 75-mm dia. min.	---
Differential travel		---		20% max. of sensing distance
Directional angle		Both Emitter and Receiver 3° to 20°	1° to 5°	---
Light source (wavelength)		Infrared LED (950 nm)	Red LED (660 nm)	Infrared LED (950 nm)
Power supply voltage		12 to 240 VDC±10%, ripple (p-p): 10% max. 24 to 240 VAC±10%, 50/60 Hz		
Power consumption	DC	3 W max. (Emitter 1 W max. Receiver 2 W max.)	2 W max.	
	AC	3 W max. (Emitter 1 W max. Receiver 2 W max.)	2 W max.	
Control output		Relay output (E3JM-□□M4 (T) model): SPDT, 250 VAC, 3A (cosϕ=1) max., 5 VDC, 10 mA min. DC SSR output (E3JM-□□S4 (T) model): 48 VDC, 100 mA max. (residual voltage: 2 V max.) Light-ON/Dark-ON selectable		
Life expectancy (relay output)	Mechanical	50,000,000 times min. (switching frequency: 18,000 times/h)		
	Electrical	100,000 times min. (switching frequency: 1,800 times/h)		
Response time	Relay output	(E3JM-□□M4 (T) models) Operate or reset: 30 ms max.		
	DC SSR output	(E3JM-□□S4 (T) models) Operate or reset: 5 ms max.		
Sensitivity adjustment		---		One-turn adjuster
Timer function *		ON-delay/OFF-delay/One-shot delay switch selectable Delay time: 0.1 to 5 s (adjustable), only for E3JM-□□□4T		
Ambient illumination (Receiver side)		Incandescent lamp: 3,000 lx max.		
Ambient temperature range		Operating: –25°C to 55°C, Storage: –30°C to 70°C (with no icing or condensation)		
Ambient humidity range		Operating: 45% to 85% (with no condensation), Storage: 35% to 95% (with no condensation)		
Insulation resistance		20 MΩ min. at 500 VDC		
Dielectric strength		2,000 VAC, 50/60 Hz for 1 min.		
Vibration resistance	Destruction	10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions		
	Malfunction	10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions		
Shock resistance	Destruction	500 m/s^2 3 times each in X, Y, and Z directions		
	Malfunction	100 m/s^2 3 times each in X, Y, and Z directions		
Degree of protection		IEC 60529: IP66		
Connection method		Terminal block		
Weight (packed state)		Approx. 270 g	Approx. 160 g	
Material	Case	ABS (Acrylonitril Butadiene Styrene)		
	Lens	Methacrylic resin		
	Cover	Polycarbonate		
	Mounting Bracket	Iron		
Accessories		Mounting Bracket (with screw), Nuts, Terminal Protection Cover, One set of cable connection nuts (excluding -US Models), Instruction manual, Reflector (E39-R1: only for Retro-reflective Sensors)		

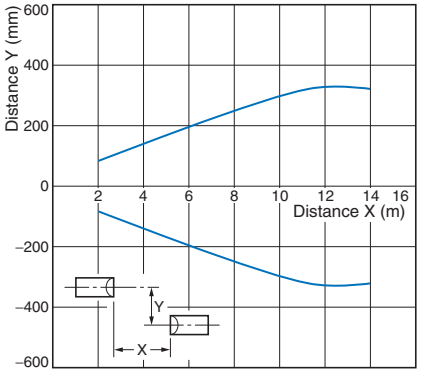
*The timer cannot be disabled for models with timer functions (E3JM-□□□4T).

Engineering Data (Reference Value)

Parallel Operating Range

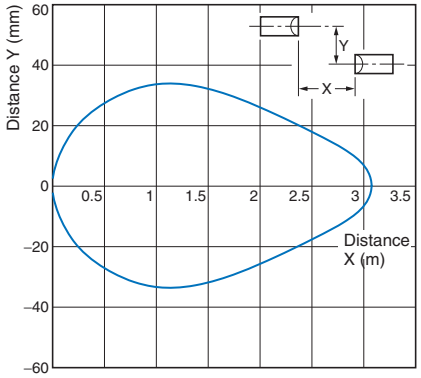
Through-beam

E3JM-10□4(T)-N



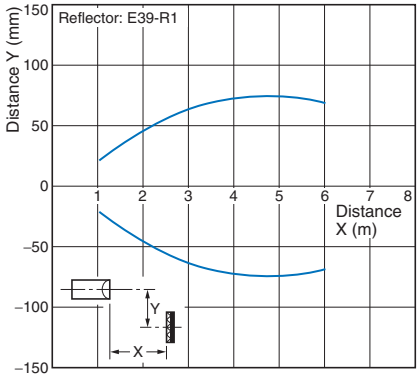
Through-beam

E3JM-10□4(T)-N + E39-S39 (Optional Slit)
(A Slit is mounted to the Emitter and Receiver.)



Retro-reflective

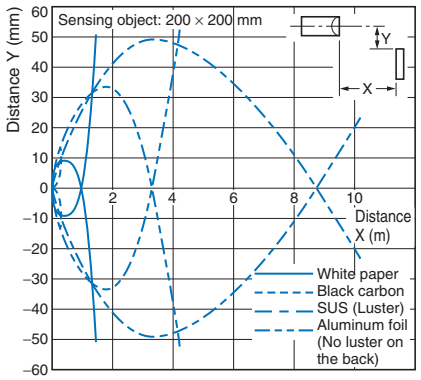
E3JM-R4□4(T) + E39-R1
(Supplied Reflector)



Operating Range

Diffuse-reflective

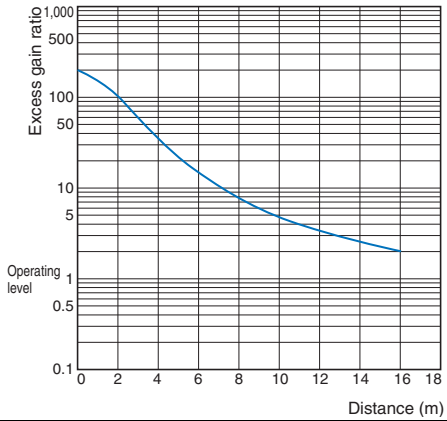
E3JM-DS70□4(T)



Excess Gain Ratio vs. Set Distance

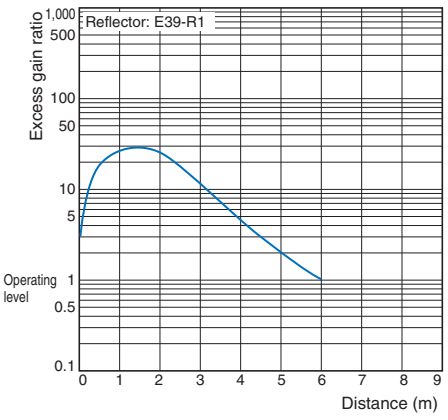
Through-beam

E3JM-10□4(T)-N

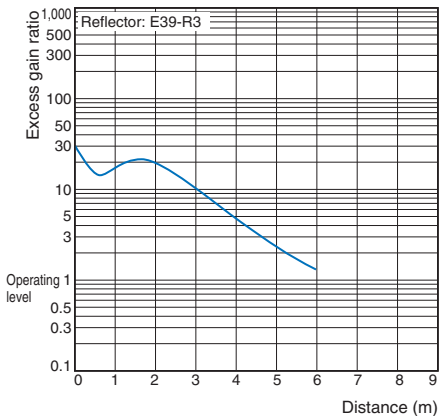


Retro-reflective

E3JM-R4□4(T) + E39-R1
(Supplied Reflector)

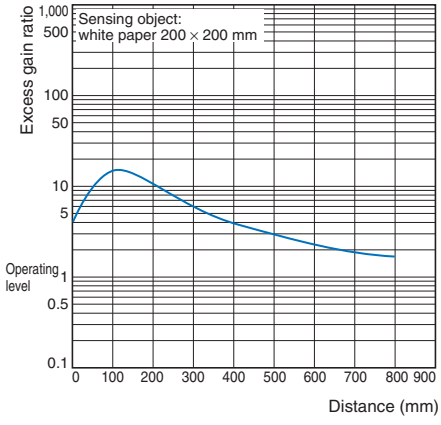


E3JM-R4□4(T) + E39-R3
(Optional Reflector)



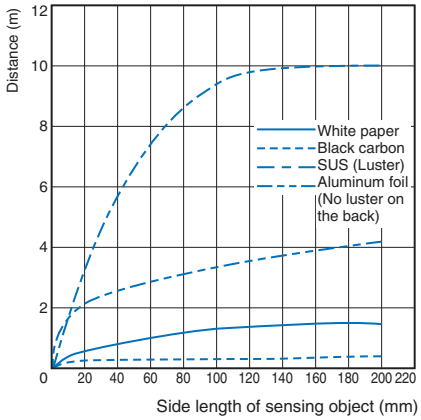
Diffuse-reflective

E3JM-DS70□4(T)



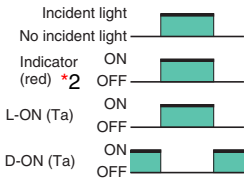
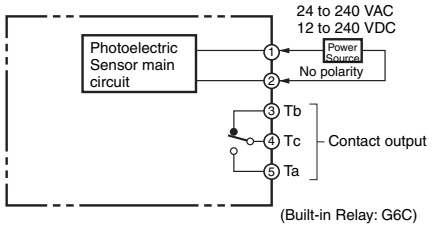
Sensing Object Size vs. Sensing Distance

E3JM-DS70□4(T)

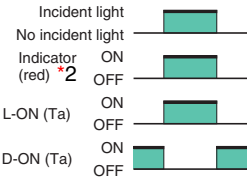
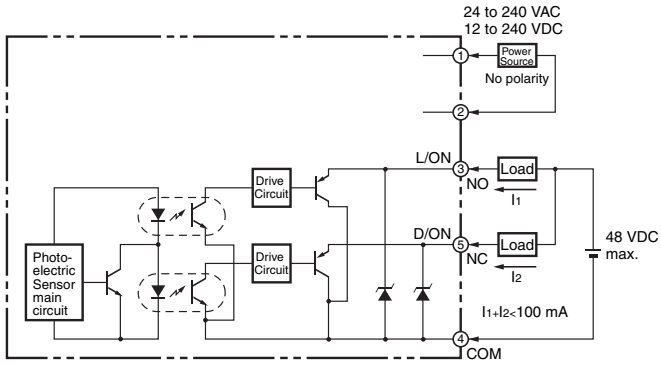


I/O Circuit Diagrams

Relay Output Models

Model	Timing chart	Output circuit
E3JM-10M4(T)-N *1 E3JM-R4M4(T) E3JM-DS70M4(T)	 Refer to page 7 for information on Sensors with timers (T).	 (Built-in Relay: G6C)

DC SSR Output Models

Model	Timing chart	Output circuit
E3JM-10S4(T)-N *1 E3JM-R4S4(T) E3JM-DS70S4(T)	 Refer to page 7 for information on Sensors with timers (T).	

Note: Connect terminal 1 to any polarity and terminal 2 to the power supply because there is no polarity on the Emitter side.

*1. Models numbers for Through-beam Sensors (E3JM-10□4(T)-N) are for sets that include both the Emitter and Receiver. The model number of the Emitter is always E3JM-10L-N. Add a "D" to get the model number of the Receiver (example: E3JM-10DM4-N). Confirm the model numbers of the Emitter and Receiver in *Ordering Information*.

*2. This is the light indicator on Sensors without a timer and the operation indicator on Sensors with a timer.

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.



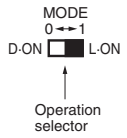
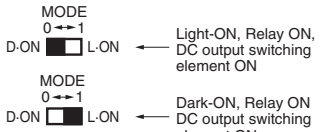
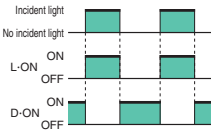
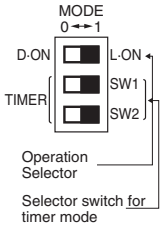
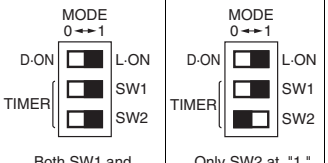
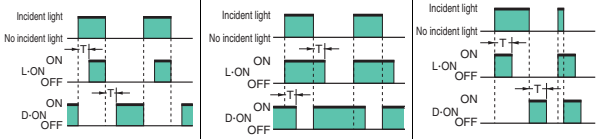
Precautions for Correct Use

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

● Designing

Operation

Note: ■ The white part of the DIP switch indicates which setting is selected.

<table>
<tr><th></th><th>Switch configuration</th><th colspan="3">Switch selection</th><th colspan="3">Timing charts</th></tr>
<tr><td>Models without timer</td><td>
</td><td colspan="3">
</td><td colspan="3">
</td></tr>
<tr><td>Models with timer</td><td rowspan="2">
</td><td>ON-delay</td><td>OFF-delay</td><td>One-shot delay</td><td>ON-delay</td><td>OFF-delay</td><td>One-shot delay</td></tr>
<tr><td>
</td><td colspan="3">
</td></tr>
<tr><td colspan="4">Note: The operation selector is the same as that for models without a timer.</td><td colspan="3"></td></tr>
</table>

Output Relay Contact

If E3JM is connected to a load with contacts that spark when the load is turned OFF (e.g., a contactor or valve), the normally-closed side may be turned ON before the normally-open side is turned OFF or vice-versa. If both normally-open output and normally-closed output are used simultaneously, apply an surge suppressor to the load.
Refer to *OMRON's PCB Relays Catalog* (X33) for typical examples of surge suppressors.

● Wiring

Connecting and Wiring

- We recommend connecting a cable with a conductor cross-section of 0.3 mm^2 and an outer diameter of 6 to 8 mm.
- Be sure to firmly tighten the cover in order to maintain waterproof and dustproof properties. The screw size of the conduit sockets is shown in the following table.

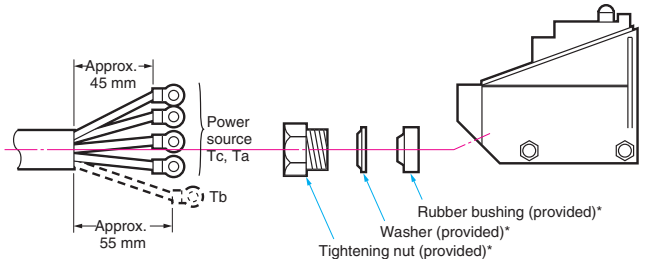
Model	Conduit socket thread size
E3JM-□	PF1/2

- When using the DC SSR output model, the total of the load current for the Light-ON output (NO) and that for the Dark-ON (NC) should be 100 mA max. If the total exceeds 100 mA, the load short-circuit protection function will be activated (this function will be reset when the power of the Photoelectric Sensor is turned OFF).

Cable End Treatment

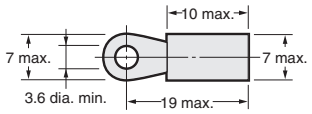
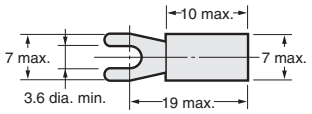
Adjust the four wires to the same length when the Ta output is to be used only. If both the Ta and Tb outputs are to be used, treat them as shown in the following diagram.

Recommended example



✻ These parts are not provided with models with a -US suffix.

Recommended Crimp Terminal Dimensions (Unit: mm)

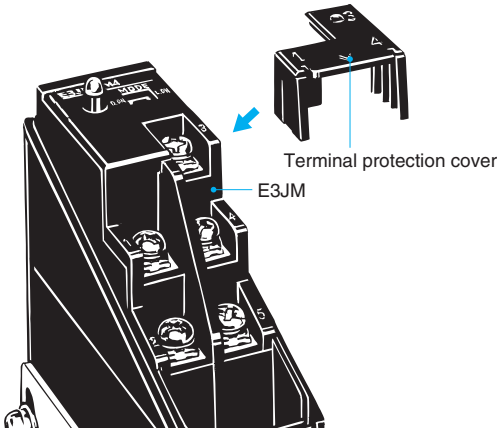
Round type	Fork type
	
(After crimping)	(After crimping)

Note: Use terminals with insulation tube (recommended crimp terminal: 1.25 to 3.5).

● Others

Terminal Protection Cover (Provided)

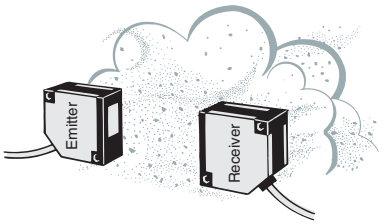
The terminal protection cover is designed to improve safety by maintaining the sensitivity properties of the product and by preventing any contact with charged sections while it is being operated with the mode set to the timer mode. Mount the product as shown in the following diagram (mount the Through-beam Model on the Receiver side).



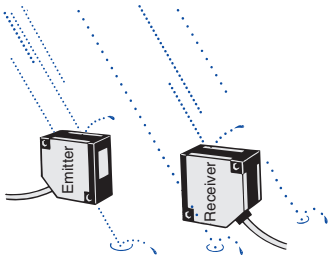
Ambient Conditions (Installation Area)

The E3JM will malfunction if installed in the following places.

- Places where the E3JM is exposed to a dusty environment.
- Places where corrosive gases are produced.



- Places where the E3JM is directly exposed to water, oil, or chemicals.

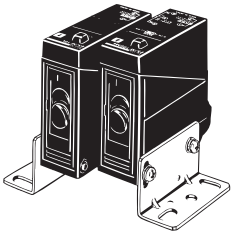


Dimensions

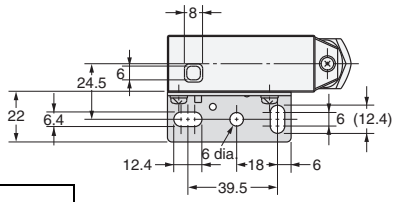
(Unit: mm)
Tolerance class IT16 applies to dimensions in this datasheet unless otherwise specified.

Sensors

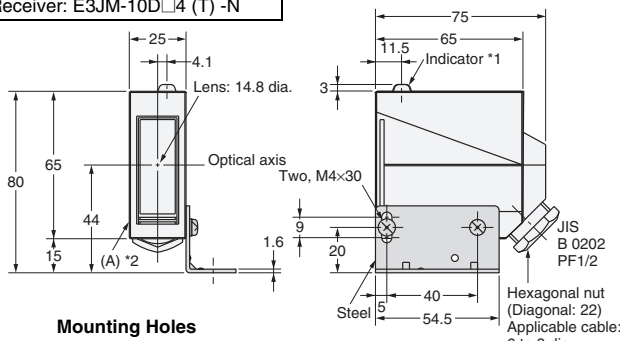
E3JM-10□4(T)-N ✻



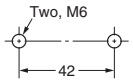
With Mounting Bracket Attached



Emitter: E3JM-10L-N
Receiver: E3JM-10D□4 (T) -N



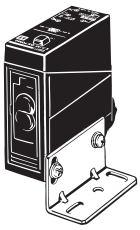
Mounting Holes



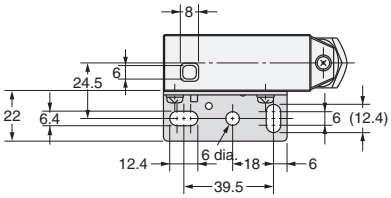
*1. Emitter: Power indicator
Receiver: Light indicator (without timer function)
Operation indicator (with timer function)
*2. Mounting Brackets can be used on the A side.

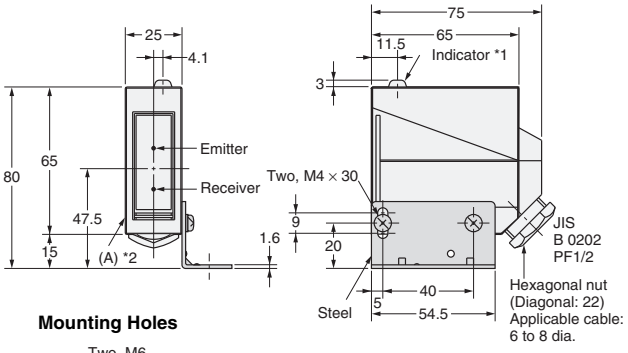
Note: The operating mode switch and timer mode switch are located inside the cover.

E3JM-R4□4(T)
E3JM-DS70□4(T)

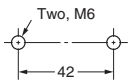


With Mounting Bracket Attached





Mounting Holes



*1. Light indicator (without timer function)
Operation indicator (with timer function)
*2. Mounting Brackets can be used on the A side.

Note: The operating mode switch, timer mode switch, and sensitivity adjuster (sensitivity adjuster: E3JM-DS70□4(T) only) are located inside the cover.

✻ Models numbers for Through-beam Sensors (E3JM-10□4(T)-N) are for sets that include both the Emitter and Receiver. The model number of the Emitter is always E3JM-10L-N. Add a "D" to get the model number of the Receiver (example: EE3JM-10DM4-N). Confirm the model numbers of the Emitter and Receiver in *Ordering Information*.

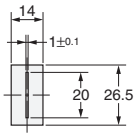
Accessories (Order separately)

Seal-type Long Slit

E39-S39



Materials: Polyester
0.1-mm thick



Mounting Brackets

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

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2016.12

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