

E3S-C

- Water- and Oil-resistive Photoelectric Sensor with Metal Housing Used for Long-range Sensing
- Satisfies the water- and oil-resistive requirements and safe enough for use in oil-mist environments.
- Long-range sensing up to 30 m with Through-beam models.
- Shock resistance rated at 1,000m/s² is Proximity Sensor-quality.
- Series includes pre-wired M12 metal connector models.
- NPN/PNP selector switch output.



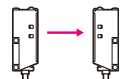
CE

⚠ Be sure to read *Safety Precautions* on page 6.

Ordering Information

Sensors

Red light Infrared light

Sensing method	Appearance	Connection method	Sensing distance			Model
Through-beam	Horizontal 	Pre-wired				E3S-CT11
		Pre-wired Connector (M12)				E3S-CT11-M1J
	Vertical 	Pre-wired			30 m	E3S-CT61
		Pre-wired Connector (M12)				E3S-CT61-M1J
Retro-reflective	Horizontal 	Pre-wired				E3S-CR11
		Pre-wired Connector (M12)				E3S-CR11-M1J
	Vertical 	Pre-wired		3 m		E3S-CR61
		Pre-wired Connector (M12)				E3S-CR61-M1J
Diffuse-reflective	Horizontal 	Pre-wired	700 mm			E3S-CD11
			2 m			E3S-CD12
		Pre-wired Connector (M12)	700 mm			E3S-CD11-M1J
			2 m			E3S-CD12-M1J
	Vertical 	Pre-wired	700 mm			E3S-CD61
			2 m			E3S-CD62
		Pre-wired Connector (M12)	700 mm			E3S-CD61-M1J
			2 m			E3S-CD62-M1J

Accessories (Order Separately)

Slits

Slit width	Sensing distance	Minimum detectable object (typical)	Model	Quantity	Remarks
0.5 mm × 11 mm	1.8 m	0.5-mm dia.	E39-S61	1 set each for Emitter and Receiver (8 Slits total)	(Snap-in Long Slit) Can be used with the E3S-CT□1(-M1J) Through-beam Sensor. Refer to page 10.
1 mm × 11 mm	3.5 m	1-mm dia.			
2 mm × 11 mm	7 m	2-mm dia.			
4 mm × 11 mm	15 m	2.6-mm dia.			

Reflectors

Name	Sensing distance (typical)	Model	Quantity	Remarks
Reflectors	3 m (rated value)	E39-R1	1	Provided with the E3S-CR□1 (-M1J) Retro-reflective Sensor.
	4 m	E39-R2	1	---
Small Reflectors	1.5 m	E39-R3	1	---
	750 mm	E39-R4	1	---
Tape Reflectors	700 mm (50 mm)*	E39-RS1	1	Enables MSR function.
	1,100 mm (100 mm)*	E39-RS2	1	
	1,400 mm (100 mm)*	E39-RS3	1	

Note: When using any reflector other than the provided one, use a sensing distance of approximately 0.7 times the typical value as a guide.

* Values in parentheses indicate the minimum distance required between the Sensor and Reflector.

Mounting Brackets

Appearance	Model	Quantity	Remarks
	E39-L102	1	Provided with Horizontal Models.
	E39-L103	1	Provided with Vertical Models.
	E39-L85	1	Mounting bracket for changing from E3S-□□□□42/44 to E3S-C Vertical Models.
	E39-L86	1	Mounting bracket for changing from E3S-□□□□43 to E3S-C Vertical Models.
	E39-L87	1	---

Note: If a Through-beam model is used, order two Mounting Brackets, one for the Emitter and one for the Receiver.

Sensor I/O Connectors

Cable	Appearance	Cable type		Model
Standard	Straight 	2 m	3-wire	XS2F-D421-DC0-A
		5 m		XS2F-D421-GC0-A
	L-shape 	2 m		XS2F-D422-DC0-A
		5 m		XS2F-D422-GC0-A

Note: For details on Sensor I/O Connectors and cables such as vibration-proof robot cables.

Ratings and Specifications

Item		Sensing method	Through-beam	Retro-reflective (with M.S.R. function) *1	Diffuse reflective	
		Model	Horizontal E3S-CT11(-M1J)	Horizontal E3S-CR11(-M1J)	Horizontal E3S-CD11(-M1J)	Horizontal E3S-CD12(-M1J)
			Vertical E3S-CT61(-M1J)	Vertical E3S-CR61(-M1J)	Vertical E3S-CD61(-M1J)	Vertical E3S-CD62(-M1J)
Sensing distance		30 m	3 m (when using E39-R1)	700 mm (300 × 300 mm white paper)	2 m (300 × 300 mm white paper)	
Standard sensing object		Opaque, 15-mm dia. min.	Opaque, 75-mm dia. min.	---		
Differential travel		---			20% max. of sensing distance	
Directional angle		Emitter and Receiver: 3° to15°	3° to 10°	---		
Light source (wavelength)		Infrared LED (880 nm)	Red LED (700 nm)	Infrared LED (880 nm)		
Power supply voltage		10 to 30 VDC including 10% (p.p) ripple				
Current consumption		50 mA max. (Emitter 25 mA max. Receiver 25 mA max.)	40 mA max.			
Control output		Load power supply voltage: 30 VDC max. Load current: 100 mA max. (Residual voltage: NPN output: 1.2 V max., PNP output: 2.0 V max.) Open controller output (NPN/PNP selectable) Light-ON/Dark-ON selectable				
Protection circuits		Power supply reverse polarity circuit protection, Output short-circuit protection	Power supply reverse polarity protection, Output short-circuit protection, Mutual interference prevention			
Response time		Operate or reset: 1 ms max.			Operate or reset 2 ms max.	
Sensitivity adjustment		One-turn adjuster			Two-turn endless adjuster with an indicator	
Ambient illumination (Receiver side)		Incandescent lamp: 5,000 lx max. Sunlight: 10,000 lx max.				
Ambient temperature range		Operating: −25°C to 55°C, Storage: −40°C to 70°C (with no icing or condensation)				
Ambient humidity range		Operating: 35% to 85%, Storage: 35% to 95% (with no condensation)				
Insulation resistance		20 MΩ min. (at 500 VDC)				
Dielectric strength		1,000 VAC, 50/60 Hz for 1 min				
Vibration resistance		Destruction: 10 to 2,000 Hz, 1.5-mm double amplitude or 300 m/s ² for 0.5 hours each in X, Y, and Z directions				
Shock resistance		Destruction: 1,000 m/s ² 3 times each in X, Y, and Z directions				
Degree of protection		IEC 60529: IP67 (in-house standards: oil-resistant), NEMA: 6P (indoors only) *2				
Connection method		Pre-wired (standard cable length: 2 m) or Pre-wired M12 Connector (standard cable length: 0.3 m)				
Weight (packed state)		Approx. 270 g (Pre-wired cable) Approx. 230 g (Pre-wired Connector (M12))	Approx. 160 g (Pre-wired cable) Approx. 130 g (Pre-wired Connector (M12))	Approx. 150 g (Pre-wired cable) Approx. 110 g (Pre-wired Connector (M12))		
Material	Case	Zinc die-cast				
	Operation panel cover	PES (polyether sulfone)				
	Lens	Methacrylic resin				
	Mounting Bracket	Stainless steel (SUS304)				
Accessories		Mounting Bracket (with screws), Adjustment screwdriver, Instruction manual, and Reflector (only for Retro-reflective Sensors)				

*1. Refer to MSR function of Technical Guide (Technical version).

*2. NEMA: National Electrical Manufacturers Association

I/O Circuit Diagrams

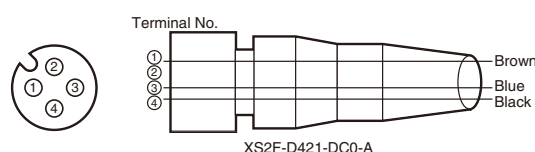
NPN Output

Model	Operation mode	Timing charts	Operation selector	Output circuits
E3S-CT11(-M1J) E3S-CT61(-M1J) E3S-CR11(-M1J) E3S-CR61(-M1J) E3S-CD11(-M1J) E3S-CD12(-M1J) E3S-CD61(-M1J) E3S-CD62(-M1J)	Light-ON	Incident light No incident light Light indicator (Red) ON OFF Output transistor ON OFF Load (relay) Operate Reset (Between brown and black leads)	L side (LIGHT ON)	Through-beam Model Receivers: Retro-reflective Models, Reflective Models * Set the NPN or PNP selector to NPN. Connector Pin Arrangement Pin 2 is not used.
	Dark-ON	Incident light No incident light Light indicator (Red) ON OFF Output transistor ON OFF Load (relay) Operate Reset (Between brown and black leads)	D side (DARK ON)	Through-beam Model Emitters Connector Pin Arrangement Note: Pins 2 and 4 are not used.

PNP Output

Model	Operation mode	Timing charts	Operation selector	Output circuits
E3S-CT11(-M1J) E3S-CT61(-M1J) E3S-CR11(-M1J) E3S-CR61(-M1J) E3S-CD11(-M1J) E3S-CD12(-M1J) E3S-CD61(-M1J) E3S-CD62(-M1J)	Light-ON	Incident light No incident light Light indicator (Red) ON OFF Output transistor ON OFF Load (relay) Operate Reset (Between blue and black leads)	L side (LIGHT ON)	Through-beam Model Receivers: Retro-reflective Models, Reflective Models * Set the NPN or PNP selector to PNP. Connector Pin Arrangement Pin 2 is not used.
	Dark-ON	Incident light No incident light Light indicator (Red) ON OFF Output transistor ON OFF Load (relay) Operate Reset (Between blue and black leads)	D side (DARK ON)	Through-beam Model Emitters Connector Pin Arrangement Note: Pins 2 and 4 are not used.

Plug (Sensor I/O Connector)

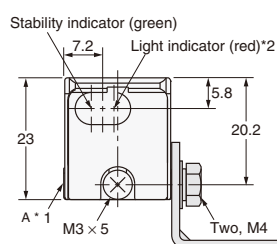
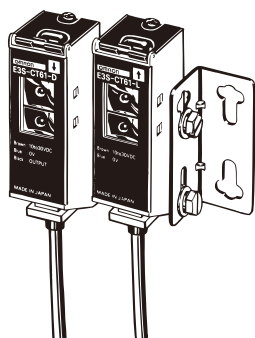


Classification	Conductor	Connector pin No.	Application
DC	Brown	1	Power supply (+V)
	---	2	---
	Blue	3	Power supply (0 V)
	Black	4	Output

Note: Pin 2 is not used.

Through-beam (Vertical)

E3S-CT61(-MJ)

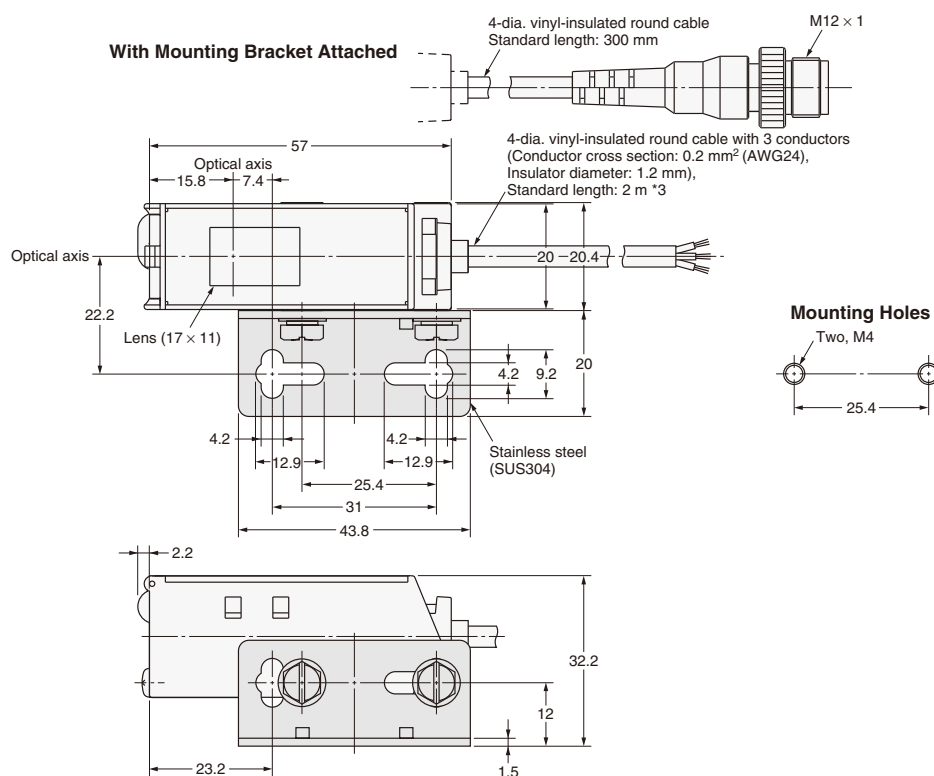


*1. The Mounting Bracket can be attached to side A.

*2. The Emitters for Through-beam Sensors only have the power indicator (red).

*3. The Emitter cable is 4-dia.vinyl-insulated round cable with 2 conductors (conductor cross section: 0.3 mm², insulator diameter: 1.3 mm) and a standard length of 2 m.

Pre-wired Connector (-M1J)

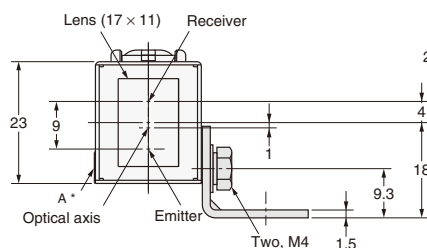
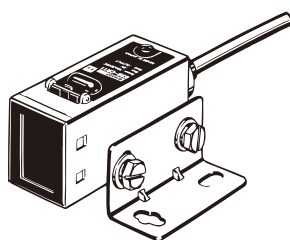


Retro/Diffuse-reflective (Horizontal)

E3S-CR11(-M1J)

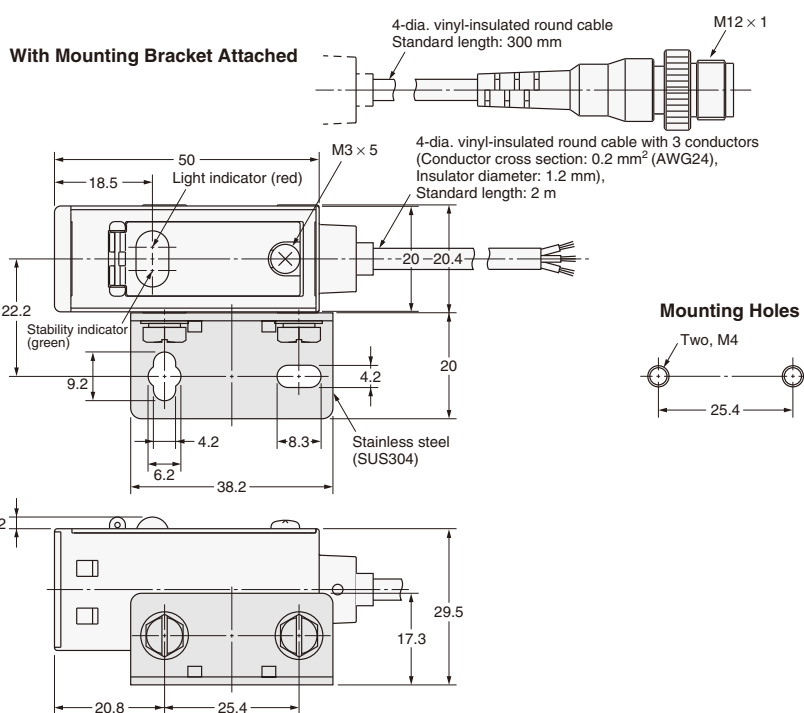
E3S-CD11(-M1J)

E3S-CD12(-M1J)



*The Mounting Bracket can be attached to side A.

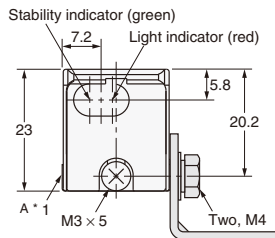
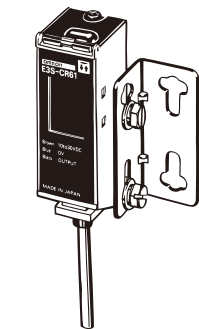
Pre-wired Connector (-M1J)



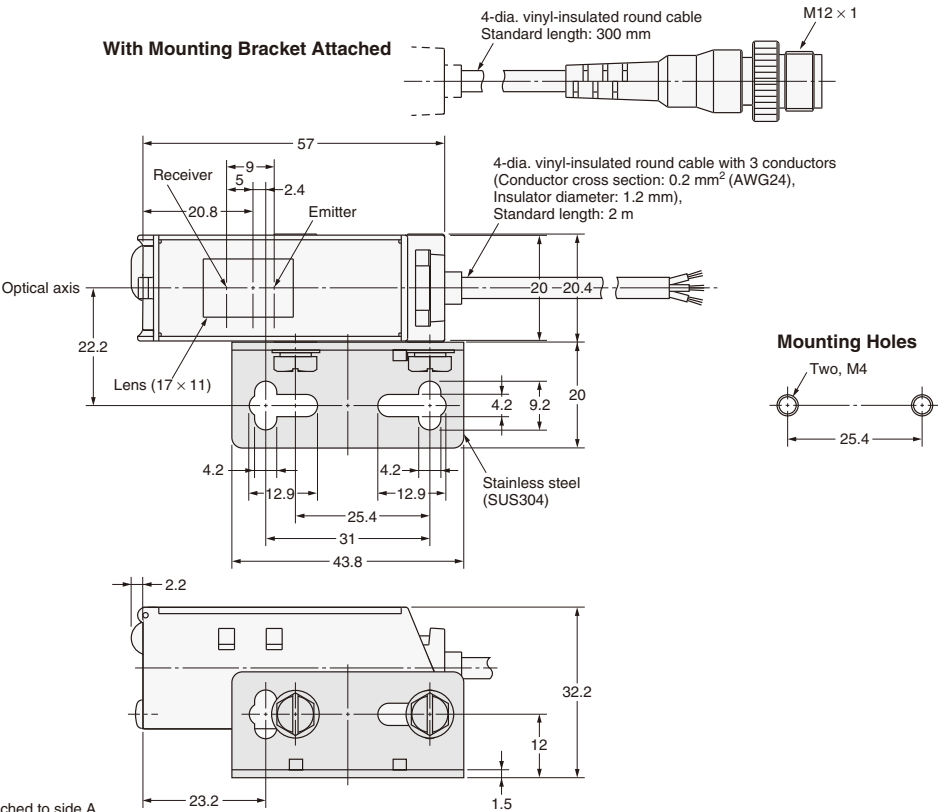
Retro-/Diffuse-reflective (Vertical)

E3S-CR61(-M1J)
E3S-CD61(-M1J)
E3S-CD62(-M1J)

Pre-wired Connector (-M1J)

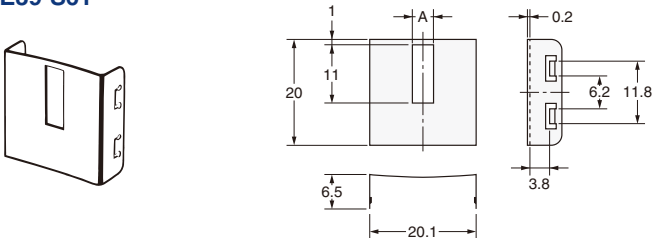


*The Mounting Bracket can be attached to side A.



Accessories (Order Separately)

Snap-in Long Slit (For Through-beam Models)
E39-S61



Dimension A (mm)	Material	Quantity
0.5	Stainless steel	1 set each for Emitter/Receiver (8 Slits total)
1		
2		
4		

- Slits
- Reflectors
- Mounting Brackets