Ultra Small Inductive Proximity Sensor

E2EC

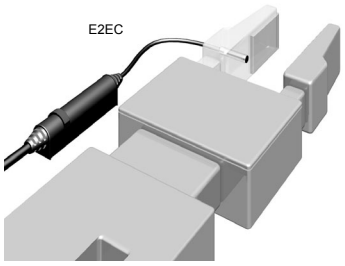
Subminiature Sensor for demanding mounting conditions

- 3 mm dia sensing head for most demanding mounting conditions
- 18 mm long ultra short M12 size housing

Applications

Check of a robot hand chucking

The proximity sensor which can be attached to a moving part like a chucking robot.



Ordering Information

Sensors

DC 2-wire

Shape		Sensing distance	Model	
			Operating status	
			NO	NC
Shield 	3-mm dia. *	0.8mm	**E2EC-CR8D1**	**E2EC-CR8D2**
	5.4-mm dia. *	1.5mm	**E2EC-C1R5D1**	**E2EC-C1R5D2**
	8-mm dia. *	3mm	**E2EC-C3D1**	**E2EC-C3D2**
	M12*	4mm	**E2EC-X4D1**	**E2EC-X4D2**

Note: A different frequency type is available. (E2EC-□□5; e.g.E2EC-CR8D15)

Accessories (Order Separately)

Mounting Brackets

Shape	Model	Applicable models
	**Y92E-F5R4**	E2EC-C1R5D□

Rating/performance

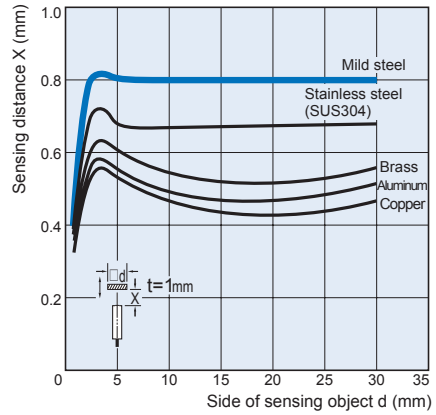
Item \ Type / Model		DC 2-wire			
		E2EC-CR8D□	E2EC-C1R5D□	E2EC-C3D□	E2EC-X4D□
Sensing distance		0.8 mm ±15%	1.5 mm ±10%	3 mm ±10%	4 mm ±10%
Setting distance		0 to 0.56 mm	0 to 1.05 mm	0 to 2.1 mm	0 to 2.8 mm
Differential distance		10% max.			
Sensing object		Ferrous metal (Sensitivity lowers with non-ferrous metals)			
Standard sensing object		Iron, 5 × 5 × 1 mm		Iron, 8 × 8 × 1 mm	Iron, 12 × 12 × 1 mm
Response frequency		1.5 kHz		1 kHz	
Power supply (Operating voltage range)		12 to 24 VDC (10 to 30 VDC) ripple (p-p): 10% max.			
Current consumption		---			
Leakage current		0.8 mA max.			
Control output	Switching capacity	5 to 100 mA			
	Residual voltage	3.0 V max. (under load current of 100 mA with cable length of 2 m)			
Indicator lamp		D1 type: Operation indicator (red LED), Operation set indicator (green LED) D2 type: Operation indicator (red LED)			
Operating status (with sensing object approaching)		D1 models: NO D2 models: NC			
Protective circuits		Surge absorber, short-circuit protection			
Ambient temperature		Operating/Storage: -25°C to 70°C (with no icing or condensation)			
Ambient humidity		Operating/Storage: 35% to 95%RH (with no condensation)			
Temperature influence		±20%max. of sensing distance at 23° in temperature range of -25° to 70°			
Voltage influence		±2.5% max. of sensing distance within a range of ±15% of rated power supply voltage			
Insulation resistance		50 MΩ min. (at 500 VDC) between current carry parts and case			
Dielectric strength		1,000 VAC for 1 min between current carry parts and case			
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions			
Shock resistance		Destruction: 1,000 m/s^2 for 10 times each in X, Y, and Z directions			
Protective structure		IEC60529 IP67			
Connection method		Pre-wired models (standard length: 2 m)			
Weight (Packed state)		Approx. 45 g			
Material	Case	Brass			
	Sensing surface	ABS			
Accessories		Mounting bracket, instruction manual			

* The response frequencies for DC switching are average values measured on condition that the distance between each sensing object is twice as large as the size of the sensing object and the sensing distance set is half of the maximum sensing distance.

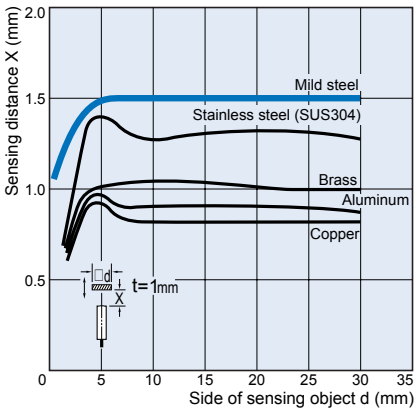
Characteristic data (typical)

Sensing Distance vs. Sensing Object

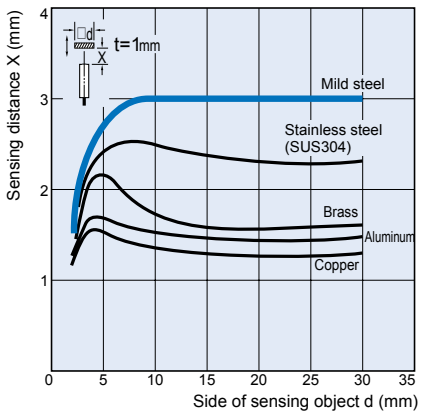
E2EC-CR8D1



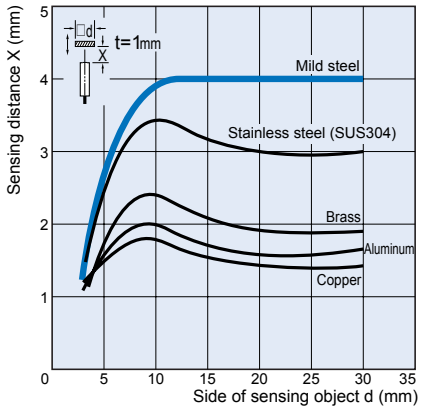
E2EC-C1R5D1



E2EC-C3D1

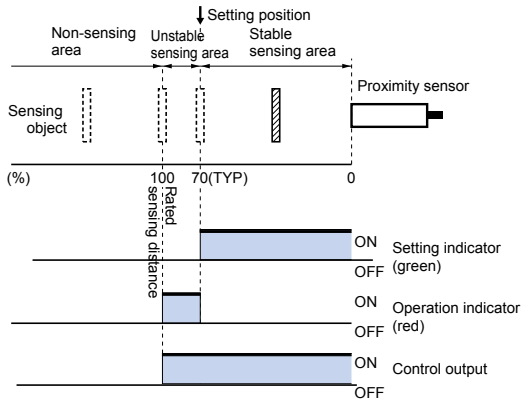
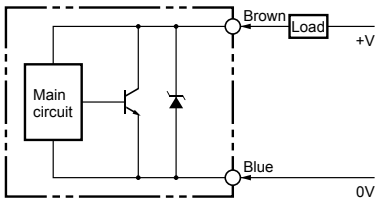


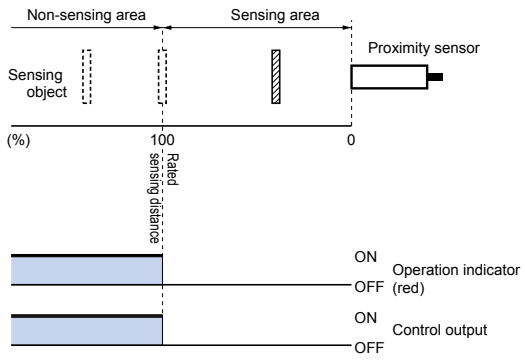
E2EC-X4D1



Output Circuit Diagram

DC 2-wire Models

<table>
<tr><th>Operating status</th><th>Model</th><th>Timing chart</th><th>Output circuit</th></tr>
<tr><td>NO</td><td>E2EC-CR8D1
E2EC-C1R5D1
E2EC-C3D1
E2EC-X4D1</td><td> 
</td><td rowspan="2"> 

Note: The load can be connected to either the +V or 0-V side.</td></tr>
<tr><td>NC</td><td>E2EC-CR8D2
E2EC-C1R5D2
E2EC-C3D2
E2EC-X4D2</td><td> 
</td></tr>
</table>

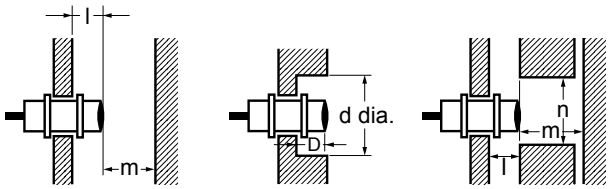
Precautions

Correct Use

Design

Effects of Surrounding Metal

Provide a minimum distance as shown in the table below between the Sensor and the surrounding metal.

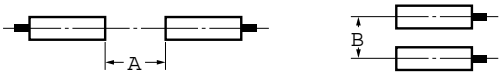


Effects of Surrounding Metal(Unit: mm)

Model / Item	l	d	D	m	n
E2EC-CR8D□	0	3	0	2.4	6
E2EC-C1R5D□		5.4		4.5	10.8
E2EC-C3D□		8		9	16
E2EC-X4D□		12		12	24

Mutual Interference

If more than one Sensor is located face-to-face or in parallel, be sure to maintain enough space, as provided in the following diagram, between adjacent Sensors to suppress mutual interference.



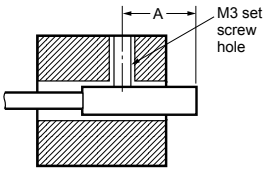
Mutual Interference(Unit: mm)

Model / Item	A	B
E2EC-CR8D□	18 (4)	6 (3)
E2EC-C1R5D□	15 (8)	10.8 (5.4)
E2EC-C3D□	30 (15)	16 (8)
E2EC-X4D□	40 (20)	24 (12)

Note: The above values in parentheses are applicable when using two sensors with different frequencies.

Mounting

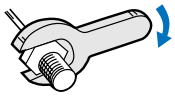
- Refer to the following table for the torque and tightening ranges applied to mount unthreaded E2EC-C models.



Permissible Tightening Torque

Model	Tightening range	Set-screw tightening torque
E2EC-CR8D□	6 to 10 mm	0.49 N•m
E2EC-C1R5D□	8 to 16 mm	
E2EC-C3D□		0.98 N•m

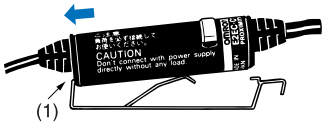
- The tightening torque applied to the E2EC-X4D (I.e., models with column screws) must be 120 kgf•cm (12 N•m) max.



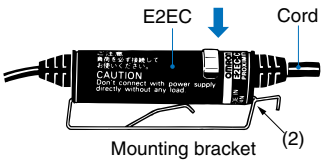
Mounting Bracket for DC 2-wire Models

Mounting

1. Insert the amplifier into the trapezoidal end (I.e., the fixing side) of the mounting bracket.

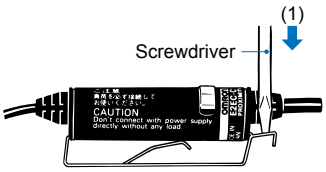


2. Press the other end of the amplifier onto the bracket.

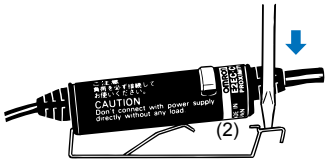


Removal

1. Lightly press the hook of the mounting bracket with a flat-blade screwdriver.



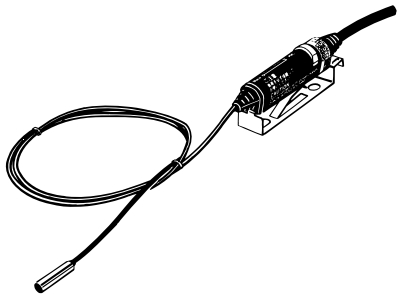
2. The amplifier will automatically spring loose from the mounting bracket.



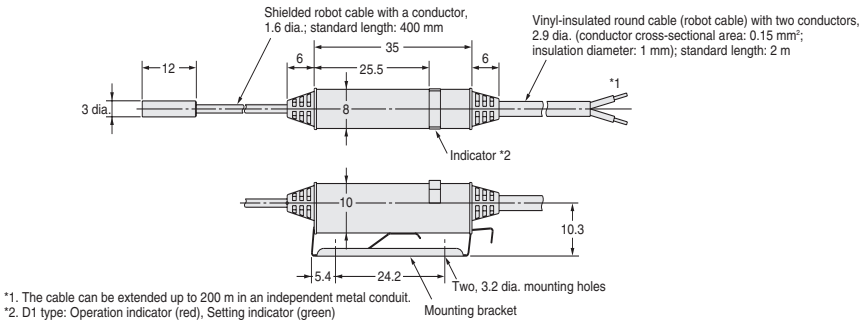
Dimensions (Unit: mm)

Sensors

E2EC-CR8D□

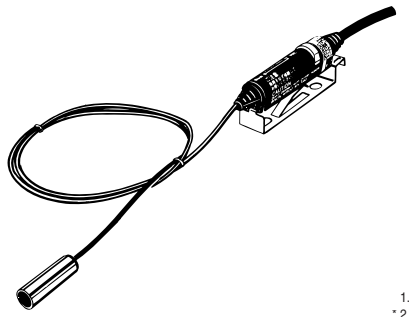


With Mounting Blanket Attached

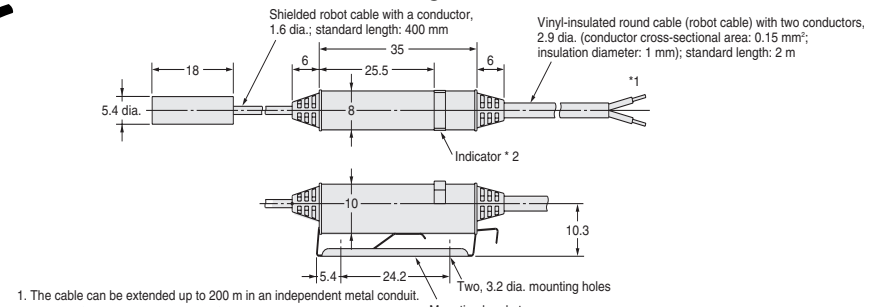


*1. The cable can be extended up to 200 m in an independent metal conduit.
*2. D1 type: Operation indicator (red), Setting indicator (green)

E2EC-C1R5D□

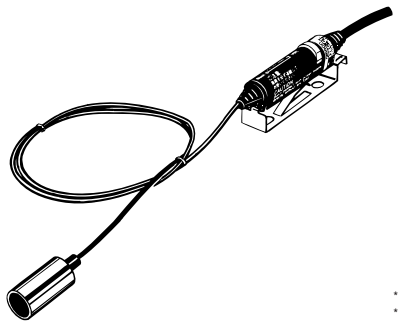


With Mounting Blanket Attached

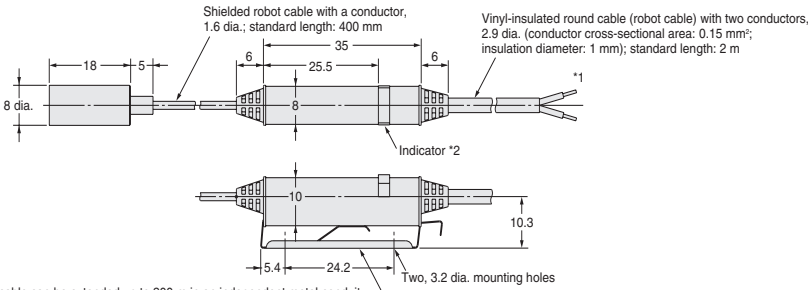


1. The cable can be extended up to 200 m in an independent metal conduit.
* 2. D1 type: Operation indicator (red), Setting indicator (green)

E2EC-C3D□

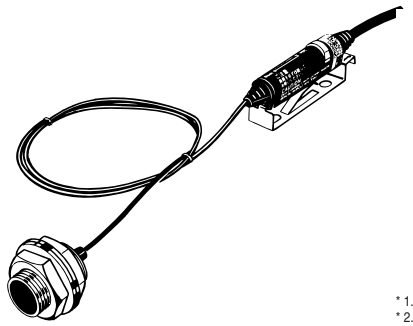


With Mounting Blanket Attached

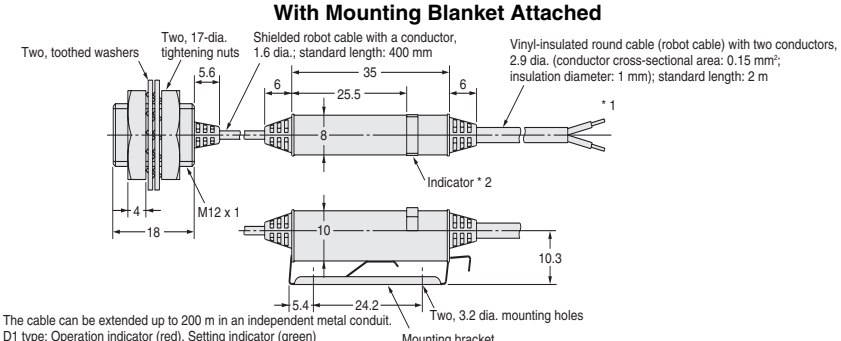


* 1. The cable can be extended up to 200 m in an independent metal conduit.
* 2. D1 type: Operation indicator (red), Setting indicator (green)
D2 type: Operation indicator (red)

E2EC-X4D□

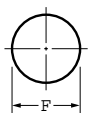


With Mounting Blanket Attached



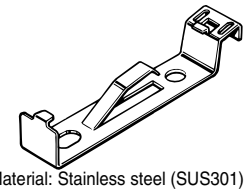
* 1. The cable can be extended up to 200 m in an independent metal conduit.
* 2. D1 type: Operation indicator (red), Setting indicator (green)
D2 type: Operation indicator (red)

Mounting Holes

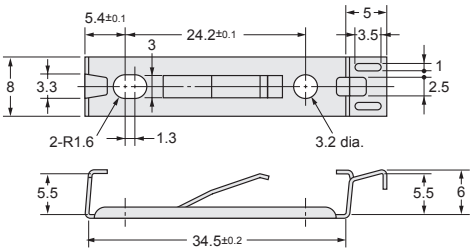


Model	F (mm)
E2EC-CR8D□	3.3-mm dia. $^{+0.}$
E2EC-C1R5D□	5.7-mm dia. $^{+0.}$
E2EC-C3D□	8.5-mm dia. $^{+0.}$
E2EC-X4D□	12.5-mm dia.$^{+0.}$

Mounting Brackets



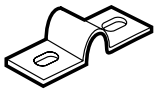
Material: Stainless steel (SUS301)
Note: It is attached to the DC 2-wire sensors.



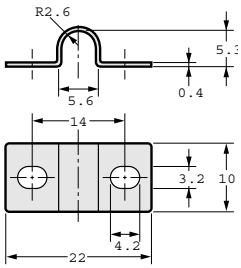
Accessories (Order Separately)

Mounting Brackets

Y92E-F5R4



Material: Stainless steel (SUS304)
Note: E2EC-C1R5D applicable to head of □



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. D09E-EN-01