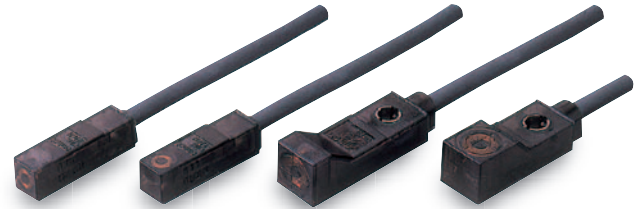


## Advanced Performance and Wide Range of Selections in a Super-compact Size



- Only 5.5 × 5.5 mm with a built-in Amplifier.
- Maximum sensing distance: 2.5 mm. Stable detection even with workpiece fluctuations.
- Response frequency: 1 kHz.
- Low current consumption.



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 6.

## Ordering Information

**Sensors** [Refer to *Dimensions* on page 7.]

### DC 2-Wire Models

Appearance	Sensing surface	Sensing distance	Model	
			Operation mode	
			NO	NC
Unshielded 	Top	1.6 mm	E2S-W11 1M *1 *2	E2S-W12 1M
	Front		E2S-Q11 1M *1 *2	E2S-Q12 1M
	Top	2.5 mm	E2S-W21 1M *1 *2	E2S-W22 1M *2
	Front		E2S-Q21 1M *1 *2	E2S-Q22 1M *2

\*1. Models with a different frequency are also available to prevent mutual interference. The model numbers are E2S-□□□B (e.g., E2S-W11B).

\*2. Models are also available with robotics (bend resistant) cables. Add "-R" to the model number.(e.g., E2S-W11-R 1M)

### DC 3-Wire Models

Appearance	Sensing surface	Sensing distance	Output configuration	Model	
				Operation mode	
				NO	NC
Unshielded 	Top	1.6 mm	NPN	E2S-W13 1M *1 *2	E2S-W14 1M
	Front			E2S-Q13 1M *1 *2	E2S-Q14 1M
	Top	2.5 mm		E2S-W23 1M *1 *2	E2S-W24 1M *2
	Front			E2S-Q23 1M *1 *2	E2S-Q24 1M *2
	Top	1.6 mm	PNP	E2S-W15 1M *1	E2S-W16 1M
	Front			E2S-Q15 1M *1	E2S-Q16 1M
	Top	2.5 mm		E2S-W25 1M *1	E2S-W26 1M
	Front			E2S-Q25 1M *1	E2S-Q26 1M

\*1. Models with a different frequency are also available to prevent mutual interference. The model numbers are E2S-□□□B (e.g., E2S-W13B).

\*2. Models are also available with robotics (bend resistant) cables. Add "-R" to the model number.(e.g., E2S-W13-R 1M)

**Accessories (Order Separately)**

**Mounting Brackets** Some Mounting Brackets are provided with the Sensor. Order other Mounting Brackets separately if required.

[Refer to *Dimensions* on page 7.]

Appearance	Model	Quantity	Remarks
	Y92E-C1R6	1	Provided with E2S-□1□□. (fixed with one screw)
	Y92E-C2R5		Provided with E2S-□2□□. (fixed with one screw)
	Y92E-D1R6		For E2S-□1□□ (fixed with two screws)
	Y92E-D2R5		For E2S-□2□□ (fixed with two screws)

**Model Number Legend**

E2S- □ □ □ □ - □  
 (1) (2) (3) (4) (5) (6)

- (1) Compact Square Series
- (2) Sensing Direction  
 W: Top surface detection  
 Q: Front surface detection
- (3) Size and Sensing Distance (Standard Sensing Object)  
 1: 5.5 × 5.5 mm, 1.6 mm (iron)  
 2: 8 × 8 mm, 2.5 mm (iron)
- (4) Output  
 1: DC 2-wire NO  
 2: DC 2-wire NC  
 3: DC 3-wire NPN NO  
 4: DC 3-wire NPN NC  
 5: DC 3-wire PNP NO  
 6: DC 3-wire PNP NC
- (5) Different Frequency  
 Blank: Standard  
 B: Different frequency
- (6) Robotics (bend resistant) cables  
 Blank: Standard  
 R: Robotics (bend resistant) cables

## Ratings and Specifications

### DC 2-Wire Models

Item	Model	E2S-W11 E2S-W12	E2S-Q11 E2S-Q12	E2S-W21 E2S-W22	E2S-Q21 E2S-Q22
	<b>Sensing surface</b>		Top	Front	Top
<b>Sensing distance</b>		1.6 mm ±15%		2.5 mm ±15%	
<b>Set distance</b>		0 to 1.2 mm		0 to 1.9 mm	
<b>Differential travel</b>		10% max. of sensing distance			
<b>Detectable object</b>		Ferrous metal (The sensing distance decreases with non-ferrous metal. Refer to <i>Engineering Data</i> on page 4.)			
<b>Standard sensing object</b>		Iron, 12 × 12 × 1 mm		Iron, 15 × 15 × 1 mm	
<b>Response frequency *</b>		1 kHz min.			
<b>Power supply voltage (operating voltage range)</b>		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.			
<b>Leakage current</b>		0.8 mA max.			
<b>Control output</b>	<b>Load current</b>	3 to 50 mA max.			
	<b>Residual voltage</b>	3 V max. (under load current of 50 mA with cable length of 1 m)			
<b>Indicators</b>		<input type="checkbox"/> 1 Models: Operation indicator (red), Setting indicator (green) <input type="checkbox"/> 2 Models: Operation indicator (red)			
<b>Operation mode (with sensing object approaching)</b>		<input type="checkbox"/> 1 Models: NO <input type="checkbox"/> 2 Models: NC Refer to the timing charts under <i>I/O Circuit Diagrams</i> on page 5 for details.			

\* The response frequency is an average value.

Measurement conditions are as follows: standard sensing object, a distance of twice the standard sensing object, and a set distance of half the sensing distance.

### DC 3-Wire Models

Item	Model	E2S-W13 E2S-W14	E2S-Q13 E2S-Q14	E2S-W23 E2S-W24	E2S-Q23 E2S-Q24	E2S-W15 E2S-W16	E2S-Q15 E2S-Q16	E2S-W25 E2S-W26	E2S-Q25 E2S-Q26
	<b>Sensing surface</b>		Top	Front	Top	Front	Top	Front	Top
<b>Sensing distance</b>		1.6 mm ±15%		2.5 mm ±15%		1.6 mm ±15%		2.5 mm ±15%	
<b>Set distance</b>		0 to 1.2 mm		0 to 1.9 mm		0 to 1.2 mm		0 to 1.9 mm	
<b>Differential travel</b>		10% max. of sensing distance							
<b>Detectable object</b>		Ferrous metal (The sensing distance decreases with non-ferrous metal. Refer to <i>Engineering Data</i> on page 4.)							
<b>Standard sensing object</b>		Iron, 12 × 12 × 1 mm		Iron, 15 × 15 × 1 mm		Iron, 12 × 12 × 1 mm		Iron, 15 × 15 × 1 mm	
<b>Response frequency *</b>		1 kHz min.							
<b>Power supply voltage (operating voltage range)</b>		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.							
<b>Current consumption</b>		13 mA max. at 24 VDC (no-load)							
<b>Control output</b>	<b>Load current</b>	NPN open-collector output, 50 mA max. (30 VDC max.)				PNP open-collector output, 50 mA max. (30 VDC max.)			
	<b>Residual voltage</b>	1.0 V max. (under load current of 50 mA with cable length of 1 m)							
<b>Indicators</b>		Operation indicator (orange)							
<b>Operation mode (with sensing object approaching)</b>		<input type="checkbox"/> 3 Models: NO <input type="checkbox"/> 4 Models: NC Refer to the timing charts under <i>I/O Circuit Diagrams</i> on page 5 for details.				<input type="checkbox"/> 5 Models: NO <input type="checkbox"/> 6 Models: NC Refer to the timing charts under <i>I/O Circuit Diagrams</i> on page 5 for details.			

\* The response frequency is an average value.

Measurement conditions are as follows: standard sensing object, a distance of twice the standard sensing object, and a set distance of half the sensing distance.

## Specifications

Item	Model	E2S-□□□
Protection circuits		Reverse polarity protection, Surge suppressor
Ambient temperature range		Operating: -25 to 70°C (with no icing or condensation), Storage: -40 to 85°C (with no icing or condensation)
Ambient humidity range		Operating: 35% to 90% (with no condensation), Storage: 35% to 95% (with no condensation)
Temperature influence		±15% max. of sensing distance at 23°C in the temperature range of -25 to 70°C
Voltage influence		±2.5% max. of sensing distance at rated voltage in rated voltage ±10% range
Insulation resistance		50 MΩ min. (at 500 VDC) between current-carrying parts and case
Dielectric strength		1,000 VAC for 1 min between current-carrying parts and case
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 <sup>2</sup> 3 times each in X, Y, and Z directions
Degree of protection		IEC 60529 IP67
Connection method		Pre-wired Models (Standard cable length: 1 m)
Weight (packed state)		Approx. 10 g
Materials	Case	Polyarylate resin
Accessories		Mounting Brackets

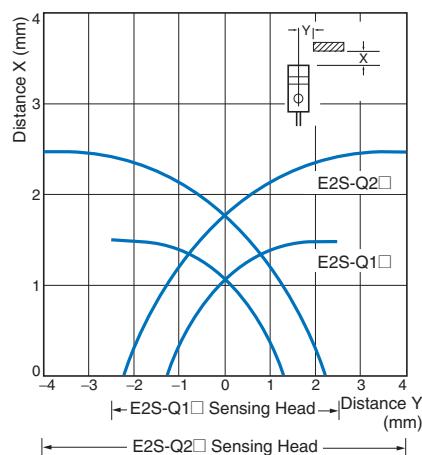
## Engineering Data (Reference Value)

### Sensing Area

E2S-W1□/-W2□



E2S-Q1□/-Q2□

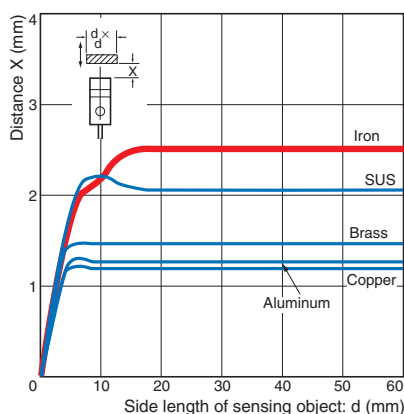


### Influence of Sensing Object Size and Material

E2S-W1□/-Q1□



E2S-W2□/-Q2□



# I/O Circuit Diagrams

## DC 2-Wire Models

Operation mode	Model	Timing chart	Output circuit
NO	E2S-W11 E2S-W21 E2S-Q11 E2S-Q21		<p>Note: The load can be connected to either the +V or 0 V side.</p>
NC	E2S-W12 E2S-W22 E2S-Q12 E2S-Q22		<p>Note: The load can be connected to either the +V or 0 V side.</p>

## DC 3-Wire Models

Operation mode	Output configuration	Model	Timing chart	Output circuit
NO	NPN	E2S-W13 E2S-W23 E2S-Q13 E2S-Q23		<p>* Load current: 50 mA max.</p>
NC		E2S-W14 E2S-W24 E2S-Q14 E2S-Q24		
NO	PNP	E2S-W15 E2S-W25 E2S-Q15 E2S-Q25		<p>* Load current: 50 mA max.</p>
NC		E2S-W16 E2S-W26 E2S-Q16 E2S-Q26		

## 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 this product under ambient conditions that exceed the ratings.

● **Design**

**Influence of Surrounding Metal**

- When mounting the Sensor within a metal panel, ensure that the clearances given in the following table are maintained. Failure to maintain these distances may cause deterioration in the performance of the Sensor.
- Models with Top Sensing Surface



(Unit: mm)

Model	Distance	A	B	C
E2S-W1□	0	0	8	2
E2S-W2□			15	10

- Models with Front Sensing Surface



(Unit: mm)

Model	Distance	A	B	C
E2S-Q1□	8	3	2	
E2S-Q2□	15	10	3	

**Applicable e-CON Connector Models and Manufacturers**

The companies and model number of e-CON connections that can be used with Sensor cables are listed in the following table. Confirm applicability when purchasing e-CON connectors for connection to Pre-wired Sensors.

Model	Applicable e-CON Connector	Manufacturer
E2S-W□3/4	XN2A-1470 Cable Plug Connector	OMRON
E2S-Q□3/4		

**Mutual Interference**

When installing Sensors face-to-face or side-by-side, ensure that the minimum distances given in the following table are maintained.

- Models with Top Sensing Surface
- Models with Front Sensing Surface



(Unit: mm)

Model	Distance	A	B
E2S-W(Q)1□	50 (40) *1	20 (5.5) *1, *2	
E2S-W(Q)2□	75 (50) *1	25 (8) *1, *2	

\*1. Values in parentheses apply to Sensors operating at different frequencies.  
\*2. Mutual interference will not occur for close-proximity mounting if models with different frequencies are used together.

● **Mounting**

**Tightening Torque**

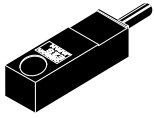
For the E2S-W(Q)2□, the maximum tightening torque that should be applied to the mounting screws is 0.7 N·m.

Dimensions

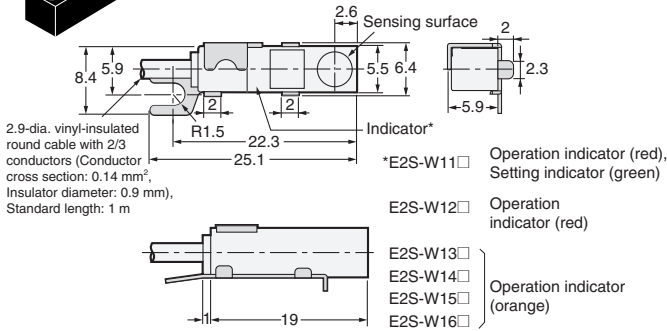
(Unit: mm)  
Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

Sensors

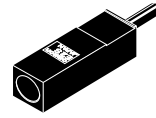
E2S-W1□



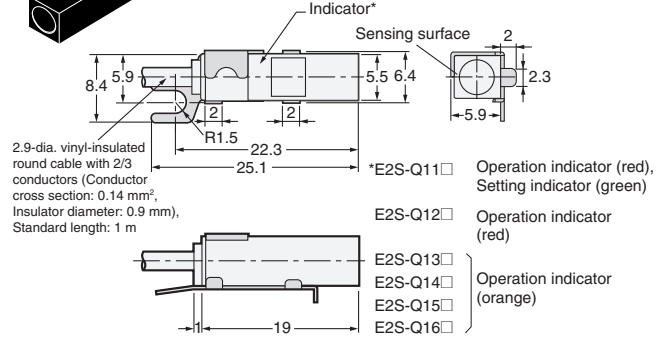
With Mounting Bracket Attached



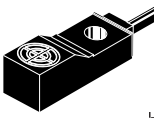
E2S-Q1□



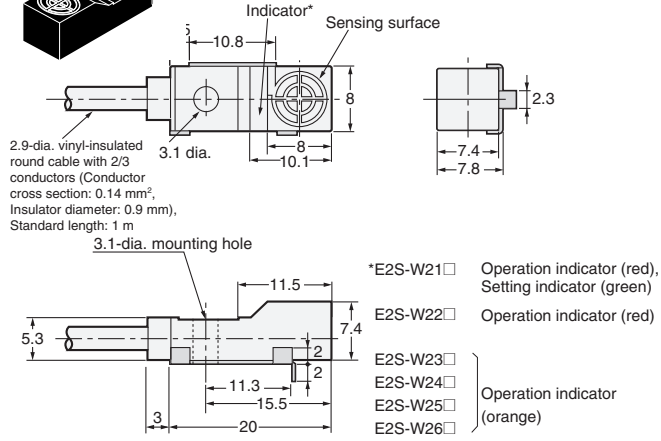
With Mounting Bracket Attached



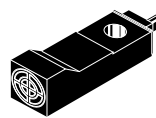
E2S-W2□



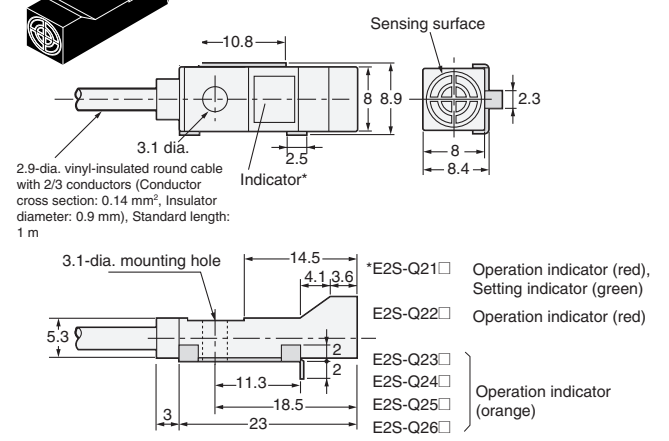
With Mounting Bracket Attached



E2S-Q2□

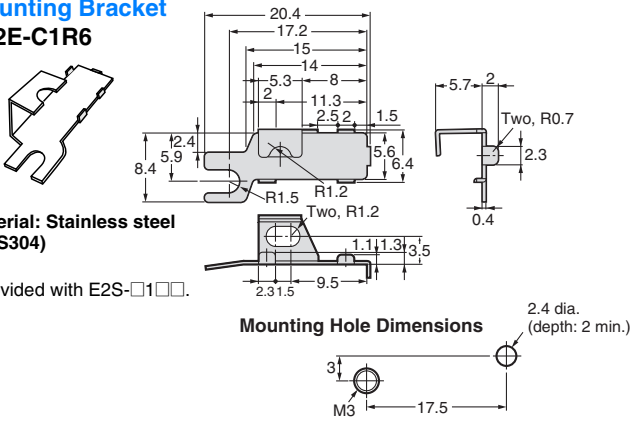


With Mounting Bracket Attached

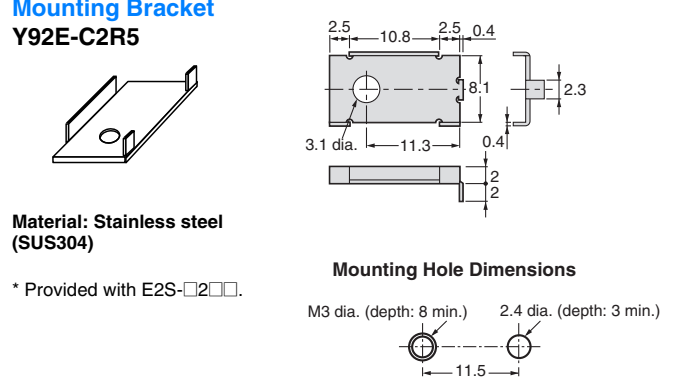


Accessories (Order Separately)

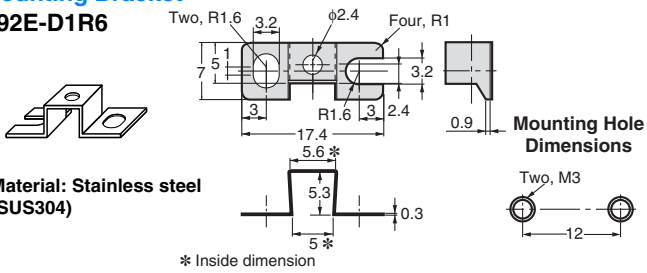
**Mounting Bracket**  
Y92E-C1R6



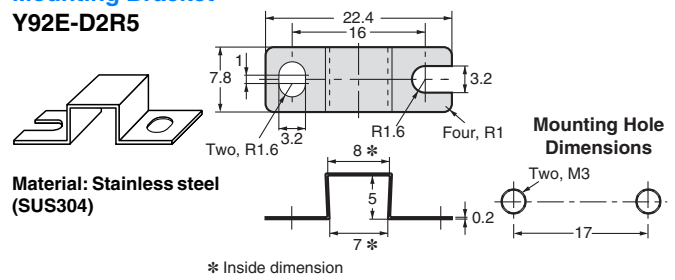
**Mounting Bracket**  
Y92E-C2R5



**Mounting Bracket**  
Y92E-D1R6



**Mounting Bracket**  
Y92E-D2R5





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2014.9

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[E2S-Q13-1M](#) [E2S-Q14 1M](#) [E2S-Q23-U1](#) [E2S-W23-U1](#) [E2S-Q11 1M](#) [E2S-Q11B 1M](#) [E2S-Q12 1M](#) [E2S-Q13B 1M](#)  
[E2S-Q15B 1M](#) [E2S-Q21 5M](#) [E2S-Q21B 1M](#) [E2S-Q22 1M](#) [E2S-Q22B 1M](#) [E2S-Q23B 1M](#) [E2S-Q24 1M](#) [E2S-Q25B](#)  
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[5M](#) [E2S-W21B 1M](#) [E2S-W21B 5M](#) [E2S-W22 1M](#) [E2S-W22B 1M](#) [E2S-W23 3M](#) [E2S-W23B 1M](#) [E2S-W24 1M](#) [E2S-](#)  
[W25B 1M](#) [E2S-W26 1M](#) [E2S-W23 1M](#) [E2S-Q16 1M](#) [E2S-Q15 5M](#) [E2S-W15B 1M](#) [E2S-W23 5M](#) [E2S-W24 5M](#) [E2S-](#)  
[W25 5M](#) [E2S-W26 5M](#)

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Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А