Super-compact Proximity Sensor
E2S

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.

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

CE

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 *	E2S-W12 1M
	Front		E2S-Q11 1M *	E2S-Q12 1M
	Top	2.5 mm	E2S-W21 1M *	E2S-W22 1M
	Front		E2S-Q21 1M *	E2S-Q22 1M

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

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 *	E2S-W14 1M
	Front			E2S-Q13 1M *	E2S-Q14 1M
	Top	2.5 mm		E2S-W23 1M *	E2S-W24 1M
	Front			E2S-Q23 1M *	E2S-Q24 1M
	Top	1.6 mm	PNP	E2S-W15 1M *	E2S-W16 1M
	Front			E2S-Q15 1M *	E2S-Q16 1M
	Top	2.5 mm		E2S-W25 1M *	E2S-W26 1M
	Front			E2S-Q25 1M *	E2S-Q26 1M

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

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		Provided with E2S-□1□□. (fixed with one screw)
	Y92E-C2R5	1	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)

(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

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
Sensing surface	Top	Front	Top	Front
Sensing distance	1.6 mm ±15%		2.5 mm ±15%	
Set distance	0 to 1.2 mm		0 to 1.9 mm	
Differential travel	10% max. of sensing distance			
Detectable object	Ferrous metal (The sensing distance decreases with non-ferrous metal. Refer to *Engineering Data* on page 4.)			
Standard sensing object	Iron, $12 \times 12 \times 1$ mm		Iron, $15 \times 15 \times 1$ mm	
Response frequency *	1 kHz min.			
Power supply voltage (operating voltage range)	12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.			
Leakage current	0.8 mA max.			
Control output — Load current	3 to 50 mA max.			
Control output — Residual voltage	3 V max. (under load current of 50 mA with cable length of 1 m)			
Indicators	□□1 Models: Operation indicator (red), Setting indicator (green) □□2 Models: Operation indicator (red)			
Operation mode (with sensing object approaching)	□□1 Models: NO □□2 Models: NC	Refer to the timing charts under *I/O Circuit Diagrams* 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
Sensing surface	Top	Front	Top	Front	Top	Front	Top	Front
Sensing distance	1.6 mm ±15%		2.5 mm ±15%		1.6 mm ±15%		2.5 mm ±15%	
Set distance	0 to 1.2 mm		0 to 1.9 mm		0 to 1.2 mm		0 to 1.9 mm	
Differential travel	10% max. of sensing distance							
Detectable object	Ferrous metal (The sensing distance decreases with non-ferrous metal. Refer to *Engineering Data* on page 4.)							
Standard sensing object	Iron, $12 \times 12 \times 1$ mm		Iron, $15 \times 15 \times 1$ mm		Iron, $12 \times 12 \times 1$ mm		Iron, $15 \times 15 \times 1$ mm	
Response frequency *	1 kHz min.							
Power supply voltage (operating voltage range)	12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.							
Current consumption	13 mA max. at 24 VDC (no-load)							
Control output — Load current	NPN open-collector output, 50 mA max. (30 VDC max.)				PNP open-collector output, 50 mA max. (30 VDC max.)			
Control output — Residual voltage	1.0 V max. (under load current of 50 mA with cable length of 1 m)							
Indicators	Operation indicator (orange)							
Operation mode (with sensing object approaching)	□□3 Models: NO □□4 Models: NC Refer to the timing charts under *I/O Circuit Diagrams* on page 5 for details.				□□5 Models: NO □□6 Models: NC Refer to the timing charts under *I/O Circuit Diagrams* 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/s² 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 (Typical)
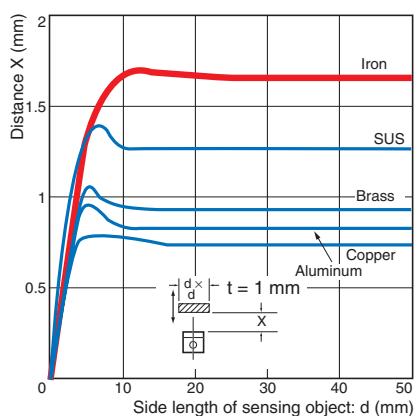
Sensing Area

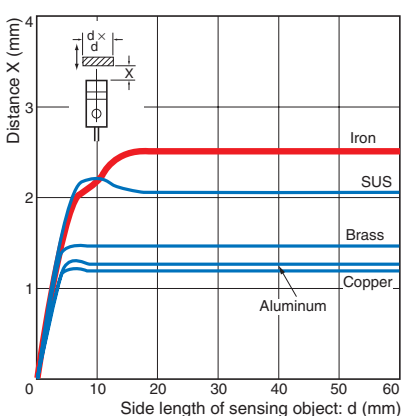**E2S-W1☐/-W2☐**
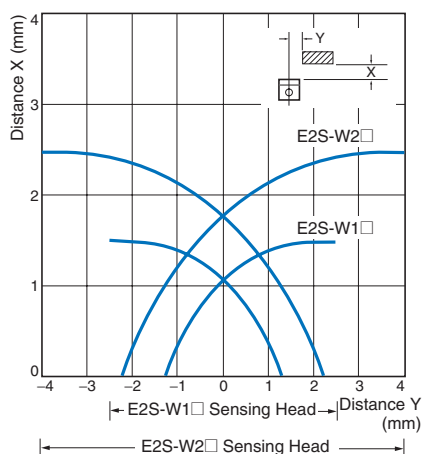
E2S-Q1☐/-Q2☐
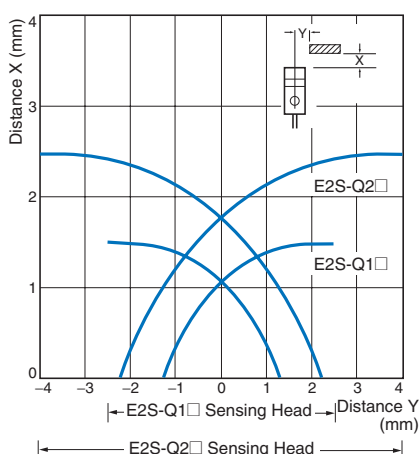
Influence of Sensing Object Size and Material

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		 Note: The load can be connected to either the +V or 0 V side.
NC	E2S-W12 E2S-W22 E2S-Q12 E2S-Q22		

DC 3-Wire Models

Operation mode	Output configuration	Model	Timing chart	Output circuit
NO	NPN	E2S-W13 E2S-W23 E2S-Q13 E2S-Q23		 * Load current: 50 mA max.
NC		E2S-W14 E2S-W24 E2S-Q14 E2S-Q24		
NO	PNP	E2S-W15 E2S-W25 E2S-Q15 E2S-Q25		 * Load current: 50 mA max.
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.
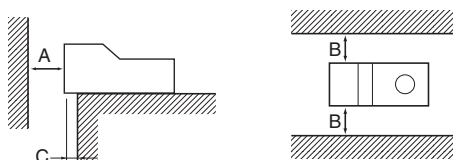- Models with Top Sensing Surface
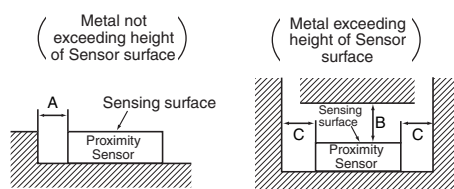
(Unit: mm)

Model Distance	A	B	C
E2S-W1☐	0	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.
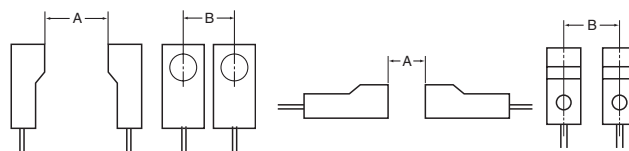
Model	Tyco Electronics AMP K.K.
E2S-W☐3/4	1-1473562-4 (red)
E2S-Q☐3/4	

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)	20 (5.5)
E2S-W(Q)2☐	75 (50)	25 (8)

Note: Values in parentheses apply to Sensors operating at different frequencies.
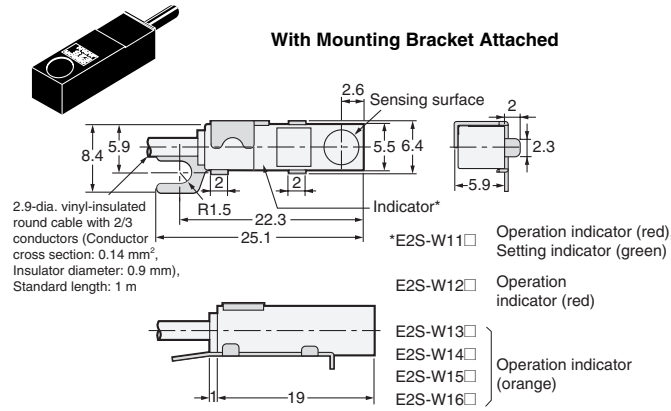
● **Mounting**

Tightening Torque

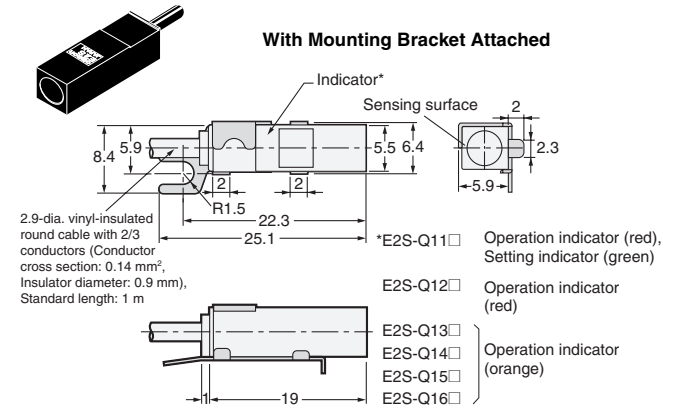For the E2S-W(Q)2☐, the maximum tightening torque that should be applied to the mounting screws is 0.7 N·m.
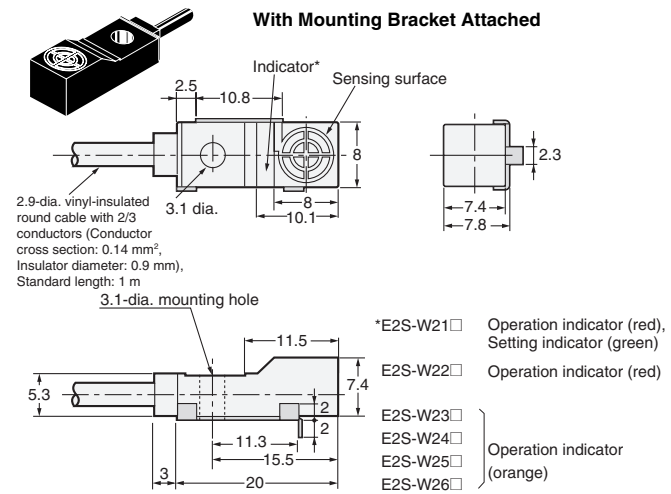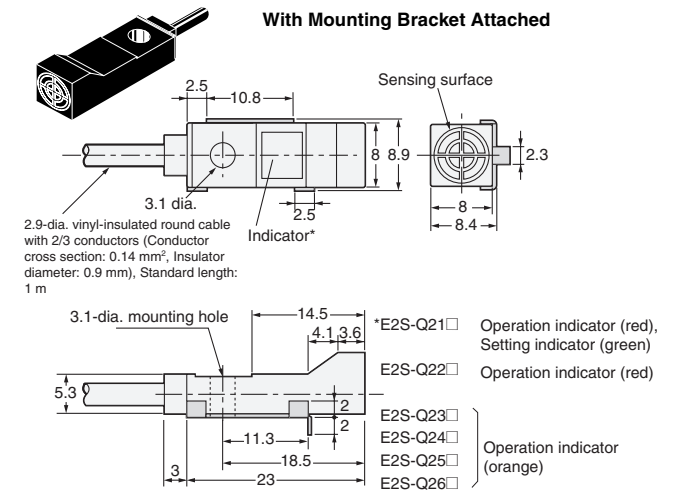
Dimensions

Sensors

E2S-W1□

With Mounting Bracket Attached

2.6 Sensing surface

8.4 5.9 5.5 6.4 2 2.3 5.9

2.9-dia. vinyl-insulated round cable with 2/3 conductors (Conductor cross section: 0.14 mm², Insulator diameter: 0.9 mm), Standard length: 1 m

R1.5 2 2 22.3 25.1 Indicator*

*E2S-W11□	Operation indicator (red), Setting indicator (green)
E2S-W12□	Operation indicator (red)
E2S-W13□ E2S-W14□ E2S-W15□ E2S-W16□	Operation indicator (orange)

1 19

E2S-Q1□

With Mounting Bracket Attached

Indicator* Sensing surface

8.4 5.9 5.5 6.4 2 2.3 5.9

2.9-dia. vinyl-insulated round cable with 2/3 conductors (Conductor cross section: 0.14 mm², Insulator diameter: 0.9 mm), Standard length: 1 m

R1.5 2 2 22.3 25.1

*E2S-Q11□	Operation indicator (red), Setting indicator (green)
E2S-Q12□	Operation indicator (red)
E2S-Q13□ E2S-Q14□ E2S-Q15□ E2S-Q16□	Operation indicator (orange)

1 19

E2S-W2□

With Mounting Bracket Attached

2.5 10.8 Indicator* Sensing surface

8 3.1 dia. 8 10.1 2.3 7.4 7.8

2.9-dia. vinyl-insulated round cable with 2/3 conductors (Conductor cross section: 0.14 mm², Insulator diameter: 0.9 mm), Standard length: 1 m

3.1-dia. mounting hole

11.5 7.4 5.3 2 2 11.3 15.5 3 20

*E2S-W21□	Operation indicator (red), Setting indicator (green)
E2S-W22□	Operation indicator (red)
E2S-W23□ E2S-W24□ E2S-W25□ E2S-W26□	Operation indicator (orange)

E2S-Q2□

With Mounting Bracket Attached

2.5 10.8 Sensing surface

8 8.9 3.1 dia. 2.5 Indicator* 2.3 8 8.4

2.9-dia. vinyl-insulated round cable with 2/3 conductors (Conductor cross section: 0.14 mm², Insulator diameter: 0.9 mm), Standard length: 1 m

3.1-dia. mounting hole

14.5 4.1 3.6 5.3 2 2 11.3 18.5 3 23

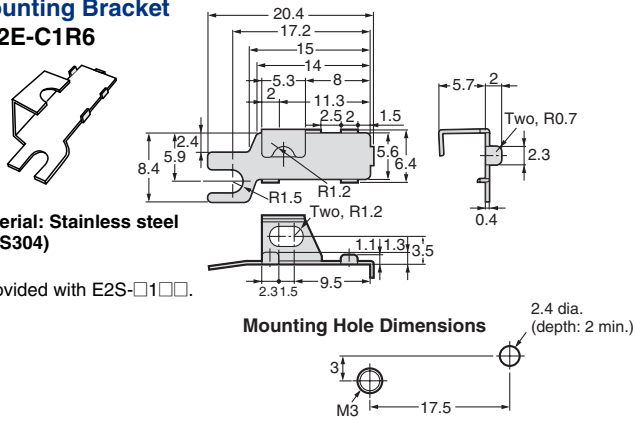|	
*E2S-Q21□	Operation indicator (red), Setting indicator (green)
E2S-Q22□	Operation indicator (red)
E2S-Q23□ E2S-Q24□ E2S-Q25□ E2S-Q26□	Operation indicator (orange)

Accessories (Order Separately)

Mounting Bracket
Y92E-C1R6

**Material: Stainless steel
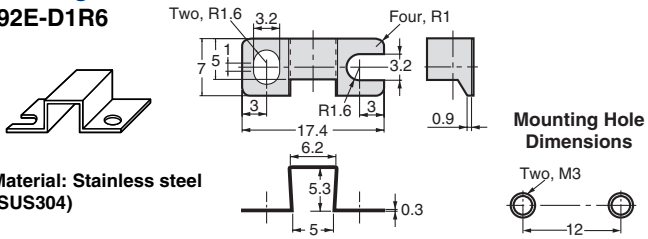(SUS304)**

*Provided with E2S-□1□□.

Mounting Hole Dimensions

Mounting Bracket
Y92E-C2R5

**Material: Stainless steel
(SUS304)**

* Provided with E2S-□2□□.

Mounting Hole Dimensions

M3 dia. (depth: 8 min.)   2.4 dia. (depth: 3 min.)

11.5
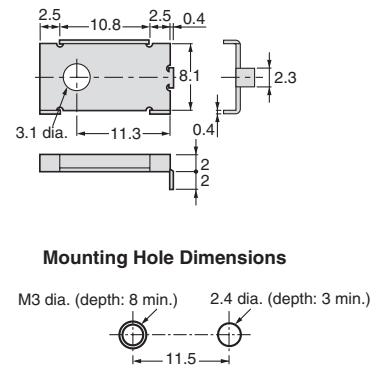
Mounting Bracket
Y92E-D1R6

**Material: Stainless steel
(SUS304)**

Two, R1.6   3.2   Four, R1

**Mounting Hole
Dimensions**

Two, M3

12

Mounting Bracket
Y92E-D2R5

**Material: Stainless steel
(SUS304)**

22.4
16

Two, R1.6   3.2   R1.6   Four, R1

**Mounting Hole
Dimensions**

Two, M3

17
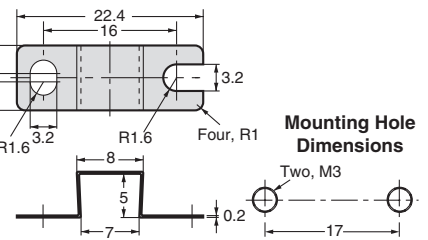
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    d. Delivery and shipping dates are estimates only; and
    e. Omron will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
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