E2S

# Advanced Performance and Wide Range of Selections in a Supercompact Size

- Only  $5.5 \times 5.5$  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

		Sensing distance		Me	odel
Appearance	Sensing surface			Operat	on mode
				NO	NC
	Тор	1.0		E2S-W11 1M *	E2S-W12 1M
Unshielded	Front	1.6 mm		E2S-Q11 1M *	E2S-Q12 1M
	Тор	0.5		E2S-W21 1M *	E2S-W22 1M
	Front	2.5 r	nm	E2S-Q21 1M *	E2S-Q22 1M

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

#### **DC 3-Wire Models**

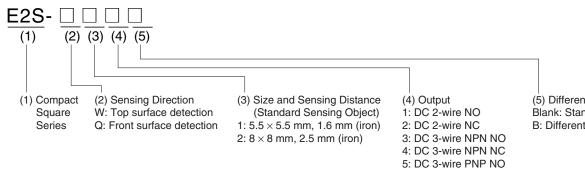
					Model	
Appearance	Sensing surface	Sensing distanc	e	Output configuration	Operation mode	
					NO	NC
	Тор				E2S-W13 1M *	E2S-W14 1M
	Front	1.6 mm			E2S-Q13 1M *	E2S-Q14 1M
	Тор			– NPN	E2S-W23 1M *	E2S-W24 1M
Unshielded	Front	2.5	5 mm		E2S-Q23 1M *	E2S-Q24 1M
	Тор			5115	E2S-W15 1M *	E2S-W16 1M
	Front	1.6 mm			E2S-Q15 1M *	E2S-Q16 1M
	Тор			PNP	E2S-W25 1M *	E2S-W26 1M
	Front	2.5	5 mm		E2S-Q25 1M *	E2S-Q26 1M

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

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
(F)	Y92E-C1R6		Provided with E2S-□1□□. (fixed with one screw)
	Y92E-C2R5		Provided with E2S-□2□□. (fixed with one screw)
A	Y92E-D1R6		For E2S-□1□□ (fixed with two screws)
sto	Y92E-D2R5		For E2S-□2□□ (fixed with two screws)

## **Model Number Legend**



(5) Different FrequencyBlank: StandardB: Different frequency

6: DC 3-wire PNP NC

# **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 su	urface	Тор	Front	Тор	Front		
Sensing di	istance	1.6 mm ±15%		2.5 mm ±15%			
Set distand	ce	0 to 1.2 mm		0 to 1.9 mm			
Differentia	l travel	10% max. of sensing distanc	e	1			
Detectable	object	Ferrous metal (The sensing	distance decreases with non-f	ferrous metal. Refer to Eng	ineering Data on page 4.)		
Standard s object	sensing	Iron, $12 \times 12 \times 1$ mm		Iron, $15 \times 15 \times 1$ mm			
Response	frequency *	1 kHz min.					
Power sup (operating range)	ply voltage voltage	12 to 24 VDC (10 to 30 VDC	), ripple (p-p): 10% max.	(p-p): 10% max.			
Leakage c	urrent	0.8 mA max.					
Control	Load current	3 to 50 mA max.					
output	Residual voltage	13 V max (under load current of 50 mA with cable length of 1 m)					
Indicators		I Models: Operation indicator (red), Setting indicator (green)     I 2 Models: Operation indicator (red)					
(with sensi	Operation mode         with sensing object         Improaching)						

\* 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.

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 su	urface	Тор	Front	Тор	Front	Тор	Front	Тор	Front
Sensing di		1.6 mm ±15%		2.5 mm ±15%	•	1.6 mm ±15%	>	2.5 mm ±15%	>
Set distand	ce	0 to 1.2 mm		0 to 1.9 mm		0 to 1.2 mm		0 to 1.9 mm	
Differential	l travel	10% max. of s	ensing distand	e .		1		1	
Detectable	object	Ferrous metal	(The sensing	distance decrea	ases with non-	ferrous metal. F	Refer to <i>Engine</i>	ering Data on p	bage 4.)
Standard s object	ensing	Iron, $12 \times 12 \times 1$ mm		Iron, 15 × 15	× 1 mm	Iron, $12 \times 12 \times 1 \text{ mm}$ Iron, $15 \times 15 \times 1 \text{ m}$			×1 mm
Response	frequency *	1 kHz min.							
Power sup (operating range)	ply voltage voltage	ge 12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.							
Current co	nsumption	13 mA max. a	t 24 VDC (no-l	oad)					
Control	Load current	NPN open-collector output, 50 mA max. (30 VDC max.) PNP open-collector output, 50 mA max. (30 VDC					) VDC max.)		
output Residual voltage 1.0 V max. (under load current of 50 mA with cable length			n of 1 m)						
Indicators	1	Operation indicator (orange)							
Operation mode (with sensing object approaching)Image: 3 Models: NO Image: 4 Models: NC Refer to the timing page 5 for details.			NC ming charts un	der I/O Circuit	<i>Diagrams</i> on	□□5 Models: □□6 Models: Refer to the ti page 5 for de	NC ming charts ur	nder I/O Circuit	<i>Diagrams</i> on

\* The response frequency is an average value.

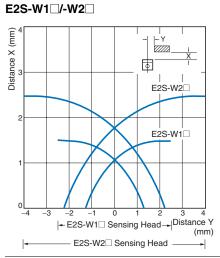
Measurement conditions are as follows: standard sensing object, a distance of twice the standard sensing object, and a set distance of half the sensing distance.

# Specifications

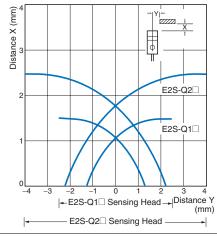
Item	Model	E2S-□□			
Protection	circuits	Reverse polarity protection, Surge suppressor			
Ambient te range	emperature	Operating: -25 to 70°C (with no icing or condensation), Storage: -40 to 85°C (with no icing or condensation)			
Ambient hu range	umidity	Operating: 35% to 90% (with no condensation), Storage: 35% to 95% (with no condensation)			
Temperatu	re influence	$\pm 15\%$ max. of sensing distance at 23°C in the temperature range of –25 to 70°C			
Voltage inf	luence	$\pm 2.5\%$ max. of sensing distance at rated voltage in rated voltage $\pm 10\%$ range			
Insulation	resistance	50 M $\Omega$ min. (at 500 VDC) between current-carrying parts and case			
Dielectric s	strength	1,000 VAC for 1 min between current-carrying parts and case			
Vibration r	esistance	Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions			
Shock resi	stance	Destruction: 500 m/s <sup>2</sup> 3 times each in X, Y, and Z directions			
Degree of p	protection	IEC 60529 IP67			
Connection	n method	Pre-wired Models (Standard cable length: 1 m)			
Weight (packed state)		Approx. 10 g			
Materials	Case	Polyarylate resin			
Accessorie	es	Mounting Brackets			

# **Engineering Data (Typical)**



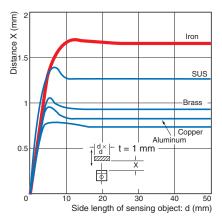


#### E2S-Q1 /-Q2

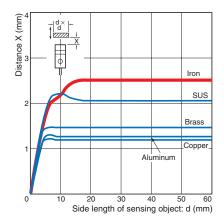


#### Influence of Sensing Object Size and Material



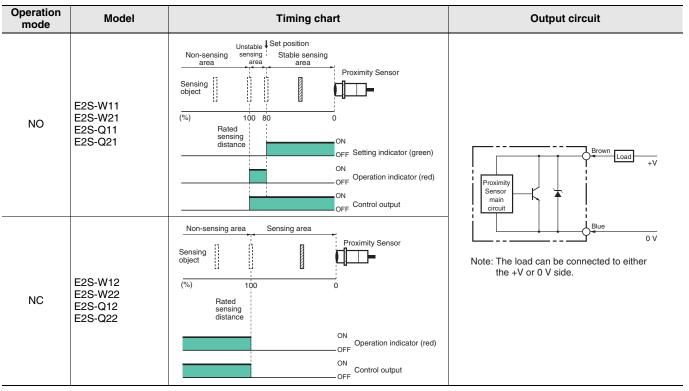






# I/O Circuit Diagrams

#### **DC 2-Wire Models**



#### **DC 3-Wire Models**

Operation mode	Output con- figuration	Model	Timing chart	Output circuit
NO	- NPN	E2S-W13 E2S-W23 E2S-Q13 E2S-Q23	Sensing object Present Not present Output transistor ON (load) OFF Operation indicator ON (orange) OFF	Proximity Sensor
NC		E2S-W14 E2S-W24 E2S-Q14 E2S-Q24	Sensing object Present Not present Output transistor (load) OFF Operation indicator (orange) OFF	<sup>main</sup> circuit Load current: 50 mA max.
NO	PNP	E2S-W15 E2S-W25 E2S-Q15 E2S-Q25	Sensing object Present Not present Output transistor (load) OFF Operation indicator (orange) OFF	Proximity Sensor
NC		E2S-W16 E2S-W26 E2S-Q16 E2S-Q26	Sensing object Present Not present Output transistor ON (load) OFF Operation indicator ON (orange) OFF	Load Urrent: 50 mA max.

#### Refer to Warranty and Limitations of Liability.

#### <u> WARNING</u>

This product is not designed or rated for ensuring safety of persons either directly or indirectly. Do not use it for such purposes.

# $\bigcirc$

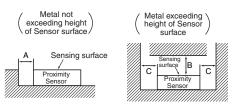
#### **Precautions for Correct Use**

Do not use this product under ambient conditions that exceed the ratings.

#### Design

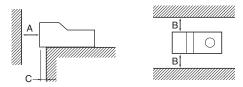
#### Influence of Surrounding Metal

- 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	Α	В	С
E2S-W1		0	8	2
E2S-W2		0	15	10

#### • Models with Front Sensing Surface



			(	(Unit: mm)
Model	Distance	Α	В	С
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.

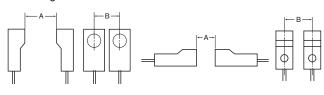
Model	Tyco Electronics AMP K.K.	
E2S-W[]3/4	1-1473562-4 (red)	
E2S-Q_3/4	1-14/3302-4 (Ted)	

#### **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	Α	В
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.

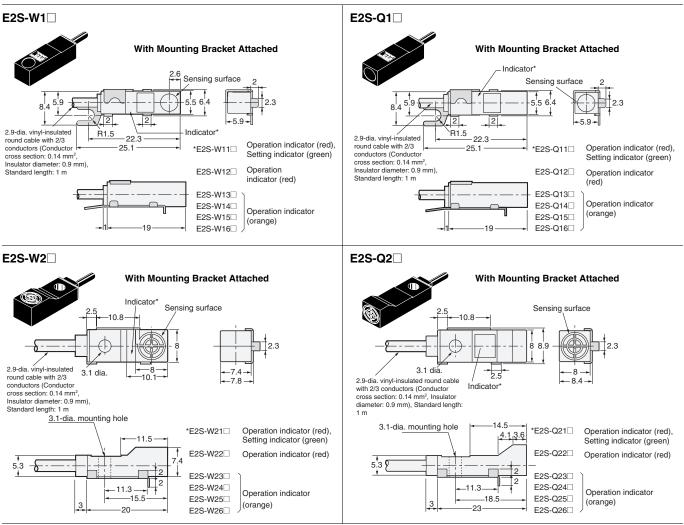
#### Mounting

#### **Tightening Torque**

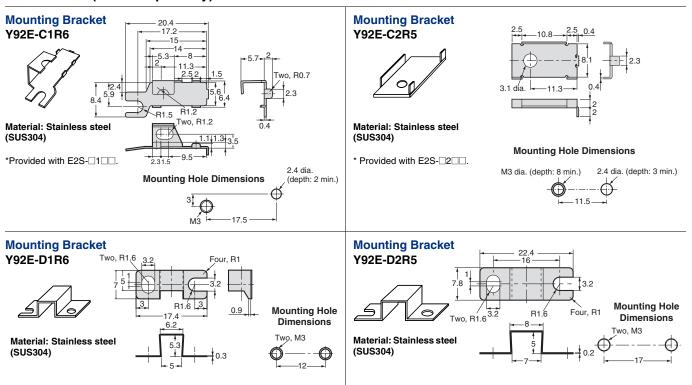
For the E2S-W(Q)2 $\Box$ , the maximum tightening torque that should be applied to the mounting screws is 0.7 N·m.

#### Dimensions

#### Sensors



#### **Accessories (Order Separately)**



# OMRON

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