

Subminiature Rectangular Inductive Prox

E2S

World's Smallest Square Sensor with Built-in Amplifier

- 5.5 x 5.5 mm type allows smaller, space-saving machines and devices
- High response frequency (1 kHz) for fast machine processes
- Long sensing distance:
(E2S-□1, 1.6 mm) (E2S-□2, 2.5 mm)
- Models with different oscillating frequency are available to reduce mutual interference



Ordering Information

■ DC 2-WIRE

Type	Sensing surface	Sensing distance	Part number	
			Operation status	
			NO (Normally open) See Note.	NC (Normally closed)
Unshielded 	Front face	1.6 mm (0.06 in)	E2S-W11	E2S-W12
	End face		E2S-Q11	E2S-Q12
	Front face	2.5 mm (0.10 in)	E2S-W21	E2S-W22
	End face		E2S-Q21	E2S-Q22

■ DC 3-WIRE

Type	Sensing surface	Sensing distance	Output configuration	Part number	
				Operation status	
				NO (Normally open) See Note.	NC (Normally closed)
Unshielded 	Front face	 1.6 mm (0.06 in)	NPN	E2S-W13	E2S-W14
	End face			E2S-Q13	E2S-Q14
	Front face	 2.5 mm (0.10 in)		E2S-W23	E2S-W24
	End face			E2S-Q23	E2S-Q24
	Front face	 1.6 mm (0.06 in)	PNP	E2S-W15	E2S-W16
	End face			E2S-Q15	E2S-Q16
	Front face	 2.5 mm (0.10 in)		E2S-W25	E2S-W26
	End face			E2S-Q25	E2S-Q26

Note: Models with different oscillating frequency are available (NO only). These model numbers take the form of E2S-□□□B (e.g., E2S-W11B).

■ ACCESSORIES

Mounting Brackets

Appearance	Part number	Note
	Y92E-C1R6	Provided with E2S-□1□□
	Y92E-C2R5	Provided with E2S-□2□□
	Y92E-D1R6	Optional bracket for E2S-□1□□
	Y92E-D2R5	Optional bracket for E2S-□2□□

Specifications

■ RATINGS/CHARACTERISTICS

DC 2-Wire Models

Part number		E2S-W11 E2S-W12	E2S-Q11 E2S-Q12	E2S-W21 E2S-W22	E2S-Q21 E2S-Q22
Sensor type		Inductive			
Sensing surface		Front face	End face	Front face	End face
Type		Unshielded			
Power supply voltage (operating voltage range)		12 to 24 V DC, ripple (p-p): 10% max., (10 to 30 V DC)			
Detectable object type		Ferrous metal (refer to <i>Engineering Data</i> for non-ferrous metals)			
Sensing distance		1.6 mm ± 15% (0.06 in)		2.5 mm ± 15% (0.10 in)	
Setting distance		0 to 1.2 mm (0.05 in)		0 to 1.9 mm (0.07 in)	
Standard target object		Iron, 12 x 12 x 1 mm		Iron, 15 x 15 x 1 mm	
Differential travel		10% max. of sensing distance			
Operating status (with target object approaching)		□□1 models: NO □□2 models: NC Refer to <i>Output Circuits and Timing Charts</i> for details			
Control output	Switching capacity	3 to 50 mA DC max.			
	Residual voltage	3.0 V max. with a load current of 50 mA and a cable length of 1 m			
Leakage current		0.8 mA max.			
Temperature influence		± 15% max. of sensing distance at 23°C (73.4°F) in temperature range of -25°C to 70°C (-13°F to 158°F)			
Voltage influence		± 2.5% max. of sensing distance in rated voltage range ± 10%			
Response frequency (See Note.)		1 kHz min.			
Circuit protection		Reverse polarity connection and surge absorber			
Indicator		□□1 models: Operation indicator (red) Setting indicator (green) □□2 models: Operation indicator (red)			
Material	Case	Polyallylate resin			
Mounting		Mounting bracket supplied			
Connection method		Pre-wired standard length: 1 m (39.37 in)			
Weight (packed state)		Approx. 10 g (0.35 oz)			
Enclosure rating		IEC60529 IP67			

(This table continues on the next page.)

Specifications Table - continued from previous page

Part number		E2S-W11 E2S-W12	E2S-Q11 E2S-Q12	E2S-W21 E2S-W22	E2S-Q21 E2S-Q22
Ambient temperature	Operating	-25°C to 70°C (-13°F to 158°F) with no icing or condensation			
	Storage	-40°C to 85°C (-40°F to 185°F) with no icing or condensation			
Ambient humidity	Operating	35% to 90% (with no condensation)			
	Storage	35% to 95% (with no condensation)			
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 ² (1640 ft/s ²) 3 times each in X, Y, and Z direction			
Insulation resistance		50 MΩ min. (at 500 V DC) between current carry parts and case			
Dielectric strength		1,000 V AC, 50/60 Hz for 1 min between current carry parts and case			

Note: The response frequencies of the DC switching components are average values obtained by measuring in sequence a line-up of standard sensing objects. The space between any adjacent sensing objects was twice the width of a single sensing object and the setting distance was half the maximum sensing distance.

DC 3-Wire Models

Part number		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
Sensor type		Inductive							
Setting surface		Front face	End face	Front face	End face	Front face	End face	Front face	End face
Type		Unshielded							
Power supply voltage (operating voltage range)		12 to 24 V DC, ripple (p-p): 10% max., (10 to 30 V DC)							
Current consumption		13 mA max. at 24 VDC with no load							
Detectable object type		Ferrous metal (refer to <i>Engineering Data</i> for non-ferrous metals)							
Sensing distance		1.6 mm ± 15%		2.5 mm ± 15%		1.6 mm ± 15%		2.5 mm ± 15%	
Setting distance		0 to 1.2 mm		0 to 1.9 mm		0 to 1.2 mm		0 to 1.9 mm	
Standard sensing object		Iron, 12 x 12 x 1 mm		Iron, 15 x 15 x 1 mm		Iron, 12 x 12 x 1 mm		Iron, 15 x 15 x 1 mm	
Differential travel		10% max. of sensing distance							
Operating status (with sensing object approaching)		☐ ☐ 3 models: NO ☐ ☐ 4 models: NC Refer to <i>Output Circuits and Timing Charts</i> for details				☐ ☐ 3 models: NO ☐ ☐ 4 models: NC Refer to <i>Output Circuits and Timing Charts</i> for details			
Control output	Switching capacity	NPN open collector output 50 mA max. (30 V DC max.)				PNP open collector output 50 mA max. (30 V DC max.)			
Control output	Residual voltage	1.0 V max. with a load current of 50 mA and a cable length of 1 m							
Temperature influence		± 15% max. of sensing distance at 23°C (73.4°F) in temperature range of -25°C to 70°C (-13°F to 158°F)							
Voltage influence		± 2.5% max. of sensing distance in rated voltage range ± 10%							
Response frequency (See Note.)		1 kHz min.							
Circuit protection		Reverse polarity connection and surge absorber							
Indicator		Operation indicator (orange)							
Material	Case	Polyallylate resin							
Mounting		Mounting bracket supplied							
Connection method		Pre-wired standard length: 1 m (39.37 in)							
Weight (packed state)		Approx. 10 g (0.35 oz)							
Degree of protection		IEC60529 IP67 [JEM IP67 (water-tight)]							

(This table continues on the next page.)

Part number		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
Ambient temperature	Operating	-25°C to 70°C (-13°F to 158°F) with no icing or condensation							
	Storage	-40°C to 85°C (-40°F to 185°F) with no icing or condensation							
Ambient humidity	Operating	35% to 90%							
	Storage	35% to 95% (with no condensation)							
Vibration resistance		Destruction: 10 to 50 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions							
Shock resistance		Destruction: 500 m/s ² (1640 ft/sec ²) 3 times each in X, Y, and Z direction							
Insulation resistance		50 MΩ min. (at 500 V DC) between current carry parts and case							
Dielectric strength		1,000 V AC, 50/60 Hz for 1 min. between current carry parts and case							

Note: The response frequencies of the DC switching components are average values obtained by measuring in sequence a line-up of standard sensing objects. The space between any adjacent sensing objects was twice the width of a single sensing object and the setting distance was half the maximum sensing distance.

Operation

■ OUTPUT CIRCUITS AND TIMING CHARTS

DC 2-Wire Models

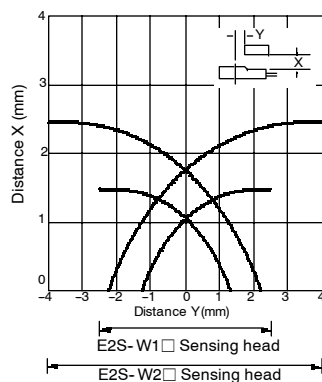
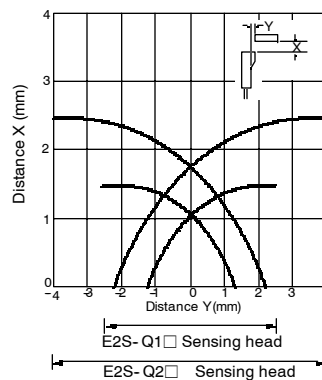
Operation status	Part number	Timing charts	Output circuits
NO E2S-W11 E2S-W21 E2S-Q11 E2S-Q22			The load can be connected both +V side and 0 V side
NC E2S-W12 E2S-W22 E2S-Q12 E2S-Q22			The load can be connected both +V side and 0 V side

DC 3-Wire Models

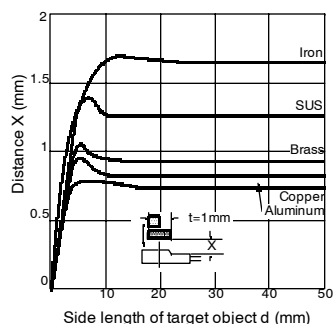
Operation status	Output configuration	Part number	Timing charts	Output circuits
NO	NPN	E2S-W13 E2S-W23 E2S-Q13 E2S-Q23	Target object Yes No Output transistor(load) ON OFF Output transistor(orange) ON OFF	
NC		E2S-W14 E2S-W24 E2S-Q14 E2S-Q24	Target object Yes No Output transistor(load) ON OFF Output transistor(orange) ON OFF	
NO	PNP	E2S-W15 E2S-W25 E2S-Q15 E2S-Q25	Target object Yes No Output transistor(load) ON OFF Output transistor(orange) ON OFF	
NC		E2S-W16 E2S-W26 E2S-Q16 E2S-Q26	Target object Yes No Output transistor(load) ON OFF Output transistor(orange) ON OFF	

Engineering Data

■ OPERATING RANGE (TYPICAL)

E2S-W1□
E2S-W2□E2S-Q1□
E2S-Q2□

■ SENSING OBJECT SIZE AND MATERIAL VS. SENSING DISTANCE (TYPICAL)

E2S-W1□
E2S-Q1□E2S-W2□
E2S-Q2□