

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 |
|---------------------------------------------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------|--------------------|
| | Sensing surface | | Top | Front | Top |
| Sensing distance | | 1.6 mm \pm 15% | | 2.5 mm \pm 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 <i>Engineering Data</i> 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. | | | |
| | Residual voltage | 3 V max. (under load current of 50 mA with cable length of 1 m) | | | |
| Indicators | | <input type="checkbox"/> 1 Models: Operation indicator (red), Setting indicator (green) <input type="checkbox"/> 2 Models: Operation indicator (red) | | | |
| Operation mode (with sensing object approaching) | | <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 |
|---------------------------------------------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------|--------------------|
| | Sensing surface | | Top | Front | Top | Front | Top | Front | Top |
| Sensing distance | | 1.6 mm \pm 15% | | 2.5 mm \pm 15% | | 1.6 mm \pm 15% | | 2.5 mm \pm 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 <i>Engineering Data</i> 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.) | | | |
| | 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) | | <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.

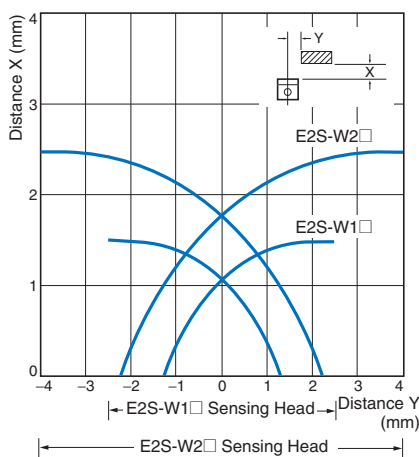
Specifications

| 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 ² 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 |

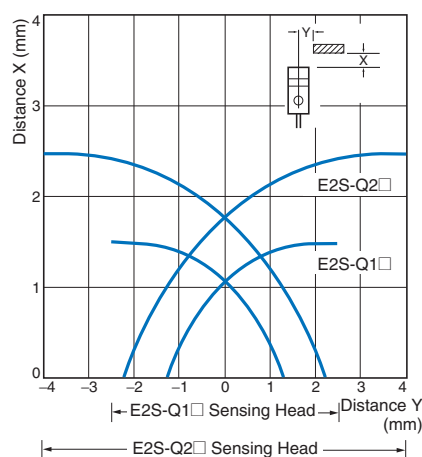
Engineering Data (Reference Value)

Sensing Area

E2S-W1□/-W2□

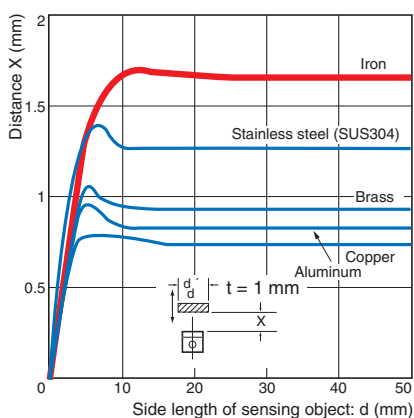


E2S-Q1□/-Q2□

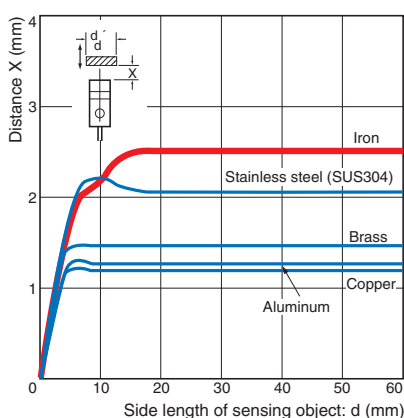


Influence of Sensing Object Size and Material

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 | | |

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

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



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