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 8.]

DC 2-Wire Models

Appearance	Sensing surface	Sensing distance	Model	
			Operation mode	
			NO	NC
Unshielded 	Top	1.6 mm	E2S-W11 1M *1, 3, 4	E2S-W12 1M *4
	Front		E2S-Q11 1M *1, 3	E2S-Q12 1M
	Top	2.5 mm	E2S-W21 1M *1, 3, 4	E2S-W22 1M *3, 4
	Front		E2S-Q21 1M *1, 2, 3, 4	E2S-Q22 1M *2, 3, 4

*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 with a different frequency are also available to prevent mutual interference. The model numbers are E2S-□□□C (e.g., E2S-Q21C).
*3. Models are also available with robotics (bend resistant) cables. Add "-R" to the model number.(e.g., E2S-W11-R 1M)
*4. Models are also available with M12 Pre-wired Smartclick Connector. Add "-M1TGJ 0.3M" to the model number. (e.g., E2S-W11-M1TGJ 0.3M)

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 8.]

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) (7)

(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/C: Different frequency

(6) Connection method
Blank: Pre-wired Model
M1TGJ: M12 Pre-wired Smartclick Connector Model

(7) 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	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 × 12 × 1 mm		Iron, 15 × 15 × 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		□□1 Models: Operation indicator (orange), Setting indicator (green) □□2 Models: Operation indicator (orange)			
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.			
Protection circuits		Output short-circuit protection, Surge suppressor			

* 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 × 12 × 1 mm		Iron, 15 × 15 × 1 mm		Iron, 12 × 12 × 1 mm		Iron, 15 × 15 × 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)		□□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.			
Protection circuits		Power supply reverse polarity protection, Surge suppressor							

* 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.

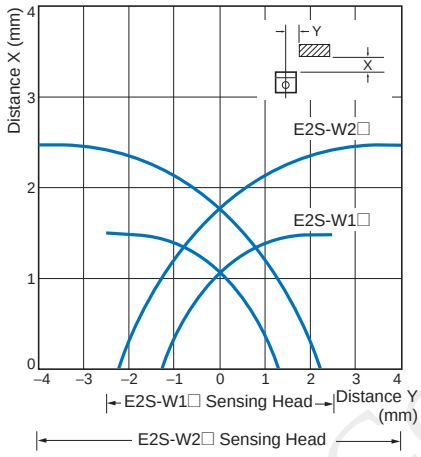
Specifications

Item	Model	E2S-□□□
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

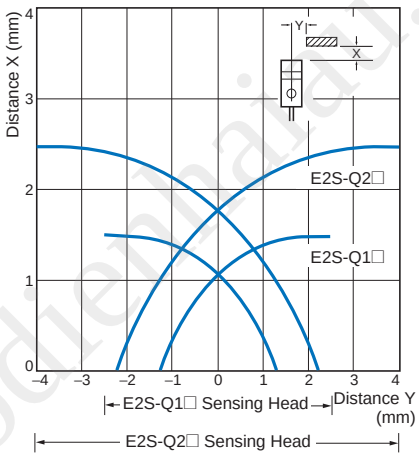
Engineering Data (Reference Value)

Sensing Area

E2S-W1□/-W2□

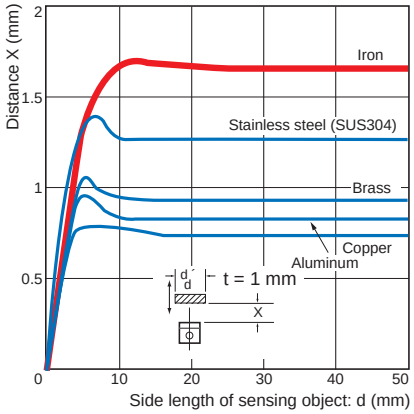


E2S-Q1□/-Q2□

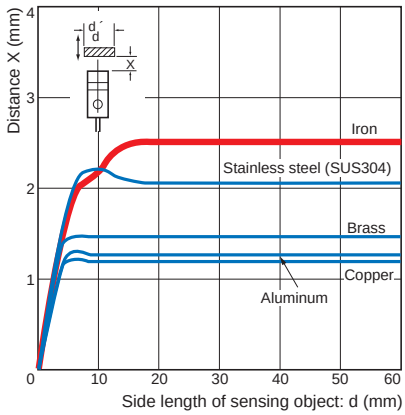


Influence of Sensing Object Size and Material

E2S-W1□/-Q1□

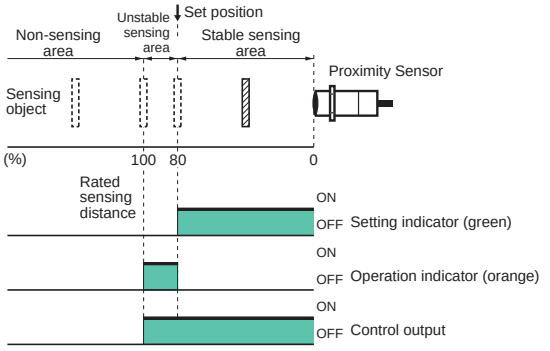
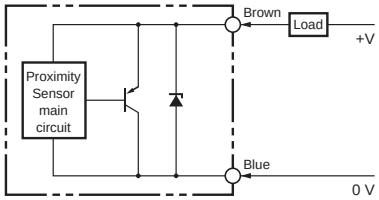
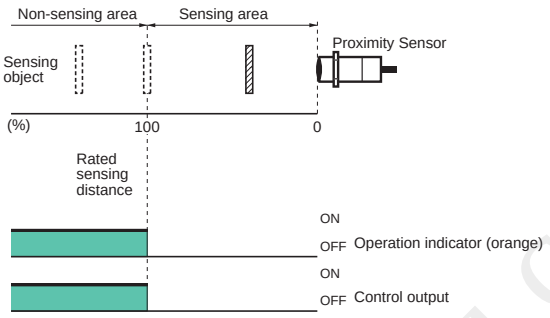


E2S-W2□/-Q2□

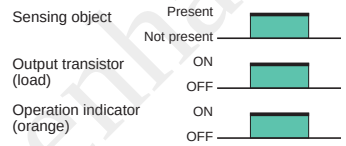
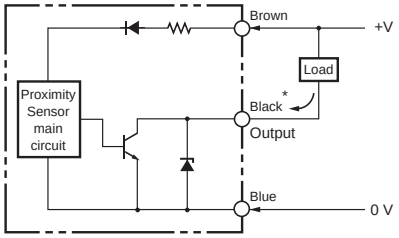
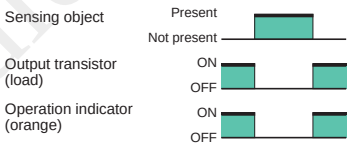
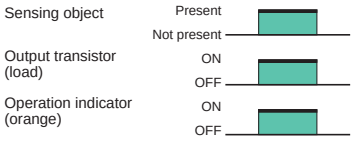
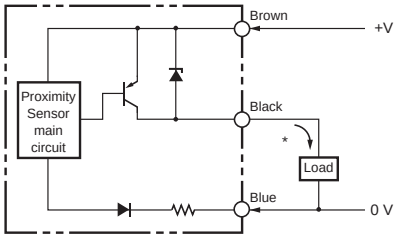
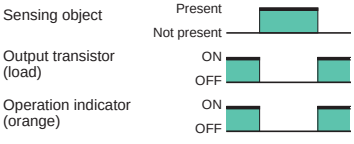


I/O Circuit Diagrams

DC 2-Wire Models

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

DC 3-Wire Models

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

Safety Precautions

Be sure to read the precautions for all models in the website at: http://www.ia.omron.com/.

Warning Indications

⚠WARNING	**Warning level** Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.
Precautions for Safe Use	Supplementary comments on what to do or avoid doing, to use the product safely.
Precautions for Correct Use	Supplementary comments on what to do or avoid doing, to prevent failure to operate, malfunction or undesirable effect on product performance.

Meaning of Product Safety Symbols

	**General prohibition** Indicates the instructions of unspecified prohibited action.
	**Caution, explosion** Indicates the possibility of explosion under specific conditions.

⚠WARNING

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

Otherwise, explosion may result.
Never use the product with an AC power supply.

Precautions for Safe Use

The following precautions must be observed to ensure safe operation.

1. Do not use the product in an environment where flammable or explosive gas is present.
2. Do not attempt to disassemble, repair, or modify the product.
3. Do not use a voltage that exceeds the rated operating voltage range. Applying a voltage that is higher than the operating voltage range may result in damage or burnout.
4. Be sure that the power supply polarity and other wiring is correct. Incorrect wiring may cause explosion or burnout.
5. If the power supply is connected directly without a load, the internal elements may explode or burn. Be sure to insert a load when connecting the power supply.
6.  Dispose of the product according to applicable regulations (laws).

Precautions for Correct Use

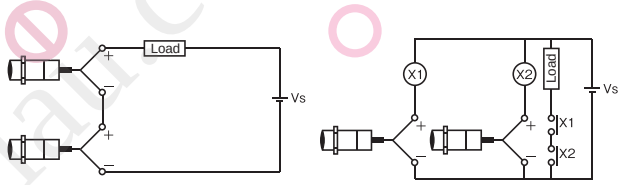
Do not use this product under ambient conditions that exceed the ratings.

Operating Environment

1. Do not install the product in the following locations.
   Doing so may result in product failure or malfunction.
   (1) Outdoor locations directly subject to sunlight, rain, snow, water droplets, or oil.
   (2) Locations subject to atmospheres with chemical vapors, in particular solvents and acids.
   (3) Locations subject to corrosive gases.
2. The Sensor may malfunction if used near ultrasonic cleaning equipment, high-frequency equipment, transceivers, cellular phones, inverters, or other devices that generate a high-frequency electric field. Please refer to the Precautions for Correct Use on the OMRON website (www.ia.omron.com) for typical measures.
3. Laying the Proximity Sensor wiring in the same conduit or duct as high-voltage wires or power lines may result in incorrect operation and damage due to induction. Wire the Sensor using a separate conduit or independent conduit.
4. Never use thinner or other solvents. Otherwise, the Sensor surface may be dissolved.

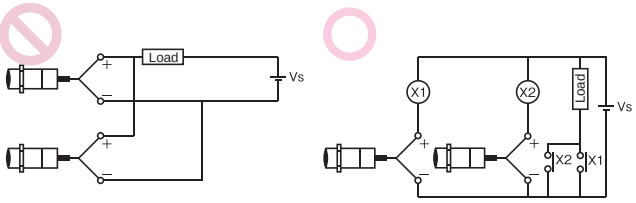
AND Connection of Proximity Sensors (DC 2-Wire)

Two or more sensors cannot be connected in series on the AND circuit. Use them via a relay as shown on the figure.



OR Wiring of Proximity Sensors (DC 2-Wire)

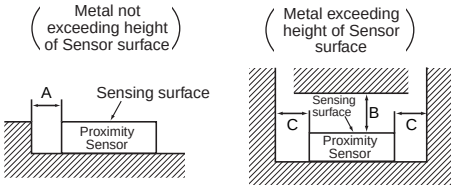
As a general principle, two or more sensors cannot be used in parallel on the OR circuit. It is possible only when sensors do not operate simultaneously and loads do not need to be maintained. When loads need to be maintained, use the sensors via a relay as shown on the figure.



● Design

Influence of Surrounding Metal

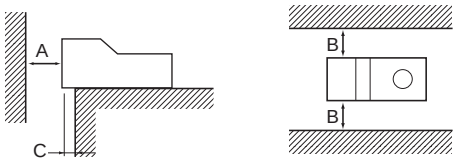
- When mounting the Sensor within a metal panel, ensure that the clearances given in the following table are maintained. Failure to maintain these distances may cause deterioration in the performance of the Sensor.
- Models with Top Sensing Surface



(Unit: mm)

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

- Models with Front Sensing Surface



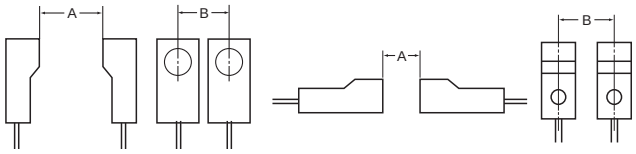
(Unit: mm)

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

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)

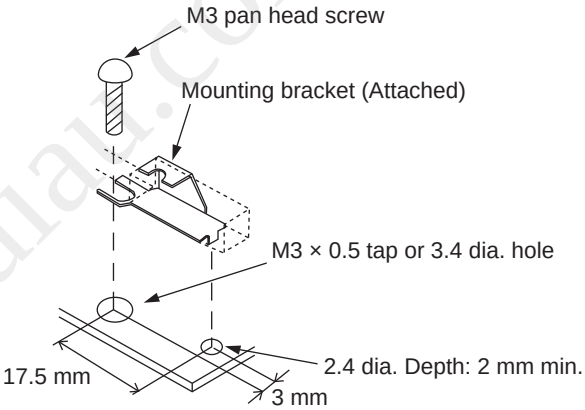
Model	Distance	A	B
E2S-W(Q)1□		50 (40) *1	20 (5.5) *1, *2
E2S-W(Q)2□		75 (50) *1	25 (8) *1, *2

*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

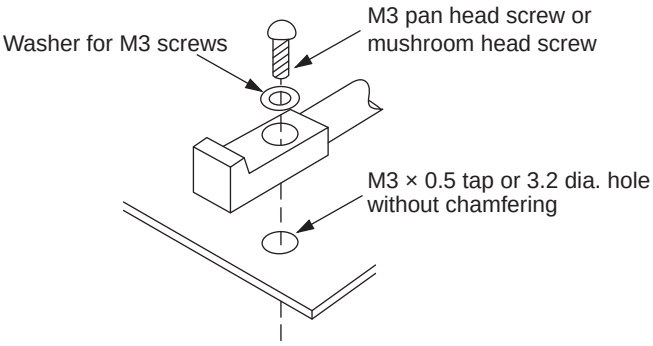
E2S-W1/Q1

Please use the set distance within 1.2 mm.



E2S-W2/Q2

When mounting with screw, use washers and use a tightening torque of 0.7 N·m or less.
Please use the set distance within 1.9 mm.



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		

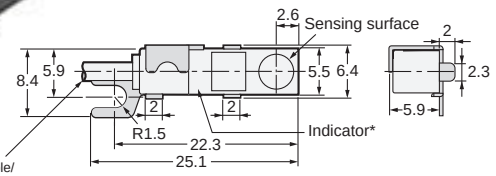
Dimensions

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

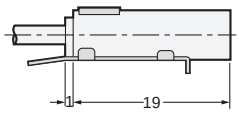
Sensors

E2S-W1□

With Mounting Bracket Attached



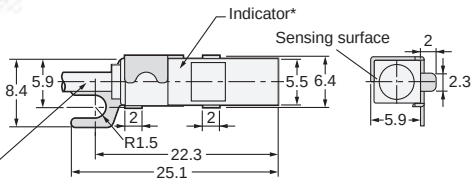
Standard cable/
Robot (bending-resistant) cable
2.9-dia. vinyl-insulated round cable
Standard length: 1 m
2 conductors
(Conductor cross section: 0.15 mm², Insulator diameter: 0.9 mm)
3 conductors
(Conductor cross section: 0.15 mm², Insulator diameter: 1.05 mm)



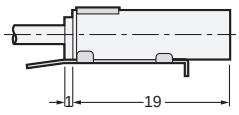
*E2S-W11□	Operation indicator (orange), Setting indicator (green)
E2S-W12□	Operation indicator (orange)
E2S-W13□ E2S-W14□ E2S-W15□ E2S-W16□	Operation indicator (orange)

E2S-Q1□

With Mounting Bracket Attached



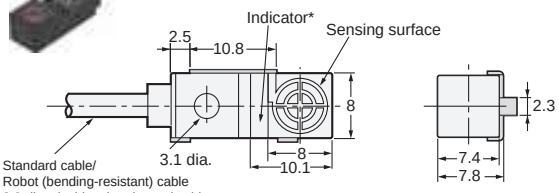
Standard cable/
Robot (bending-resistant) cable
2.9-dia. vinyl-insulated round cable
Standard length: 1 m
2 conductors
(Conductor cross section: 0.15 mm², Insulator diameter: 0.9 mm)
3 conductors
(Conductor cross section: 0.15 mm², Insulator diameter: 1.05 mm)



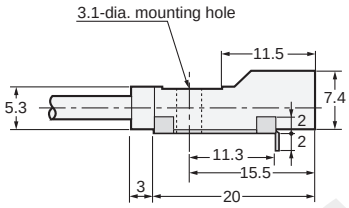
*E2S-Q11□	Operation indicator (orange), Setting indicator (green)
E2S-Q12□	Operation indicator (orange)
E2S-Q13□ E2S-Q14□ E2S-Q15□ E2S-Q16□	Operation indicator (orange)

E2S-W2□

With Mounting Bracket Attached



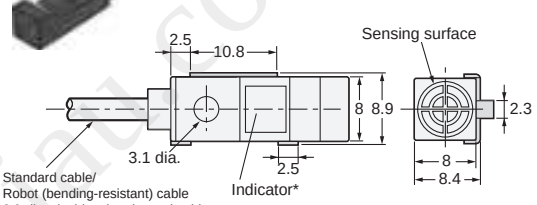
Standard cable/
Robot (bending-resistant) cable
2.9-dia. vinyl-insulated round cable
Standard length: 1 m
2 conductors
(Conductor cross section: 0.15 mm², Insulator diameter: 0.9 mm)
3 conductors
(Conductor cross section: 0.15 mm², Insulator diameter: 1.05 mm)



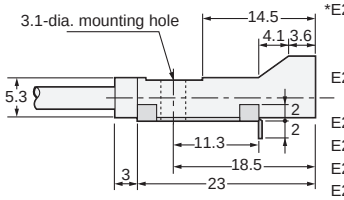
*E2S-W21□	Operation indicator (orange), Setting indicator (green)
E2S-W22□	Operation indicator (orange)
E2S-W23□ E2S-W24□ E2S-W25□ E2S-W26□	Operation indicator (orange)

E2S-Q2□

With Mounting Bracket Attached



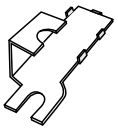
Standard cable/
Robot (bending-resistant) cable
2.9-dia. vinyl-insulated round cable
Standard length: 1 m
2 conductors
(Conductor cross section: 0.15 mm², Insulator diameter: 0.9 mm)
3 conductors
(Conductor cross section: 0.15 mm², Insulator diameter: 1.05 mm)

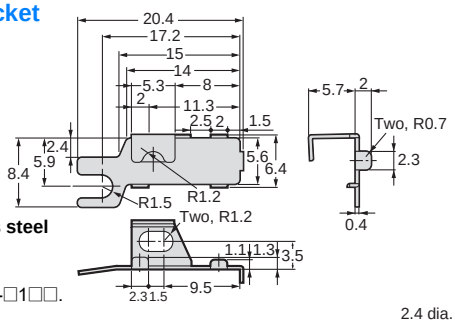


*E2S-Q21□	Operation indicator (orange), Setting indicator (green)
E2S-Q22□	Operation indicator (orange)
E2S-Q23□ E2S-Q24□ E2S-Q25□ E2S-Q26□	Operation indicator (orange)

Accessories (Order Separately)

Mounting Bracket
Y92E-C1R6

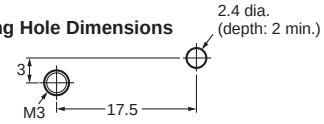




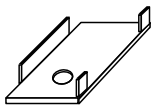
Material: Stainless steel (SUS304)

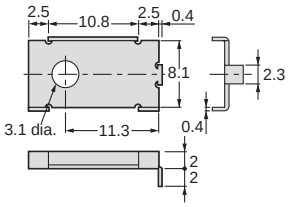
*Provided with E2S-□1□□.

Mounting Hole Dimensions



Mounting Bracket
Y92E-C2R5

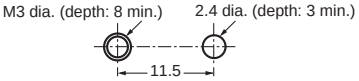




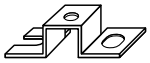
Material: Stainless steel (SUS304)

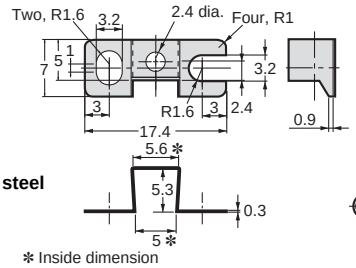
* Provided with E2S-□2□□.

Mounting Hole Dimensions



Mounting Bracket
Y92E-D1R6



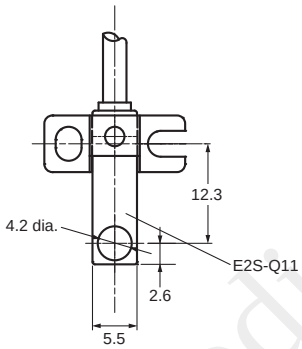


Material: Stainless steel (SUS304)

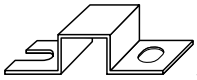
Mounting Hole Dimensions

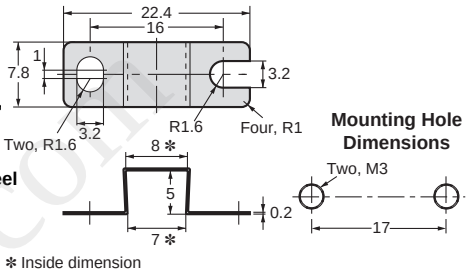
✻ Inside dimension

Photoelectric Sensor Accessory is installed (Example of E2S-Q11)



Mounting Bracket
Y92E-D2R5





Material: Stainless steel (SUS304)

Mounting Hole Dimensions

✻ Inside dimension

Photoelectric Sensor Accessory is installed (Example of E2S-Q21)