OMRON

Cylindrical Proximity Sensor
E2A3

High Quality for Extra Long Distance

- CENELEC triple-distance operation.
- Normally open (NO), and normally closed (NC) models are available.
- Stainless steel and brass housings.
- 360° angle indicators

<READ AND UNDERSTAND THIS CATALOG>

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

CE

Ordering Information

DC 3-wire Models

Size	Type	Sensing distance	Connection	Body material	Thread length	Output	Operation mode: NO	Operation mode: NC
M8	Shielded	3.0mm	Pre-wired	Stainless steel (See note.)	27 (40) mm	PNP	E2A3-S08KS03-WP-B1 2M	E2A3-S08KS03-WP-B2 2M
						NPN	E2A3-S08KS03-WP-C1 2M	E2A3-S08KS03-WP-C2 2M
			M12 connector		27 (44) mm	PNP	E2A3-S08KS03-M1-B1	E2A3-S08KS03-M1-B2
						NPN	E2A3-S08KS03-M1-C1	E2A3-S08KS03-M1-C2
			M8 connector (3-pin)		27 (40) mm	PNP	E2A3-S08KS03-M5-B1	E2A3-S08KS03-M5-B2
						NPN	E2A3-S08KS03-M5-C1	E2A3-S08KS03-M5-C2
M12	Shielded	6.0mm	Pre-wired	Brass	34 (50) mm	PNP	E2A3-M12KS06-WP-B1 2M	E2A3-M12KS06-WP-B2 2M
						NPN	E2A3-M12KS06-WP-C1 2M	E2A3-M12KS06-WP-C2 2M
			M12 connector		34 (49) mm	PNP	E2A3-M12KS06-M1-B1	E2A3-M12KS06-M1-B2
						NPN	E2A3-M12KS06-M1-C1	E2A3-M12KS06-M1-C2
M18	Shielded	11.0mm	Pre-wired	Brass	39 (60) mm	PNP	E2A3-M18KS11-WP-B1 2M	E2A3-M18KS11-WP-B2 2M
						NPN	E2A3-M18KS11-WP-C1 2M	E2A3-M18KS11-WP-C2 2M
			M12 connector		39 (54) mm	PNP	E2A3-M18KS11-M1-B1	E2A3-M18KS11-M1-B2
						NPN	E2A3-M18KS11-M1-C1	E2A3-M18KS11-M1-C2
M30	Shielded	20.0mm	Pre-wired	Brass	44 (65) mm	PNP	E2A3-M30KS20-WP-B1 2M	E2A3-M30KS20-WP-B2 2M
						NPN	E2A3-M30KS20-WP-C1 2M	E2A3-M30KS20-WP-C2 2M
			M12 connector		44 (59) mm	PNP	E2A3-M30KS20-M1-B1	E2A3-M30KS20-M1-B2
						NPN	E2A3-M30KS20-M1-C1	E2A3-M30KS20-M1-C2

Note: Material specifications for stainless steel housing case: 1.4305 (W.-No.), SUS303 (AISI), 2346 (SS).

Connectivity

E2A3 Sensors are available with the following connectors and cable materials:

Pre-wired Models

Standard cable lengths are 2 m and 5 m.
For other cable lengths, please contact your OMRON representative.

Standard cable material: PVC (4-mm dia.) -WP

Connector Models

Standard connectors: M12, M8 (3-pin) -M1, -M5

Model Number Legend

E2A□-□□□□□-□-□□-□□

1 2 3 4 5 6 7 8 9 10 11 12

Example: E2A3-M12KS06-M1-B1 Triple distance, M12, standard barrel, shielded, Sn = 6 mm, M12 connector, PNP-NO
E2A3-S08KS03-WP-B1 2M Triple distance, M8 stainless steel, standard barrel, shielded, Sn = 3 mm, pre-wired PVC cable, PNP-NO, cable length = 2 m

1. Basic name
E2A

2. Sensing technology
Blank: Standard double distance
3: Triple distance

3. Housing shape and material
M: Cylindrical, metric threaded, brass
S: Cylindrical, metric threaded, stainless steel

4. Housing size
08: 8 mm
12: 12 mm
18: 18 mm
30: 30 mm

5. Barrel length
K: Standard length
L: Long body

6. Shield
S: Shielded
N: Non-shielded

7. Sensing distance
Numeral: Sensing distance: e.g., 03 = 3 mm, 11 = 11 mm

8. Kind of connection
WP: Pre-wired, PVC, 4-mm dia.
M1: M12 connector (4-pin) *
M5: M8 connector (3-pin)

9. Power source and output
B: DC, 3-wire, PNP open collector
C: DC, 3-wire, NPN open collector

10. Operation mode
1: Normally open (NO)
2: Normally closed (NC)

11. Specials (e.g., cable material, oscillating frequency)

12. Cable length
Blank: Connector Model
Numeral: Cable length

Specifications

DC 3-wire Models

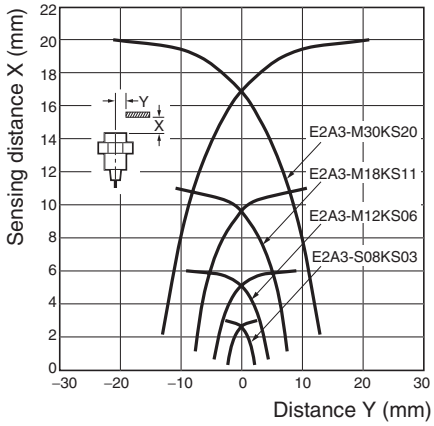
Size		M8	M12	M18	M30
Type		Shielded	Shielded	Shielded	Shielded
	Item	E2A3-S08KS03-□□-B□ E2A3-S08KS03-□□-C□	E2A3-M12KS06-□□-B□ E2A3-M12KS06-□□-C□	E2A3-M18KS11-□□-B□ E2A3-M18KS11-□□-C□	E2A3-M30KS20-□□-B□ E2A3-M30KS20-□□-C□
Sensing distance		3 mm ± 10%	6 mm ± 10%	11 mm ± 10%	20 mm ± 10%
Setting distance	Ambient temp. of −25 to 70°C	0 to 2.1 mm	0 to 4.2 mm	0 to 7.7 mm	0 to 14 mm
	Ambient temp. of −10 to 60°C	0 to 2.4 mm	0 to 4.8 mm	0 to 8.8 mm	0 to 16 mm
Differential travel		20% max. of sensing distance			
Target		Ferrous metal (The sensing distance decreases with non-ferrous metal.)			
Standard sensing object		9 × 9 × 1 mm	18 × 18 × 1 mm	33 × 33 × 1 mm	60 × 60 × 1 mm
Response frequency (See note 1.)		700 Hz	350 Hz	250 Hz	80 Hz
Power supply voltage (operating voltage range)		12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)			
Current consumption		10 mA max.			
Output type		-B models: PNP open collector -C models: NPN open collector			
Control output	Load current	200 mA max. (32 VDC max.)			
	Residual voltage	2 V max. (under load current of 200 mA with cable length of 2 m)			
Indicator		Operation indicator (Yellow LED)			
Operation mode		-B1/-C1 models: NO -B2/-C2 models: NC For details, refer to the timing charts.			
Protection circuits		Power source circuit reverse polarity protection, Surge suppressor, Short-circuit protection	Output reverse polarity protection, Power source circuit reverse polarity protection, Surge suppressor, Short-circuit protection		
Ambient air temperature		Operating: −25°C to 70°C, Storage: −25°C to 70°C			
Temperature influence		±20% max. of sensing distance at 23°C within temperature range of −25°C to 70°C −10% max. to +20% of sensing distance at 23°C within temperature range of −10°C to 60°C			
Ambient humidity		Operating: 35% to 95%, Storage: 35% to 95%			
Voltage influence		±1% max. of sensing distance in rated voltage range ±15%			
Insulation resistance		50 MΩ min. (at 500 VDC) between current-carrying parts and case			
Dielectric strength		1,000 VAC at 50/60 Hz for 1 min between current-carrying parts and case			
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions			
Shock resistance		500 m/s^2, 10 times each in X, Y, and Z directions	1,000 m/s^2, 10 times each in X, Y and Z directions		
Standards and listings (See note 2.)		IP67 under IEC 60529 EMC under EN60947-5-2			
Connection method		-WP models: Pre-wired Models (4-mm dia. PVC cable with length of 2 m) -M1 models: M12 4-pin Connector Models -M5 models: M8 3-pin Connector Models			
Weight (packed state)	Pre-wired Models	Approx. 65 g	Approx. 85 g	Approx. 160 g	Approx. 280 g
	Connector Models	M12 Connector Models: Approx. 20 g	Approx. 35 g	Approx. 70 g	Approx. 200 g
Material	Case	Stainless steel	Brass-nickel plated		
	Sensing surface	PBT			
	Cable	PVC			
	Clamping nut	Stainless steel	Brass-nickel plated		

Note 1. The response frequency is an average value. Measurement conditions are as follows: standard sensing object, a distance of twice the standard sensing object length between sensing objects, and a set distance of half the sensing distance.

2. For USA and CANADA : use class 2 circuit only.

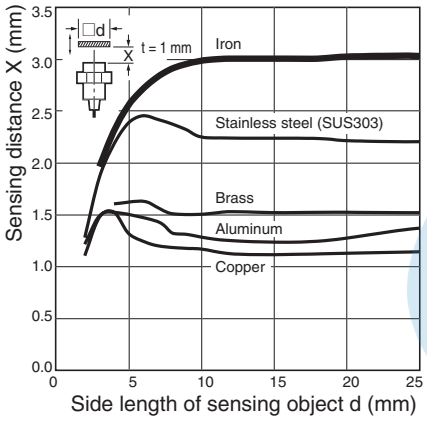
Engineering Data

Operating Range (Typical)

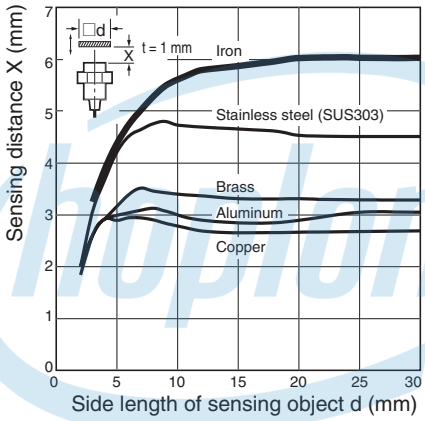


Influence of Sensing Object Size and Materials

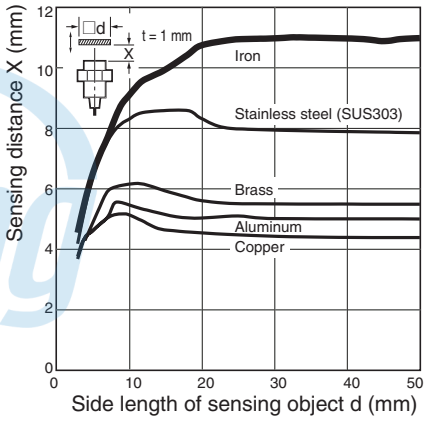
E2A3-S08KS03



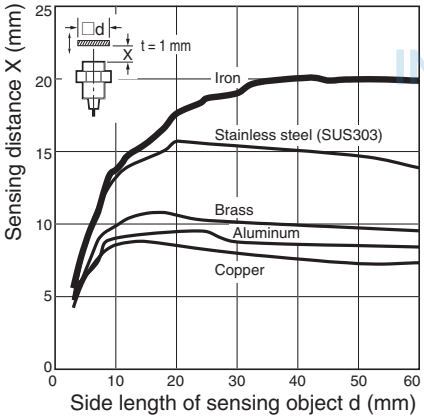
E2A3-M12KS06



E2A3-M18KS11



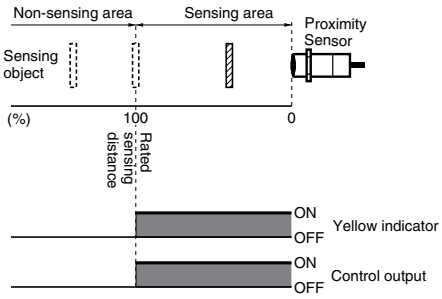
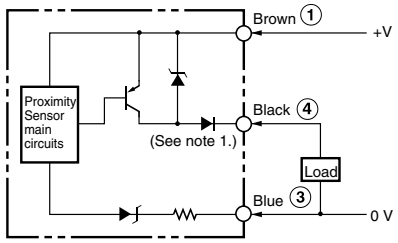
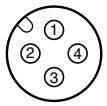
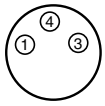
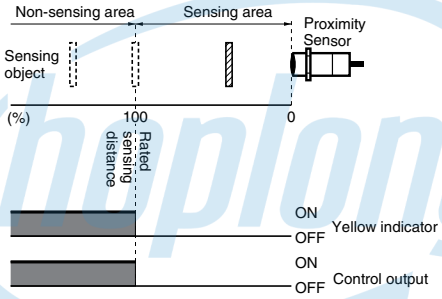
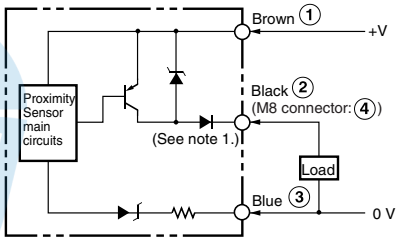
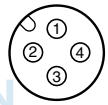
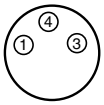
E2A3-M30KS20



Operation

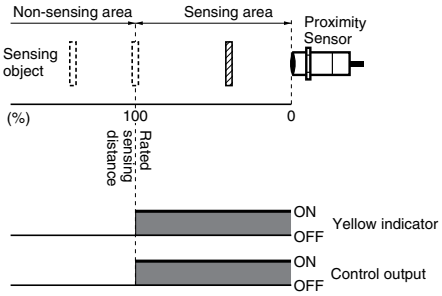
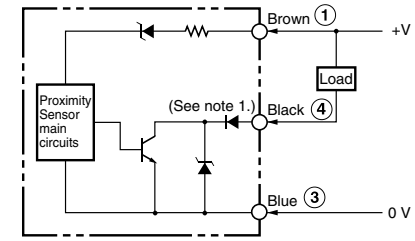
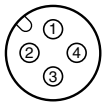
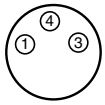
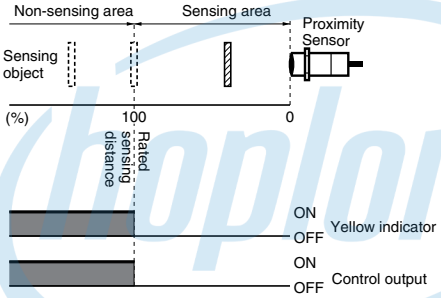
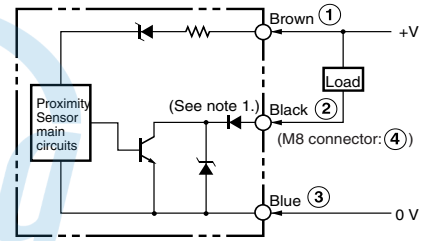
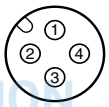
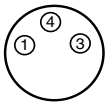
DC 3-wire Models

PNP Output

Operation mode	Model	Timing chart	Output circuit
NO	E2A3-□-□-B1		 **Note 1:** With M8 Size Models, there is no output reverse polarity protection diode. M12 Connector Pin Arrangement (See note 2.)  M8 Connector (3-pin) Pin Arrangement  **Note 2:** Terminal 2 of the M12 connector is not used.
NC	E2A3-□-□-B2		 **Note 1:** With M8 Size Models, there is no output reverse polarity protection diode. M12 Connector Pin Arrangement (See note 2.)  M8 Connector (3-pin) Pin Arrangement  **Note 2:** Terminal 4 of the M12 connector is not used.

DC 3-wire Models

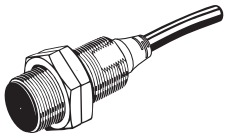
NPN Output

Operation mode	Model	Timing chart	Output circuit
NO	E2A3-□-□-C1		 **Note 1:** With M8 Size Models, there is no output reverse polarity protection diode. M12 Connector Pin Arrangement (See note 2.)  M8 Connector (3-pin) Pin Arrangement  **Note 2:** Terminal 2 of the M12 connector is not used.
NC	E2A3-□-□-C2		 **Note 1:** With M8 Size Models, there is no output reverse polarity protection diode. M12 Connector Pin Arrangement (See note 2.)  M8 Connector (3-pin) Pin Arrangement  **Note 2:** Terminal 4 of the M12 connector is not used.

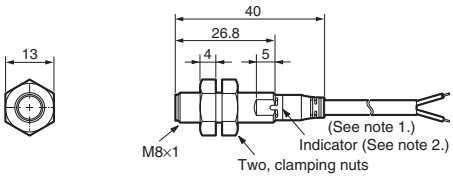
Dimensions

Note: All units are in millimeters unless otherwise indicated.

Pre-wired Models



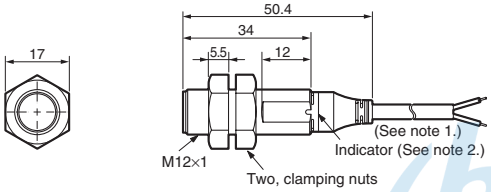
E2A3-S08KS03-WP-□□



Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.3 mm^2; Insulator diameter: 1.3 mm), Standard length: 2 m

2. Operation indicator (yellow)

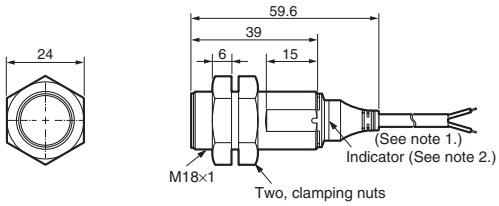
E2A3-M12KS06-WP-□□



Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.3 mm^2; Insulator diameter: 1.3 mm), Standard length: 2 m

2. Operation indicator (yellow)

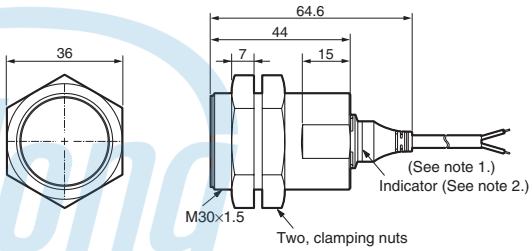
E2A3-M18KS11-WP-□□



Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.3 mm^2; Insulator diameter: 1.3 mm), Standard length: 2 m

2. Operation indicator (yellow)

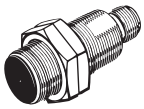
E2A3-M30KS20-WP-□□



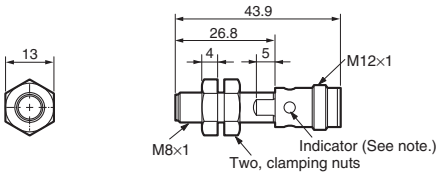
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.3 mm^2; Insulator diameter: 1.3 mm), Standard length: 2 m

2. Operation indicator (yellow)

M12 Connector Models

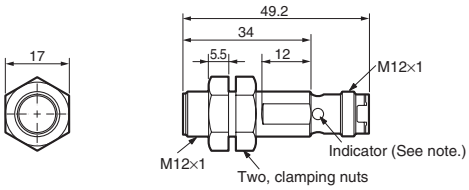


E2A3-S08KS03-M1-□□



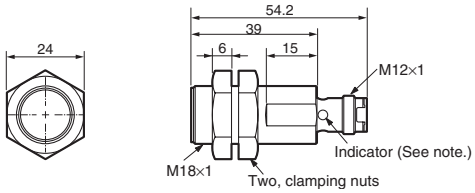
Note: Operation indicator (yellow LED, 4×90°)

E2A3-M12KS06-M1-□□



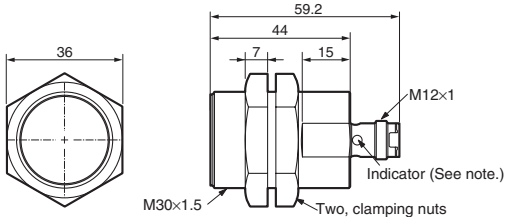
Note: Operation indicator (yellow LED, 4×90°)

E2A3-M18KS11-M1-□□



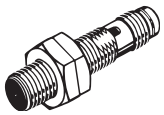
Note: Operation indicator (yellow LED, 4×90°)

E2A3-M30KS20-M1-□□

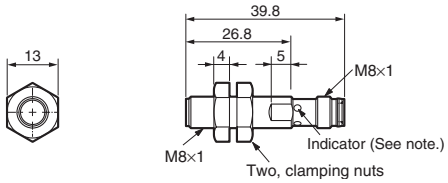


Note: Operation indicator (yellow LED, 4×90°)

M8 Connector Models



E2A3-S08KS03-M5-□□



Note: Operation indicator (yellow LED, 4×90°)

Mounting Hole Cutout Dimensions

External diameter of Proximity Sensor	Dimension F (mm)
M8	8.5 dia.$^{+0.5}_{0}$
M12	12.5 dia.$^{+0.5}_{0}$
M18	18.5 dia.$^{+0.5}_{0}$
M30	30.5 dia.$^{+0.5}_{0}$

Safety Precautions

Precautions for Safe Use

⚠ WARNING

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

Power Supply

Do not impose an excessive voltage on the E2A3, otherwise it may be damaged. Do not impose AC current (100 to 240 VAC) on any DC Model, otherwise it may be damaged.

Load Short-circuit

Do not short-circuit the load, or the E2A3 may be damaged.

The E2A3's short-circuit protection function will be valid if the polarity of the supply voltage is correct and within the rated voltage range.

Wiring

Be sure to wire the E2A3 and load correctly, otherwise it may be damaged.

Connection with No Load

Be sure to insert a load when wiring. Make sure to connect a proper load to the E2A3 during operation, otherwise it may damage internal elements.

Do not expose the product to flammable or explosive gases.

Do not disassemble, repair, or modify the product.

Precautions for Correct Use

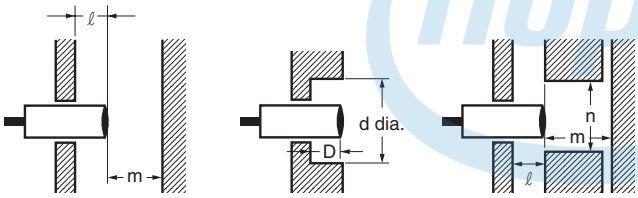
Designing

Power Reset Time

The Proximity Sensor is ready to operate within 100 ms after power is supplied. If separate power supplies are connected to the Proximity Sensor and load, be sure to supply power to the Proximity Sensor before supplying power to the load.

Effects of Surrounding Metal

When mounting the E2A3 within a metal panel, ensure that the clearances given in the following tables are maintained.



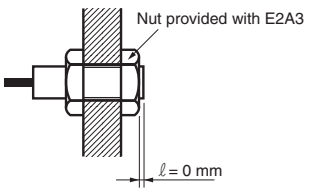
(Unit: mm)

Model	Dimension	M8		M12	
	Material of surrounding metal	Ferrous metal	Non-ferrous metal	Ferrous metal	Non-ferrous metal
E2A3 Shielded	l	0.5 (*)	2 (*)	2 (*)	1 (*)
	m	9		18	
	d	24		36	
	D	0.5	2	2	1
	n	24		36	

(Unit: mm)

Model	Dimension	M18		M30	
	Material of surrounding metal	Ferrous metal	Non-ferrous metal	Ferrous metal	Non-ferrous metal
E2A3 Shielded	l	4 (*)	2.5 (*)	6 (*)	4 (*)
	m	33		60	
	d	54		90	
	D	4	2.5	6	4
	n	54		90	

* Using the nuts provided with the E2A3 allows mounting in the way shown below.



Power OFF

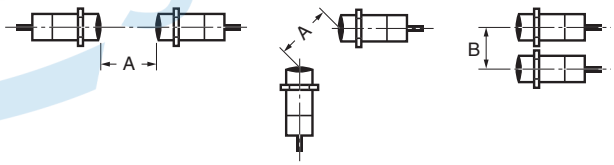
The Proximity Sensor may output a pulse signal when it is turned OFF. Therefore, it is recommended that the load be turned OFF before turning OFF the Proximity Sensor.

Power Supply Transformer

When using a DC power supply, make sure that the DC power supply has an insulated transformer. Do not use a DC power supply with an auto-transformer.

Mutual Interference

When installing two or more Sensors face-to-face or side-by-side, ensure that the minimum distances given in the following table are maintained.



(Unit: mm)

Type	Dimension	M8	M12	M18	M30
E2A3 Shielded	A	25	35	70	110
	B	20	25	45	70

Wiring

High-tension Lines

Wiring through Metal Conduit**:**
If there is a power or high-tension line near the cable of the Proximity Sensor, wire the cable through an independent metal conduit to prevent against Proximity Sensor damage or malfunctioning.

Cable Extension

The standard cable length is less than 200 m.

The tractive force is 50 N.

Mounting

The Proximity Sensor must not be subjected to excessive shock with a hammer when it is installed, otherwise the Proximity Sensor may be damaged or lose its water-resistance.

Do not tighten the nut with excessive force. A washer must be used with the nut.

Type		Torque
M8	Stainless Steel Model	9 N·m
	Brass Model	---
M12		20 N·m
M18		60 N·m
M30		150 N·m

Maintenance and Inspection

Periodically perform the following checks to ensure stable operation of the Proximity Sensor over a long period of time.

1. Check for mounting position, dislocation, looseness, or distortion of the Proximity Sensor and sensing objects.
2. Check for loose wiring and connections, improper contacts, and line breakage.
3. Check for attachment or accumulation of metal powder or dust.
4. Check for abnormal temperature conditions and other environmental conditions.
5. Check for proper lighting of indicators (for models with a set indicator).

Never attempt to disassemble or repair the Sensor.

Environment

Water Resistivity

The Proximity Sensors are tested intensively on water resistance, but to ensure maximum performance and life expectancy, avoid immersion in water and provide protection from rain or snow.

Operating Environment

Store and operate the Proximity Sensor only within the given specifications.

Inrush Current

A load that has a large inrush current (e.g., a lamp or motor) will damage the Proximity Sensor. Connect the load to the Proximity Sensor through a relay.

<SUITABILITY FOR USE>

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of the products in the customer's application or use of the products.

Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used.

<CHANGE IN SPECIFICATIONS>

Product specifications and accessories may be changed at any time based on improvements and other reasons. Consult with your OMRON representative at any time to confirm actual specifications of purchased product.

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Application Considerations

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THE PRODUCTS CONTAINED IN THIS CATALOG ARE NOT SAFETY RATED. THEY ARE NOT DESIGNED OR RATED FOR ENSURING SAFETY OF PERSONS, AND SHOULD NOT BE RELIED UPON AS A SAFETY COMPONENT OR PROTECTIVE DEVICE FOR SUCH PURPOSES. Please refer to separate catalogs for OMRON's safety rated products.

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the product.

Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used.

Know and observe all prohibitions of use applicable to this product.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

Disclaimers

■ CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons. Consult with your OMRON representative at any time to confirm actual specifications of purchased product.

■ DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. D102-E1-01A

In the interest of product improvement, specifications are subject to change without notice.

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