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Cylindrical Proximity Sensor for Mobile Usage

E2AU

Designed and tested to keep your machines moving



IP69k tested and certified for highest water resistance



e1 type approval (according to automotive directive 95/54/EC)



EMC noise tested up to 100 V/m (ISO 11452-2)



Ordering Information

DC 3-wire models

Size		Sensing distance	Connection	Body material	Thread length (overall length)	Output configuration	Operation mode NO			
M12	Shielded	4.0 mm	Pre-wired	Brass	34 (50)	PNP	E2AU-M12KS04-WP-B1 2M			
					56 (72)	PNP	E2AU-M12LS04-WP-B1 2M			
			M12 connector	Brass	34 (48)	PNP	E2AU-M12KS04-M1-B1			
					56 (70)	PNP	E2AU-M12LS04-M1-B1			
M18	Shielded	8.0 mm	Pre-wired	Brass	39 (59)	PNP	E2AU-M18KS08-WP-B1 2M			
					61 (81)	PNP	E2AU-M18LS08-WP-B1 2M			
					M12 connector	Brass	39 (53)	PNP	E2AU-M18KS08-M1-B1	
			61 (75)	PNP			E2AU-M18LS08-M1-B1			
			M30	Shielded			15.0 mm	Pre-wired	Brass	44 (64)
					66 (86)	PNP				E2AU-M30LS15-WP-B1 2M
M12 connector	Brass	44 (58)			PNP	E2AU-M30KS15-M1-B1				
		66 (80)	PNP	E2AU-M30LS15-M1-B1						

E2AU

Model Number Legend

E2A□-□□□□□□-□-□□-□□

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

Example: E2A-M12LS04-M1-B1 Standard, M12, long barrel, shielded, Sn=4 mm, M12 connector, PNP-NO
 E2A-S08KN04-WP-B1 5M Standard, M8 stainless steel, short barrel, non-shielded, Sn=4 mm, pre-wired PVC cable, PNP-NO, cable length=5 m

1. Basic name

E2A

2. Sensing technology

Blank: Standard double distance

3: Triple distance

U: Mobile Usage

X: Explosion hazardous environments

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. 02=2 mm, 16=16 mm

8. Kind of connection

WP: pre-wired, PVC, dia 4mm (standard)

WS: pre-wired, PVC, dia 6mm

WR: pre-wired, PVC, robotic cable, dia 4mm

WA: pre-wired, PUR/PVC (PUR jacket), dia 4mm

WB: pre-wired, PUR/PVC (PUR jacket), dia 6mm

M1: M12 connector (4 pin) *

M3: M8 connector (4 pin)

M5: M8 connector (3 pin)

M1J pre-wired with M12 cable end connector (4 pin)

M3J pre-wired with M8 cable end connector (4 pin)

M5J pre-wired with M8 cable end connector (3 pin)

9. Power source and output

B: DC, 3-wire, PNP open collector

C: DC, 3-wire, NPN open collector

D: DC, 2-wire

E: DC, 3-wire, NPN voltage output

F: DC, 3-wire, PNP voltage output

10. Operation mode

1: Normally open (NO)

2: Normally closed (NC)

3: Antivalent (NO+NC)

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

12. Cable length

Blank: Connector type

Numeral: Cable length

Note: *In case of DC 2-wire models the M12 connector identifier is 'M1G'

Specifications

DC 3-wire Models

Size		M12
Type		Shielded
Item		E2A-M12□S04-□□-B1
Sensing distance		4 mm ± 10%
Setting distance		0 to 3.2 mm
Differential travel		10% max. of sensing distance
Target		Ferrous metal (The sensing distance decreases with non-ferrous metal.)
Standard target (mild steel ST37)		12×12×1 mm
Response frequency (See note 1.)		1,000 Hz
Power supply voltage (operating voltage range)		12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)
Current consumption (DC 3-wire)		10 mA max.
Output type		PNP open collector
Control output	Load current (See note 2.)	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 (with sensing object approaching)		-B1
Protection circuit		Output reverse polarity protection, Power source circuit reverse polarity protection, Surge suppressor, Short-circuit protection
Ambient air temperature		Operating: -40°C to 70°C, Storage: -40°C to 85°C (with no icing or condensation)
Temperature influence (See note 2.)		±10% max. of sensing distance at 23°C within temperature range of -25°C to 70°C ±15% max. of sensing distance at 23°C within temperature range of -40°C to 70°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 carry parts and case
Dielectric strength		1,000 VAC at 50/60 Hz for 1 min between current carry 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		1,000 m/s ² , 10 times each in X, Y and Z directions
Standard and listings (See note 3.)		IP67 after IEC 60529 IP69k after DIN 40050 EMC after EN60947-5-2 EMC after 95/54/EC EMC after ISO11452-2
Connection method		Pre-wired models (dia 4mm PVC cable with length = 2m). M12 connector models
Weight (packaged)	Pre-wired model	Approx. 85 g
	Connector model	Approx. 35 g
Material	Case	Brass-nickel plated
	Sensing surface	PBT
	Cable	Standard cable is PVC dia 4mm.
	Clamping nut	Brass-nickel plated

Note 1. The response frequency is an average value. Measurement conditions are as follows: standard target, a distance of twice the standard target distance between targets, and a setting distance of half the sensing distance.

2. When using any model at an ambient temperature between -40°C and -25°C and a power voltage between 30 and 32 VDC, use a load current of 100 mA max.,

3. For USA and Canada: Use class 2 circuit only.

DC 3-wire Models / DC 4-wire

Size		M18	M30
Type		Shielded	Shielded
Item		E2A-M18□S08-□□-B1	E2A-M30□S15-□□-B1
Sensing distance		8 mm±10%	15 mm±10%
Setting distance		0 to 6.4 mm	0 to 12 mm
Differential travel		10% max. of sensing distance	
Target		Ferrous metal (The sensing distance decreases with non-ferrous metal.)	
Standard target (mild steel ST37)		24×24×1 mm	45×45×1 mm
Response frequency (See note 1.)		500 Hz	250 Hz
Power supply voltage (operating voltage range)		12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)	
Current consumption (DC 3-wire)		10 mA max.	
Output type		PNP open collector	
Control output	Load current (See note 2.)	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 (with sensing object approaching)		-B1	
Protection circuit		Output reverse polarity protection, Power source circuit reverse polarity protection, Surge suppressor, Short-circuit protection	
Ambient air temperature		Operating: -40°C to 70°C, Storage: -40°C to 85°C (with no icing or condensation)	
Temperature influence (See note 2.)		±10% max. of sensing distance at 23°C within temperature range of -25°C to 70°C ±15% max. of sensing distance at 23°C within temperature range of -40°C to 70°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 carry parts and case	
Dielectric strength		1,000 VAC at 50/60 Hz for 1 min between current carry 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		1,000 m/s ² , 10 times each in X, Y and Z directions	
Standard and listings (See note 3.)		IP67 after IEC 60529 IP69k after DIN 40050 EMC after EN60947-5-2 EMC after 95/94/EC EMC after ISO11452-2	
Connection method		Pre-wired models (dia 4mm PVC cable with length = 2m). M12 connector models.	
Weight (packed)	Pre-wired model	Approx. 160 g	Approx. 280 g
	Connector model	Approx. 70 g	Approx. 200 g
Material	Case	Brass-nickel plated	
	Sensing surface	PBT	
	Cable	Standard cable is PVC dia 4mm.	
	Clamping nut	brass-nickel plated for brass models stainless steel for steel models	

Note 1. The response frequency is an average value. Measurement conditions are as follows: standard target, a distance of twice the standard target distance between targets, and a setting distance of half the sensing distance.

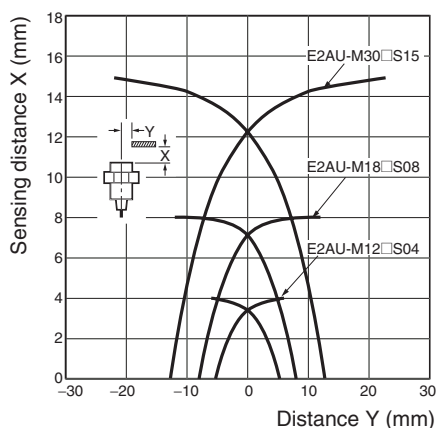
2. When using any model at an ambient temperature between -40°C and -25°C and a power voltage between 30 and 32 VDC, use a load current of 100 mA max.

3. For USA and Canada: Use class 2 circuit only.

Engineering Data

Operating Range (Typical)

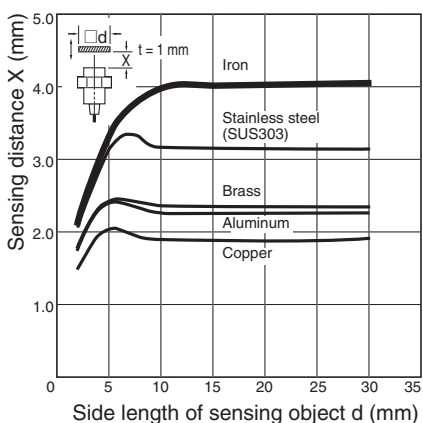
Shielded Models



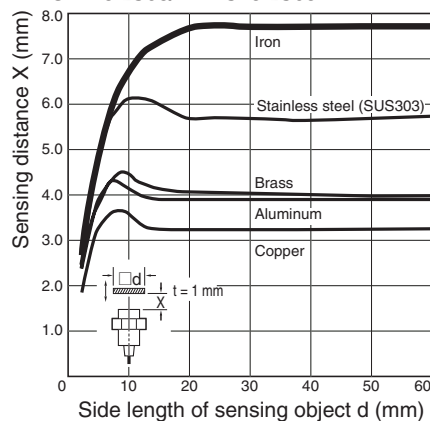
Influence of Sensing Object Size and Materials

Shielded Models

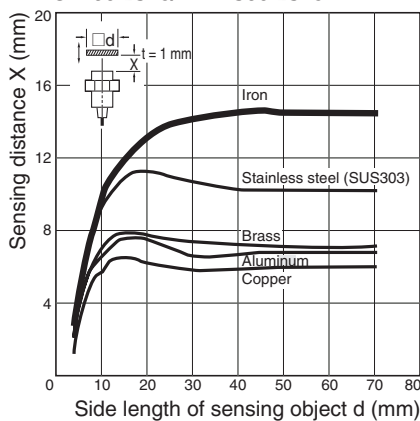
E2AU-M12□S04/ E2A-S12□S04



E2AU-M18□S08/E2A-S18□S08



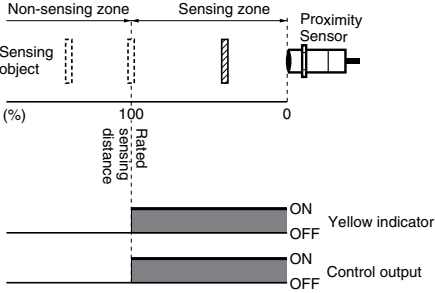
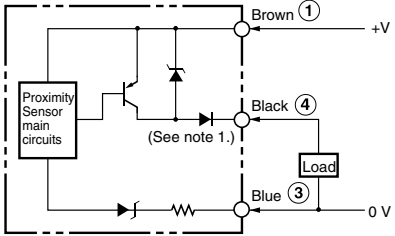
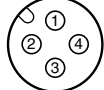
E2AU-M30□S15/ E2A-S30□S15



Operation

DC 3-wire models

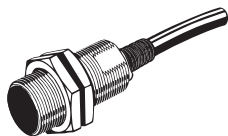
PNP Output

Operation mode	Model	Timing chart	Output circuit
NO	E2AU-□-□- B1	 <p>Non-sensing zone Sensing zone Proximity Sensor</p> <p>Sensing object</p> <p>(%) 100 0</p> <p>Rated sensing distance</p> <p>ON OFF Yellow indicator</p> <p>ON OFF Control output</p>	 <p>Brown ① +V</p> <p>Black ④</p> <p>Blue ③ 0 V</p> <p>Proximity Sensor main circuits</p> <p>(See note 1.)</p> <p>Load</p> <p>Note 1: With M8 connector models, there is no output reverse polarity protection diode.</p> <p>M12 Connector Pin Arrangement (See note 2.)</p>  <p>Note 2: Terminal 2 of the M12 connector is not used.</p>

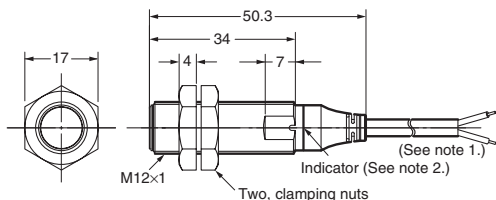
Dimensions

Note: All units are in millimeters unless otherwise indicated.

Pre-wired Models (Shielded)

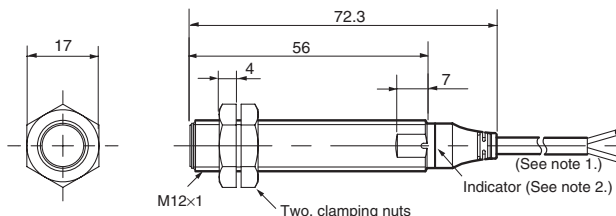


E2AU-M12KS04-WP-□□



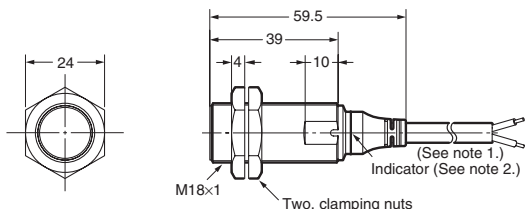
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
 2. Operation indicator (yellow)

E2A-M12LS04-WP-□□



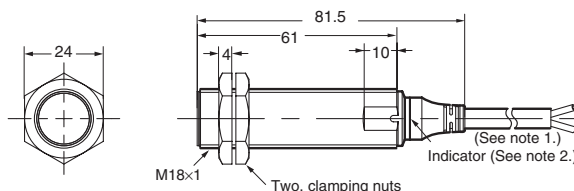
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
 2. Operation indicator (yellow)

E2AU-M18KS08-WP-□□



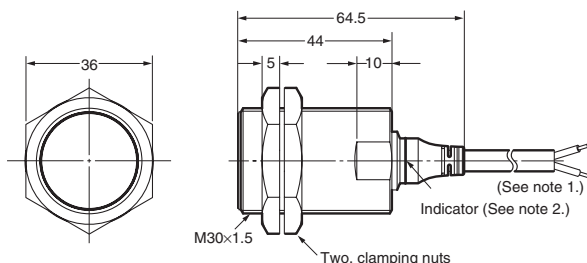
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
 2. Operation indicator (yellow)

E2AU-M18LS08-WP-□□



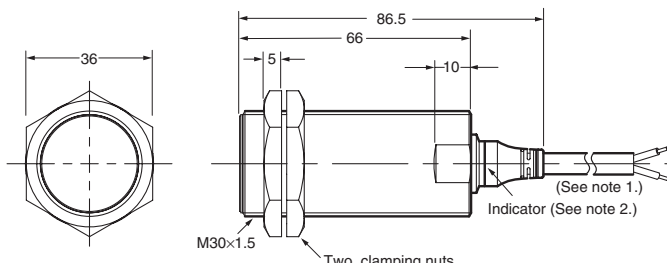
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
 2. Operation indicator (yellow)

E2AU-M30KS15-WP-□□



Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
 2. Operation indicator (yellow)

E2AU-M30LS15-WP-□□



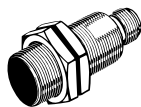
Note 1. 4-dia. vinyl-insulated round cable with 3 conductors (conductor cross section: 0.3 mm²; insulator diameter: 1.3 mm); standard length: 2 m
 2. Operation indicator (yellow)

Mounting Hole Cutout Dimensions

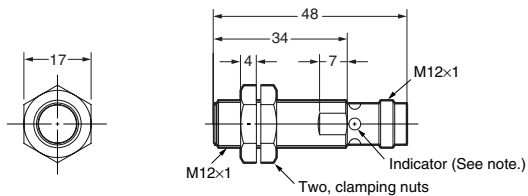


External diameter of Proximity Sensor	Dimension F (mm)
M12	12.5 dia. ^{+0.5} / ₀
M18	18.5 dia. ^{+0.5} / ₀
M30	30.5 dia. ^{+0.5} / ₀

M12 Connector Models (Shielded)

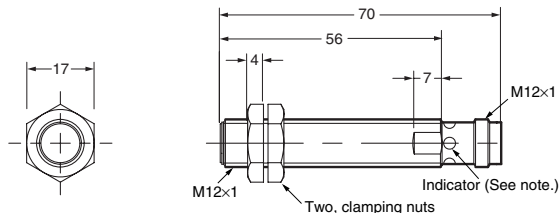


E2AU-M12KS04-M1-□□



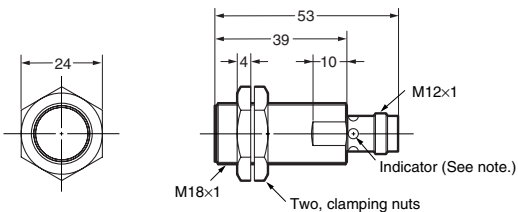
Note 1: Operation indicator (yellow LED, 4×90°)

E2AU-M12LS04-M1-□□



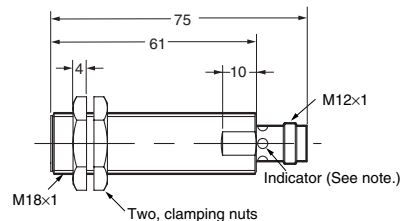
Note: Operation indicator (yellow LED, 4×90°)

E2AU-M18KS08-M1-□□



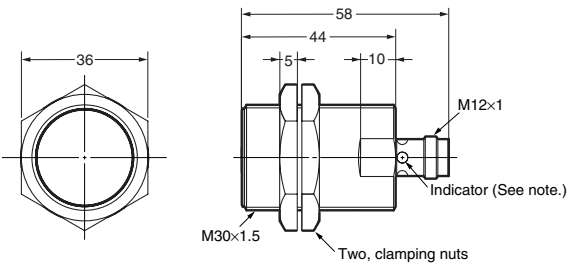
Note: Operation indicator (yellow LED, 4×90°)

E2AU-M18LS08-M1-□□



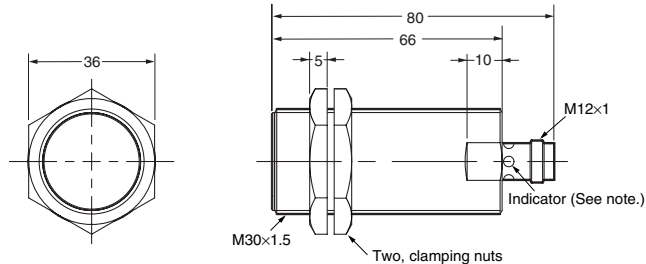
Note: Operation indicator (yellow LED, 4×90°)

E2AU-M30KS15-M1-□□



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

E2AU-M30LS15-M1-□□



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

Precautions

Safety Precautions

Power Supply

Do not impose an excessive voltage on the E2AU, 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 E2AU may be damaged.

The E2AU's short-circuit protection function will be valid if the polarity of the supply voltage imposed is correct and within the rated voltage range.

Correct Use

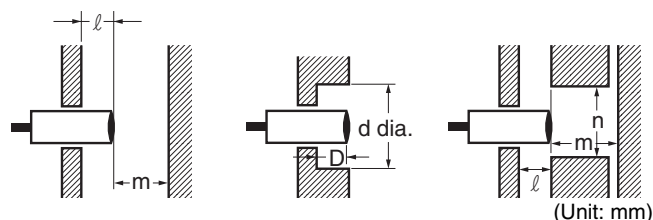
Designing

Power Reset Time

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

Effects of Surrounding Metal

When mounting the E2AU within a metal panel, ensure that the clearances given in the following table are maintained.



Type	Dimension	M12	M18	M30	
				Short barrel	Long barrel
Shielded	l	0	0 (See note 1.)	0 (See note 2.)	
	m	12	24	45	
	d	---	27	45	
	D	0	1.5	4	
	n	18	27	45	
Non-shielded	l	15	22	30	40
	m	20	48	70	90
	d	40	70	90	120
	D	15	22	30	40
	n	40	70	90	120

- Note 1.** In the case of using the supplied nuts.
If true flush mounting is necessary, apply a free zone of 1.5 mm.
- 2.** In the case of using the supplied nuts.
If true flush mounting is necessary, apply a free zone of 4 mm.

Wiring

Be sure to wire the E2AU and load correctly, otherwise it may be damaged.

Connection with No Load

Be sure to insert loads when wiring. Make sure to connect a proper load to the E2AU in 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.

Power OFF

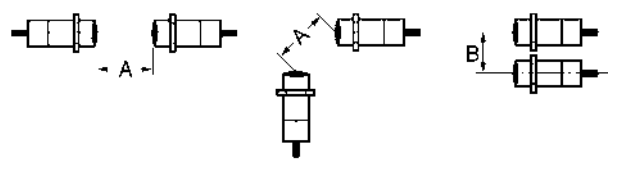
The Proximity Sensor may output a pulse signal when it is turned OFF. Therefore, it is recommended that the load be turned OFF before turning OFF the Proximity Sensor.

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.



Type	Dimension	M12	M18	M30	
				Short barrel	Long barrel
Shielded	A	30	60	110	
	B	20	35	70	
Non-shielded	A	120	200	300	300
	B	100	120	200	300

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

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-resistivity.

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



Type	Torque
M12	30 Nm
M18	70 Nm
M30	180 Nm

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 disassemble or repair the Sensor.

Environment

Water Resistivity

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

Operating Environment

Ensure storage and operation of the Proximity Sensor 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, in which case 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.

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

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

Terms and Conditions of Sale

- Offer; Acceptance.** These terms and conditions (these "Terms") are deemed part of all quotes, agreements, purchase orders, acknowledgments, price lists, catalogs, manuals, brochures and other documents, whether electronic or in writing, relating to the sale of products or services (collectively, the "Products") by Omron Electronics LLC and its subsidiary companies ("Omron"). Omron objects to any terms or conditions proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these Terms.
- Prices; Payment Terms.** All prices stated are current, subject to change without notice by Omron. Omron reserves the right to increase or decrease prices on any unshipped portions of outstanding orders. Payments for Products are due net 30 days unless otherwise stated in the invoice.
- Discounts.** Cash discounts, if any, will apply only on the net amount of invoices sent to Buyer after deducting transportation charges, taxes and duties, and will be allowed only if (i) the invoice is paid according to Omron's payment terms and (ii) Buyer has no past due amounts.
- Interest.** Omron, at its option, may charge Buyer 1-1/2% interest per month or the maximum legal rate, whichever is less, on any balance not paid within the stated terms.
- Orders.** Omron will accept no order less than \$200 net billing.
- Governmental Approvals.** Buyer shall be responsible for, and shall bear all costs involved in, obtaining any government approvals required for the importation or sale of the Products.
- Taxes.** All taxes, duties and other governmental charges (other than general real property and income taxes), including any interest or penalties thereon, imposed directly or indirectly on Omron or required to be collected directly or indirectly by Omron for the manufacture, production, sale, delivery, importation, consumption or use of the Products sold hereunder (including customs duties and sales, excise, use, turnover and license taxes) shall be charged to and remitted by Buyer to Omron.
- Financial.** If the financial position of Buyer at any time becomes unsatisfactory to Omron, Omron reserves the right to stop shipments or require satisfactory security or payment in advance. If Buyer fails to make payment or otherwise comply with these Terms or any related agreement, Omron may (without liability and in addition to other remedies) cancel any unshipped portion of Products sold hereunder and stop any Products in transit until Buyer pays all amounts, including amounts payable hereunder, whether or not then due, which are owing to it by Buyer. Buyer shall in any event remain liable for all unpaid accounts.
- Cancellation; Etc.** Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Omron against all related costs or expenses.
- Force Majeure.** Omron shall not be liable for any delay or failure in delivery resulting from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortage of labor or materials, accidents to machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.
- Shipping; Delivery.** Unless otherwise expressly agreed in writing by Omron:
 - Shipments shall be by a carrier selected by Omron; Omron will not drop ship except in "break down" situations.
 - Such carrier shall act as the agent of Buyer and delivery to such carrier shall constitute delivery to Buyer;
 - All sales and shipments of Products shall be FOB shipping point (unless otherwise stated in writing by Omron), at which point title and risk of loss shall pass from Omron to Buyer; provided that Omron shall retain a security interest in the Products until the full purchase price is paid;
 - Delivery and shipping dates are estimates only; and
 - Omron will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
- Claims.** Any claim by Buyer against Omron for shortage or damage to the Products occurring before delivery to the carrier must be presented in writing to Omron within 30 days of receipt of shipment and include the original transportation bill signed by the carrier noting that the carrier received the Products from Omron in the condition claimed.
- Warranties.** (a) **Exclusive Warranty.** Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied. (b) **Limitations.** OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right. (c) **Buyer Remedy.** Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty. See <http://www.omron247.com> or contact your Omron representative for published information.
- Limitation on Liability; Etc.** OMRON COMPANIES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY. Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.
- Indemnities.** Buyer shall indemnify and hold harmless Omron Companies and their employees from and against all liabilities, losses, claims, costs and expenses (including attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not Omron is a party) which arises or is alleged to arise from Buyer's acts or omissions under these Terms or in any way with respect to the Products. Without limiting the foregoing, Buyer (at its own expense) shall indemnify and hold harmless Omron and defend or settle any action brought against such Companies to the extent based on a claim that any Product made to Buyer specifications infringed intellectual property rights of another party.
- Property; Confidentiality.** Any intellectual property in the Products is the exclusive property of Omron Companies and Buyer shall not attempt to duplicate it in any way without the written permission of Omron. Notwithstanding any charges to Buyer for engineering or tooling, all engineering and tooling shall remain the exclusive property of Omron. All information and materials supplied by Omron to Buyer relating to the Products are confidential and proprietary, and Buyer shall limit distribution thereof to its trusted employees and strictly prevent disclosure to any third party.
- Export Controls.** Buyer shall comply with all applicable laws, regulations and licenses regarding (i) export of products or information; (ii) sale of products to "forbidden" or other proscribed persons; and (iii) disclosure to non-citizens of regulated technology or information.
- Miscellaneous.** (a) **Waiver.** No failure or delay by Omron in exercising any right and no course of dealing between Buyer and Omron shall operate as a waiver of rights by Omron. (b) **Assignment.** Buyer may not assign its rights hereunder without Omron's written consent. (c) **Law.** These Terms are governed by the law of the jurisdiction of the home office of the Omron company from which Buyer is purchasing the Products (without regard to conflict of law principles). (d) **Amendment.** These Terms constitute the entire agreement between Buyer and Omron relating to the Products, and no provision may be changed or waived unless in writing signed by the parties. (e) **Severability.** If any provision hereof is rendered ineffective or invalid, such provision shall not invalidate any other provision. (f) **Setoff.** Buyer shall have no right to set off any amounts against the amount owing in respect of this invoice. (g) **Definitions.** As used herein, "including" means "including without limitation"; and "Omron Companies" (or similar words) mean Omron Corporation and any direct or indirect subsidiary or affiliate thereof.

Certain Precautions on Specifications and Use

- Suitability of Use.** Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases but the following is a non-exhaustive list of applications for which particular attention must be given:
 - Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
 - Use in consumer products or any use in significant quantities.
 - Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
 - Systems, machines and equipment that could present a risk to life or property. Please 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 OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO
- ADDRESS THE RISKS, AND THAT THE OMRON'S PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
- Programmable Products.** Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.
- Performance Data.** Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.
- Change in Specifications.** Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.
- Errors and Omissions.** Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.



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