

Long Distance Square Inductive Proximity Sensor

E2Q5

Square Proximity Sensor



- M12 Plug-in connection
- Integrated short circuit and reverse polarity protection
- Active face positioning:
Y-axis 15°, X-axis 90°
increments



Ordering Information

Sensing distance	Connection	Active face	Output		
				NO	NO + NC
20 mm shielded	Plug-in connector	Changable	NPN	E2Q5-N20E1-M1	E2Q5-N20E3-M1
			PNP	E2Q5-N20F1-M1	E2Q5-N20F3-M1
40 mm non-shielded			NPN	E2Q5-N40ME1-M1	E2Q5-N40ME3-M1
			PNP	E2Q5-N40MF1-M1	E2Q5-N40MF3-M1

Rating/performance

Item	Model	shielded	non-shielded
		E2Q5-N20□□-M1	E2Q5-N40M□3-M1
Sensing distance Sn		20 mm ± 10%	40 mm ± 10%
Standard target size, L x W x H, Fe 37		60 x 60 x 1 mm	120 x 120 x 1 mm
Setting distance		0 to 16,2 mm	0 to 32,4 mm
Switching frequency		150 Hz	
Sensing object		Ferrous metals	
Differential travel		15% max. of sensing distance Sn	
Operating voltage		10 to 30 VDC	
Current consumption		20 mA max.	
Control output	Type	E2Q5-N□□□E1-□□: NPN - NO E2Q5-N□□□E3-□□: NPN - NO + NC E2Q5-N□□□F1-□□: PNP - NO E2Q5-N□□□F3-□□: PNP - NO + NC	
	Load	200 mA max.	
	On-stage voltage drop	3 VDC max. (at 200 mA load current)	
Circuit protection		Reverse polarity, output short circuit	
Indicator		Operating indicator (yellow LED), operating voltage (green LED)	
Ambient temperature		Operating: -25° to 85°C	
Ambient humidity		35 to 95% RH	
Influence of temperature		± 10% max. of Sn at 23° in temperature range of -25° to 70°C	
Dielectric strength		1.500 VAC, 50/60 Hz for 1 min. between current carry parts and case	
Electromagnetic compatibility EMC		EN 60947-5-2	
Vibration resistance		10 to 55 Hz, 1 mm amplitude according IEC 60068-2-6	
Shock resistance		Approx. 30 G for 11 ms according to IEC 60068-2-27	
Protection degree		IP67 IEC 60529, IP69K DIN 40050	
Connection	Connector	M12 plug, 4 pins	
Material	Case	PBT	
	Sensing face	PBT	
Approvals			

Output Circuit Diagramm

NPN output

Model	Operation mode	Timing chart	Output circuit
<p>E2Q5-N20E1-M1 E2Q5-N40ME1-M1</p>	<p>NO</p>	<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>Proximity Sensor main circuits</p> <p>4.7kΩ</p> <p>Operation Indicator (yellow)</p> <p>Brown ① +V</p> <p>Black ④ Load</p> <p>Blue ③ 0V</p> <p>Connector Pin Arrangement</p> <p>Note: Terminal 2 is not used</p>
<p>E2Q5-N20E3-M1 E2Q5-N40ME3-M1</p>	<p>NO + NC</p>	<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 NO</p> <p>ON OFF Control output NC</p>	<p>Proximity Sensor main circuits</p> <p>4.7kΩ</p> <p>Operation Indicator (yellow)</p> <p>4.7kΩ</p> <p>Brown ① +V</p> <p>Black ④ Load</p> <p>White ② Load</p> <p>Blue ③ 0V</p> <p>Connector Pin Arrangement</p>

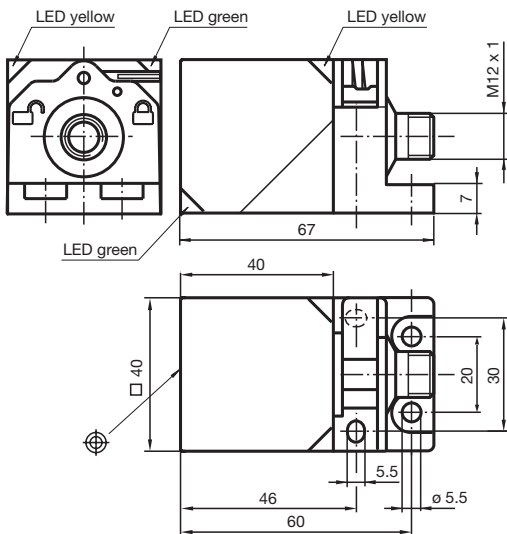
E2Q5

PNP output


Model	Operation mode	Timing chart	Output circuit
E2Q5-N20F1-M1 E2Q5-N40MF1-M1	NO		<p>Connector Pin Arrangement</p> <p>Note: Terminal 2 is not used</p>
E2Q5-N20F3-M1 E2Q5-N40MF3-M1	NO + NC		<p>Connector Pin Arrangement</p>

Dimensions (Unit:mm)

E2Q5-...-M1 type



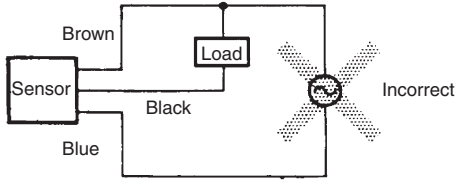
Precautions

 **Caution**

Power supply

Do not impose an excessive voltage on the E2Q2, otherwise it may explode or burn.

Do not connect an AC power supply to any DC model. If AC power (100 VAC or more) is supplied to the sensor, it may explode or burn.



Be sure to abide by the following precautions for the safe operation of the Sensor.

Wiring

Power Supply Voltage and Output Load

Power Supply Voltage

Make sure that the power supply to the Sensor is within the rated voltage range. If a voltage exceeding the rated voltage range is supplied to the Sensor, it may explode or burn.

Load Short-circuiting

Do not short-circuit the load, otherwise the Sensor may be damaged.

Connection without Load

Do not connect the power supply to the Sensor with no load connected, otherwise the internal elements may explode or burn.

Operating Environment

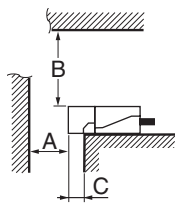
Do not use the Sensor in locations with explosive or flammable gas.

Correct Use

Design

Effects of Surrounding Metal

Provide a minimum distance between the Sensor and the surrounding metal as shown in the table below.

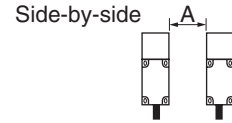


Effects of Surrounding Metal (Unit: mm)

Model	Length	A	B	C
E2Q5-N20□□-M1		45	0	0
E2Q5-N40M□□-M1		120	300	40

Mutual Interference

If more than one Sensor is located in parallel, ensure to maintain enough space between adjacent Sensors to suppress mutual interference as provided in the following diagram.



Mutual Interference (Unit: mm)

Model	Length	A
E2Q5-N20□□-M1		40
E2Q5-N40M□□-M1		150

Power Reset Time

The Sensor is ready to operate within 300 ms after the Sensor is turned ON. If the load and Sensor are connected to independent power supplies respectively, be sure to turn ON the Sensor before supplying power to the load.

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.

Sensing Object

The sensing distance of the Proximity Sensor vary with the metal coating on sensing objects.

Wiring

High-tension cables

Wiring through Metal Conduit:

If there is 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 malfunction.

Mounting

Mounting the Sensor

Do not subject the Proximity Sensor to excessive shock with a hammer when it is installed, otherwise the Proximity Sensor may be damaged or lose its water-resistivity.

Maintenance and Inspection

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

- Check for mounting position, dislocation, looseness or distortion of the Proximity Sensor and sensing objects.
- Check for loose wiring and connections, improper contacts and line breakage.
- Check for attachment or accumulation of metal powder or dust.
- Check for abnormal temperature conditions and other environmental conditions.

Never disassemble or repair the Sensor.

Environment

Water Resistivity

Do not use the Proximity Sensor underwater, outdoors or in the rain.

Operating Environment

Be sure to use the Proximity Sensor within its operating ambient temperature range and do not use the Proximity Sensor outdoors so that its reliability and life expectancy can be maintained. Although the Proximity Sensor is water resistive, a cover to protect the Proximity Sensor from water or water-soluble machining oil is recommended so that its reliability and life expectancy can be maintained.

Do not use the Proximity Sensor in an environment with chemical gas (e.g., strong alkaline or acid gasses including nitric, chromic and concentrated sulfuric acid gases).

Inrush Current

A load that has a large inrush current (e.g., a lamp or motor) will damage the Proximity Sensor, in this case connect the load to the Proximity Sensor through a Relay

Complete “Terms and Conditions of Sale” for product purchase and use are on Omron’s website at www.omron247.com – under the “About Us” tab, in the Legal Matters section.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Terms and Conditions of Sale

1. **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.
2. **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.
3. **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.
4. **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.
5. **Orders.** Omron will accept no order less than \$200 net billing.
6. **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.
7. **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.
8. **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.
9. **Cancellation; Etc.** Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Omron against all related costs or expenses.
10. **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.
11. **Shipping; Delivery.** Unless otherwise expressly agreed in writing by Omron:
 - a. Shipments shall be by a carrier selected by Omron; Omron will not drop ship except in "break down" situations.
 - b. Such carrier shall act as the agent of Buyer and delivery to such carrier shall constitute delivery to Buyer;
 - c. 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;
 - d. Delivery and shipping dates are estimates only; and
 - e. Omron will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
12. **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.
13. **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.
14. **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.
15. **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.
16. **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.
17. **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.
18. **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

1. **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: (i) Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document. (ii) Use in consumer products or any use in significant quantities. (iii) 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. (iv) 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.
2. **Programmable Products.** Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.
3. **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.
4. **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.
5. **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.

OMRON INDUSTRIAL AUTOMATION • THE AMERICAS HEADQUARTERS

Schaumburg, IL USA • 847.843.7900 • 800.556.6766 • www.omron247.com

OMRON CANADA, INC. • HEAD OFFICE

Toronto, ON, Canada • 416.286.6465 • 866.986.6766 • www.omron247.com

OMRON ELECTRONICS DE MEXICO • HEAD OFFICE

México DF • 52.55.59.01.43.00 • 001.800.556.6766 • mela@omron.com

OMRON ELECTRONICS DE MEXICO • SALES OFFICE

Apodaca, N.L. • 52.81.11.56.99.20 • 001.800.556.6766 • mela@omron.com

OMRON ELETRÔNICA DO BRASIL LTDA • HEAD OFFICE

São Paulo, SP, Brasil • 55.11.2101.6300 • www.omron.com.br

OMRON ARGENTINA • SALES OFFICE

Cono Sur • 54.11.4783.5300

OMRON CHILE • SALES OFFICE

Santiago • 56.9.9917.3920

OTHER OMRON LATIN AMERICA SALES

54.11.4783.5300

OMRON EUROPE B.V. • Wegalaan 67-69, NL-2132 JD, Hoofddorp, The Netherlands. • Tel: +31 (0) 23 568 13 00

Fax: +31 (0) 23 568 13 88 • www.industrial.omron.eu