OMRON Inductive Proximity Sensors E2Q2/E2Q3/E2Q4

Square Proximity Sensors

- Limit switch styled housing models easy to install
- Standard CENELEC models and miniature types
- Terminal housing, M12 Plug-in connection and cable types
- Special weld-field immune models



E2Q2	E2Q2

OMRON Inductive Proximity Sensor

E2Q2

Square Proximity Sensor

- Terminal housing
- Active face changeable to one of every five
- Easy to install and same mounting dimensions as a standard style electomechanical limit switch
- Integrated short circuit and reverse polarity protection
- Robust body with stainless steel screws

Ordering Information -

DC type

Sensing	Connection	Active Output			
distance		face		NO	NO + NC
20 mm	Terminals/	Changeable	NPN	E2Q2-N20E1-G	E2Q2-N20E3-🗆
shielded	Connector		PNP	E2Q2-N20F1-G	E2Q2-N20F3-🗆
30 mm	Terminals/	Changeable	NPN		E2Q2-N30ME3-

G: terminal conduit PG 13,5
 U: terminal conduit 1/2" NPT
 50: BHMS4 connector, North American style

AC type

Sensing	Connection	Active	Active Output		
distance		face		NO	NO or NC
15 mm	Terminals/	Changeable	AC		E2Q2-N15Y4-🗆
shielded	Connector				
30 mm	Terminals/	Changeable	AC		E2Q2-N30MY4-
non shielded	Connector				

 \Box = G: terminal conduit PG 13,5

U: terminal conduit 1/2" NPT

50: BHMS3 connector, North American style

Weld-Field Immune DC type (100mT)

Sensing	Connection	Active Output			
distance		face		NO	NO + NC
15 mm	Terminal	Changeable	PNP	E2Q2-N15F1-51	
shielded	conduit 1/2" NPT				
15 mm	BHMS4-	Changeable	PNP	E2Q2-N15F1-52	
shielded	Connector				

Weld-Field Immune AC type (100mT)

Sensing	Connection	Active		Output	
distance		face		NO	NO or NC
15 mm	Terminal	Changealbe	AC		E2Q2-N15Y4-51
shielded	conduit 1/2" NPT				
15 mm	BHMS3-	Changealbe	AC		E2Q2-N15Y4-52
shielded	Connector				



Specifications for DC type _____

Operating voltage		10 to 60 VDC/10 to 30 VDC weld-field immune types	
Current consumptio	n	max. 20 mA / max 10 mA E2Q2-N30 types	
Sensing object		Ferrous metals	
Sensing distance Sn E2Q2-N15 (Standard target size, L x W x H, Fe 37) E2Q2-N20 (Standard target size, L x W x H, Fe 37) E2Q2-N30 (Standard target size, L x W x H Fe 37)		15 mm ±10%, shielded (45 x 45 x 1 mm) 20 mm ±10%, shielded (60 x 60 x 1 mm) 30 mm ±10%, non shielded (90 x 90 x 1 mm)	
Setting distance	E2Q2-N15 E2Q2-N20 E2Q2-N30	0 to 12,15 mm 0 to 16,2 mm 0 to 24,3 mm	
Differential travel		15% max. of sensing distance Sn	
Switching frequency	y .	N20: 150 Hz /N30: 100 Hz / N15 : 10Hz weld-field immune types	
Control output	Туре	E2Q2-N E1 : NPN-NO E2Q2-N E3 : NPN-NO+NC E2Q2-N F1 : PNP-NO E2Q2-N F3 : PNP-NO+NC	
	Max-Load	200 mA	
	Max on-state voltage drop	3 VDC (at 200 mA load current)	
Circuit protection		Reverse polarity, output short circuit	
Alternating magneti	c field	100 mT	
Indicator		Operating indicator (yellow LED)	
Ambient temperatur	re	Operating: -25° to 70°C	
Humidity		35 to 95% RH	
Influence of tempera	ature	\pm 10% max. of Sn at 23°C 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 co	mpatibility EMC	EN 60947-5-2	
Vibration resistance		10 to 55 Hz, 1 mm amplitude according to IEC 60068-2-6	
Shock resistance		approx. 30 G for 11 ms according to IEC 60068-2-27	
Protection degree		IP 67 (IEC 529)	
Connection	Terminals	Up to 2,5 mm ²	
Material	Case Terminal base	PBT Al / G Type: PBT	
	Sensing face	РВТ	
Approvals			

Specifications for AC type —

Operating voltage		20 to 253 VAC	
Off-state current		max. 1,9 mA / max 2,5 mA weld-field immune types	
Sensing object		Ferrous metals	
Sensing distance Si	n		
	E2Q2-N15	15 mm ±10%, shielded	
(Standard target size,	L x W x H, Fe 37)	(45 x 45 x 1 mm)	
	E2Q2-N30	30 mm ±10%, non shielded	
(Standard target size,	L x W x H, Fe 37)	(90 x 90 x 1 mm)	
Setting distance	E2Q2-N15	0 to 12,15 mm	
	E2Q2-N30	0 to 24,3 mm	
Differential travel		15% max. of sensing distance Sn	
Switching frequency	у	20 Hz	
Control output	Туре	E2Q2-N	
	Max-Load	500 mA	
	Min-Load	8 mA / 10 mA weld-field immune types	
	Max on-state voltage drop	12 VAC (at 500 mA load current)	
Circuit protection		none	
Alternating magneti	ic field	100 mT	
Indicator		Operating indicator (yellow LED)	
Ambient temperatu	re	Operating: -25° to 70°C	
Humidity		35 to 95% RH	
Influence of temper	ature	± 10% max. of Sn at 23°C in temperature range of -25° to 70°C	
Dielectric strength		1.500 VAC/ 2500 VAC E2Q2G between current carry parts and case	
Electromagnetic co	mpatibility EMC	EN 60947-5-2	
Vibration resistance	<u>)</u>	10 to 55 Hz, 1 mm amplitude according to IEC 60068-2-6	
Shock resistance		approx. 30 G for 11 ms according to IEC 60068-2-27	
Protection degree		IP 67 (IEC 529)	
Connection Terminals		Up to 2,5 mm ²	
Material Case Terminal base		PBT Al / G Type: PBT	
	Sensing face	РВТ	
Approvals			

Operation -

Output Circuit Diagram and Timing Chart







Output	NO
Sensing Object	Present Absent
Load	Operates Release
Operation Indicator	

Output	NO
Sensing Object	Present Absent
Load	Operates Release_XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Operation Indicator	

NPN NO + NC output



Output NO NC Sensing Object Present Absent Present Absent Present Absent Load Operates Release Operates Release Operates Release Operates Release Operation Indicator ON ON

PNP NO + NC output



Output	NO	NC
Sensing Object	Present Absent	Present Absent
Load	Operates Release_XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	Operates Releases
Operation Indicator	ON OFF	

■ BHMS Wiring





E2Q2-...-U and -51 type





■ E2Q2-...-50 and -52 type



E2Q2 -

Precautions-

Item	Examples
Power Supply Do not impose an excessive voltage on the E2Q2, otherwise it may explode or burn. Do not impose AC voltage on any E2Q2 DC model, otherwise it may explode or burn.	Sensor Blue Blue
Do not connect the AC types without load to the power supply. The sensor will be damaged.	sensor Contract

Correct Use------

Installation

Power Reset Time

The Proximity Sensor is ready to operate within 300 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.

Power OFF

The Proximity Sensor may output a pulse signal when it is turned off. Therefore, it is recommended to turn off the load 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

Metal Coating: 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 a power or high-tension cable near the cable of the Proximity Sensor, wire the sensor cable through an independent metal conduit to prevent against Proximity Sensor damage or malfunctioning.

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 the water-resistivity.

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 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 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 gases including nitric, chromic, and concentrated sulfuric acid gases).

DC Type

Connection type	Method	Description
AND (serial connection)		The Sensors connected together must satisfy the following conditions: $i_{L} + (N-1) \times i \leq Upper-limit of control output of each Sensor Vs - N x VR \geq Load operating voltage N = No. of Sensors VR = Residual voltage of each Sensor Vs = Supply voltage i = Current consumption of the Sensor i_{L} = Load currentIf the MY Relay, which operate at 24 VDC, is used as a load forexample, a maximum of two Proximity Sensors can be connectedto the load.$
OR (parallel connection)		A minimum of three Sensors with current outputs can be connected in parallel. The number of Sensors connected in parallel varies with the Proximity Sensor model.

АС Туре

Connection type	Method	Description
AND (serial connection)		If 100 or 200 VAC is imposed on the Proximity Sensors, V_L (i.e., the voltage imposed on the load) will be obtained from the following. $V_L = V_S$ - (residual voltage x no. of Proximity Sensors) (V) Therefore, if V_L is lower than the load operating voltage, the load will not operate. A maximum of three Proximity Sensors can be connected in series provided that the supply voltage is 100 V minimum.
OR (parallel connection)	Incorrect	In principle, more than two Proximity Sensors cannot be connected in parallel. Provided that Proximity Sensor A does not operate with Proximity Sensor B simultaneously and there is no need to keep the load operating continuously, the Proximity Sensors can beconnected in parallel. In this case, however, due to the total leakage current of the Proximity Sensors, the load may not reset properly. It is not possible to keep the load operating continuously with Proximity Sensors A and B in simultaneous operation to sense sensing objects due to the following reason. When Proximity Sensor A is ON, the voltage imposed on Proximity Sensor A will drop to approximately 10 V and the load current flows into Proximity Sensor A, and when one of the sensing objects is close to Proximity Sensor A is OFF, the voltage imposed on Proximity Sensor B will reach the supply voltage and Proximity Sensor B will be ON. Then, Proximity Sensor A as well as Proximity Sensor B will be OFF for approximately 10 ms, which resets the load for an instant. To prevent the instantaneous resetting of the load, use a relay as shown on the left.

OMRON Inductive Proximity Sensor

E2Q3

Square Proximity Sensor

- Miniature terminal housing
- Integrated short circuit and reverse polarity protection
- Output function programmable by wiring
- Active face positioning: Y-axis 15°, X-axis 90° increments

Ordering Information —

Sensing distance	Connection	Active face		Output NO or NC
15 mm	Terminals	Changeable	NPN	E2Q3-N15ME4-G
non shielded			PNP	E2Q3-N15MF4-G



Specifications —

		1	
Operating voltage		10 to 60 VDC	
Current consumption		max. 14 mA	
Sensing object		Ferrous metals	
Sensing distance Sn (Standard target size, L x W x H , Fe 37)		15 mm ±10%, non shielded (45 x 45 x 1 mm)	
Setting distance		0 to 12,15 mm	
Differential travel		15 % max. of sensing distance Sn	
Switching frequenc	у	150 Hz	
Control output	Туре	E2Q3-N15ME4-G: NPN-NO / NC E2Q3-N15MF4-G: PNP-NO / NC	
	Max-Load	200 mA	
	Max on-state voltage drop	3 VDC (at 200 mA load current)	
Circuit protection		Reverse polarity, output short circuit	
Indicator		Operating indicator (yellow LED)	
Ambient temperature		Operating: -25° to 70°C	
Humidity		35 to 95% RH	
Influence of temper	ature	± 10% max. of Sn at 23°C 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 co	mpatibility EMC	EN 60947-5-2	
Vibration resistance	9	10 to 55 Hz, 1 mm amplitude according to IEC 60068-2-6	
Shock resistance		approx. 30 G for 11 ms according to IEC 60068-2-27	
Protection degree		IP 67 (IEC 529)	
Connection Terminals		Up to 2,5 mm ²	
Material	Case	PBT	
	Sensing face	РВТ	
Approvals			

Operation -

Output Circuit Diagram and Timing Chart







PNP NO Output



PNP NC Output



Output		NO		NC	
Sensing Object	Present Absent_		Present Absent_		Ł
Load	Operates Release_	****	Operates Releases		8
Operation Indicator	ON OFF_		ONF OFF		8

Output	NO	NC	
Sensing Object	Present Absent	Present XXXXX	8
Load	Operates Release	Operates Releases	
Operation Indicator			

Dimensions -



Precautions -



Correct Use-

Installation

Power Reset Time

The Proximity Sensor is ready to operate within 300 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.

Power OFF

The Proximity Sensor may output a pulse signal when it is turned off. Therefore, it is recommended to turn off the load 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

Metal Coating: 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 a power or high-tension cable near the cable of the Proximity Sensor, wire the sensor cable through an independent metal conduit to prevent against Proximity Sensor damage or malfunctioning.

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 the water-resistivity.

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 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 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 gases including nitric, chromic, and concentrated sulfuric acid gases).

Connection type	Method	Description
AND (serial connection)		The Sensors connected together must satisfy the following conditions: $i_L + (N-1) \times i \leq Upper-limit of control output of each Sensor V_s - N \times V_R \geq Load operating voltage N = No. of Sensors V_R = Residual voltage of each Sensor V_s = Supply voltage i = Current consumption of the Sensori_L = Load currentIf the MY Relay, which operate at 24 VDC, is used as a load forexample, a maximum of two Proximity Sensors can be connectedto the load.$
OR (parallel connection)		A minimum of three Sensors with current outputs can be connected in parallel. The number of Sensors connected in parallel varies with the Proximity Sensor model.

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Inductive Proximity Sensor

Square Proximity Sensor

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

Ordering Information -

Sensing	Connection	Active Output			
distance		face		NO	NO + NC
	Pre-wired	Changeable	NPN	E2Q4-N20E1	E2Q4-N20E3
20 mm			PNP	E2Q4-N20F1	E2Q4-N20F3
shielded	Plug-in	Changeable	NPN	E2Q4-N20E1-M1	E2Q4-N20E3-M1
	connector		PNP	E2Q4-N20F1-M1	E2Q4-N20F3-M1
	Pre-wired	Changeable	NPN	E2Q4-N30ME1	E2Q4-N30ME3
30 mm			PNP	E2Q4-N30MF1	E2Q4-N30MF3
non shielded	Plug-in	Changeable	NPN	E2Q4-N30ME1-M1	E2Q4-N30ME3-M1
	connector		PNP	E2Q4-N30MF1-M1	E2Q4-N30MF3-M1



E2Q4

Specifications _____

Operating voltage		10 to 30 VDC	
Current consumption		max. 20 mA	
Sensing object		Ferrous metals	
Sensing distance Sr (Standard target siz L x W x H, Fe 37)	n E2Q4-N20 E2Q4-N30M e, E2Q4-N20 E2Q4-N30M	20 mm ±10%, shielded 30 mm ±10%, non shielded (60 x 60 x 1 mm) (90 x 90 x 1 mm)	
Setting distance	E2Q4-N20 E2Q4-N30M	0 to 16,2 mm 0 to 24,3 mm	
Differential travel		15 % max. of sensing distance Sn	
Switching frequency	y	150 Hz	
Control output	Туре	E2Q4-N E1 : NPN-NO E2Q4-N E3 : NPN-NO+NC E2Q4-N F1 : PNP-NO E2Q4-N F1 : PNP-NO+NC	
	Max-Load	200 mA	
	Max on-state voltage drop	3 VDC (at 200 mA load current)	
Circuit protection		Reverse polarity, output short circuit	
Indicator		Operating indicator (yellow LED)	
Ambient temperature		Operating: -25° to 70°C	
Humidity		35 to 95% RH	
Influence of temper	ature	\pm 10% max. of Sn at 23°C 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 co	mpatibility EMC	EN 60947-5-2	
Vibration resistance	•	10 to 55 Hz, 1 mm amplitude according to IEC 60068-2-6	
Shock resistance		approx. 30 G for 11 ms according to IEC 60068-2-27	
Protection degree		IP 67 (IEC 529)	
Connection	Pre-wired	2 m PVC-cable, 3x0,34mm ² / 4x0,34mm ²	
	Connector	M12 plug, 3 / 4 pins	
Material	Case	PBT	
	Sensing face	PBT	
Approvals			

Operation -

■ Output Circuit Diagram and Timing Chart







3 / Blue

Output	NO
Sensing Object	Present Absent
Load	Operates Release
Operation Indicator	

Output	NO
Sensing Object	Present Absent
Load	Operates Release
Operation Indicator	

NPN NO + NC output



Output NO NC Sensing Object Present Absent Present Absent Present Absent Load Operates Release Operates Release Operates Release Operation Indicator ON ON

PNP NO + NC output



Output	NO	NC
Sens ing Object	Present Absent	Present Absent
Load	Operates Release	Operates Releases
Operation Indicator		

■ Wiring



Dimensions -

E2Q4-N....



E2Q4-N....-M1



Precautions -



Correct Use

Installation

Power Reset Time

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Power OFF

The Proximity Sensor may output a pulse signal when it is turned off. Therefore, it is recommended to turn off the load 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

Metal Coating:

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 a power or high-tension cable near the cable of the Proximity Sensor, wire the sensor cable through an independent metal conduit to prevent against Proximity Sensor damage or malfunctioning.

Mounting

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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 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 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 gases including nitric, chromic, and concentrated sulfuric acid gases).

DCType

Connection type	Method	Description
AND (serial connection)		The Sensors connected together must satisfy the following conditions: $i_L + (N-1) \times i \leq Upper-limit of control output of each Sensor Vs - N x VR \geq Load operating voltage N = No. of Sensors VR = Residual voltage of each Sensor Vs = Supply voltage i = Current consumption of the Sensori_L = Load currentIf the MY Relay, which operate at 24 VDC, is used as a load forexample, a maximum of two Proximity Sensors can be connectedto the load.$
OR (parallel connection)		A minimum of three Sensors with current outputs can be connected in parallel. The number of Sensors connected in parallel varies with the Proximity Sensor model.

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. D200-E2-01 In the interest of product improvement, specifications are subject to change without notice.

OMRON Europe BV

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