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

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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 distance	Connection	Active face	Output		
				NO	NO + NC
20 mm shielded	Terminals/ Connector	Changeable	NPN	E2Q2-N20E1-G	E2Q2-N20E3-□
			PNP	E2Q2-N20F1-G	E2Q2-N20F3-□
30 mm non shielded	Terminals/ Connector	Changeable	NPN		E2Q2-N30ME3-□
			PNP		E2Q2-N30MF3-□

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

AC type

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

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

Weld-Field Immune AC type (100mT)

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

Specifications for DC type

Operating voltage		10 to 60 VDC/10 to 30 VDC weld-field immune types
Current consumption		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)**		15 mm ±10%, shielded (45 x 45 x 1 mm)
E2Q2-N20.. **(Standard target size, L x W x H, Fe 37)**		20 mm ±10%, shielded (60 x 60 x 1 mm)
E2Q2-N30.. **(Standard target size, L x W x H, Fe 37)**		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		...N20...: 150 Hz / ...N30...: 100 Hz / ...N15... : 10Hz weld-field immune types
Control output	**Type**	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 magnetic field		100 mT
Indicator		Operating indicator (yellow LED)
Ambient temperature		Operating: -25° to 70°C
Humidity		35 to 95% RH
Influence of temperature		± 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 compatibility 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	PBT
Approvals		CERTIFIED LISTED

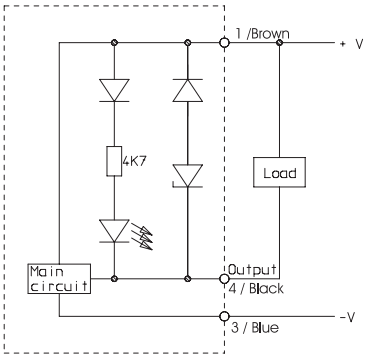
Specifications for AC type

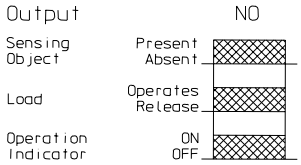
Operating voltage			20 to 253 VAC
Off-state current			max. 1,9 mA / max 2,5 mA weld-field immune types
Sensing object			Ferrous metals
Sensing distance Sn			
		E2Q2-N15..	15 mm ±10%, shielded
(Standard target size, L x W x H, Fe 37)			(45 x 45 x 1 mm)
		E2Q2-N30..	30 mm ±10%, non shielded
(Standard target 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			20 Hz
Control output	**Type**		E2Q2-N □ □ □ Y4- □ □ : AC - NO or NC
	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 magnetic field			100 mT
Indicator			Operating indicator (yellow LED)
Ambient temperature			Operating: -25° to 70°C
Humidity			35 to 95% RH
Influence of temperature			± 10% max. of Sn at 23°C in temperature range of -25° to 70°C
Dielectric strength			1.500 VAC/ 2500 VAC E2Q2-...-G between current carry parts and case
Electromagnetic compatibility 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		PBT
Approvals			CERTIFIED LISTED

Operation

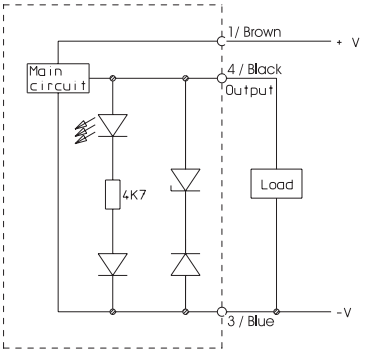
■ Output Circuit Diagram and Timing Chart

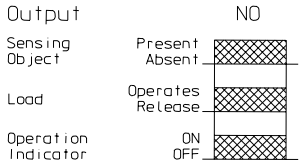
NPN NO output



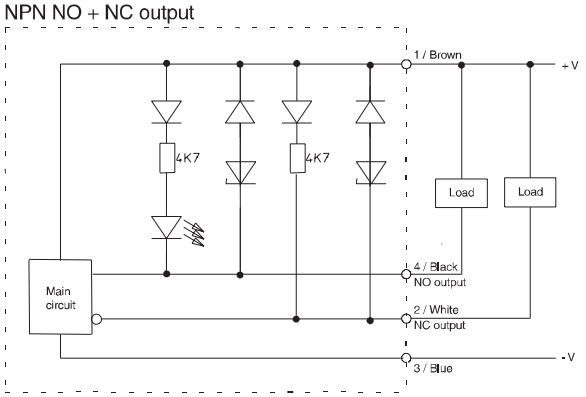


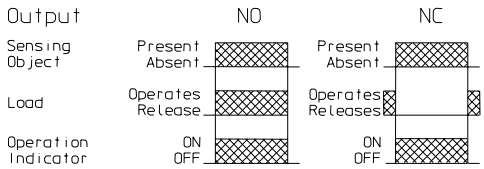
PNP NO output



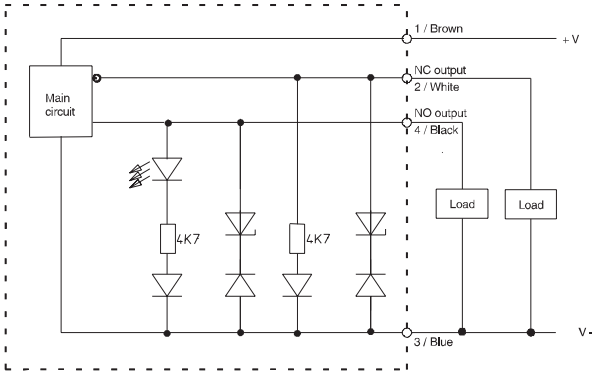


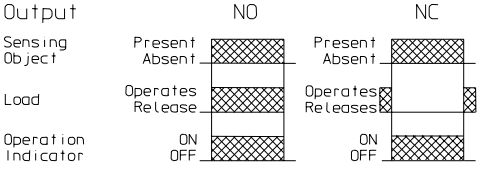
NPN NO + NC output



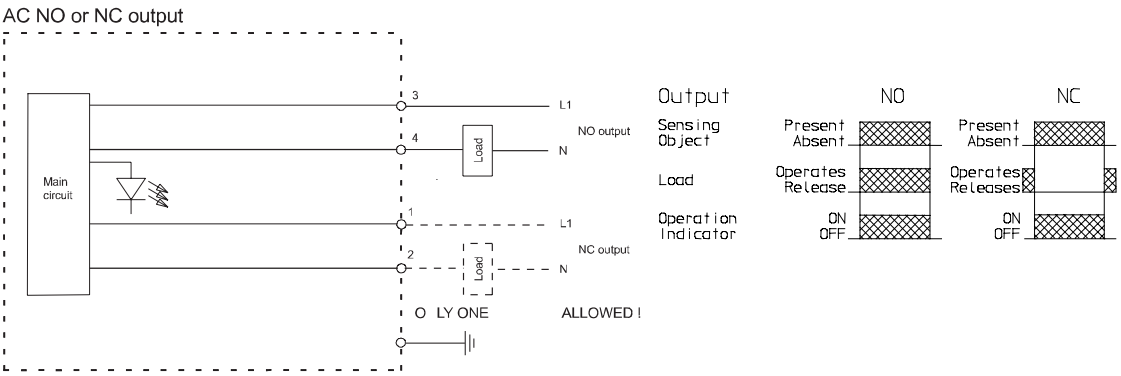


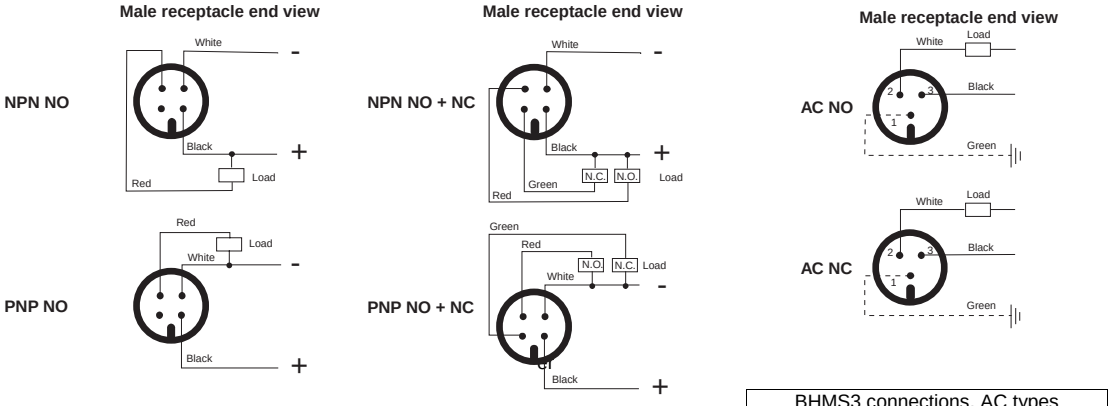
PNP NO + NC output





■ BHMS Wiring

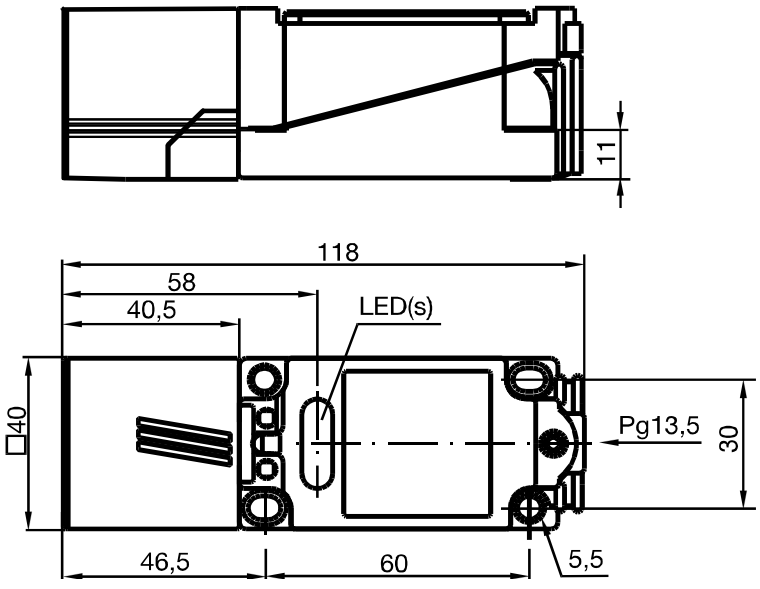




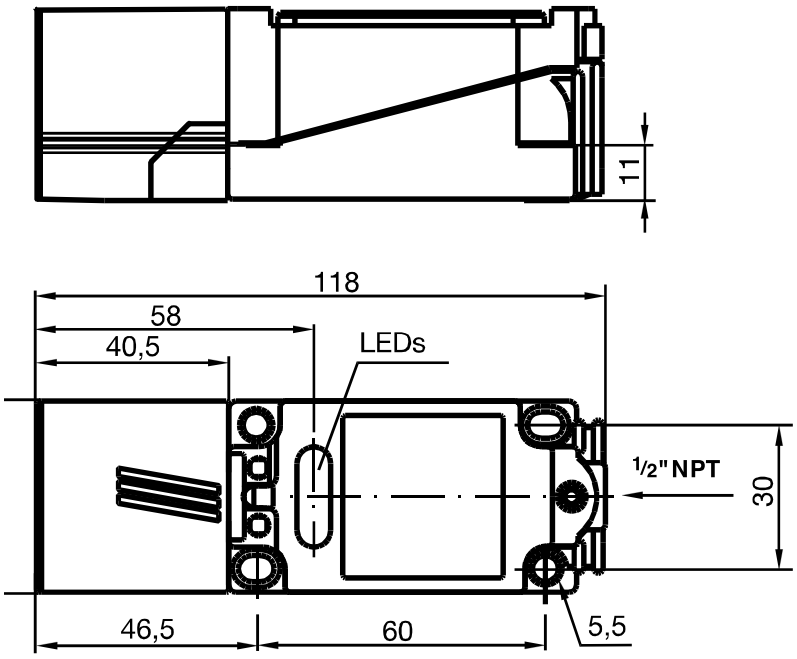
BHMS3 connections, AC types			
Func-tion	State	BHMS Connector	Intern terminals
NO	At factory	2 3	3 4
NC	Change by us	2 3	1 2

Dimensions

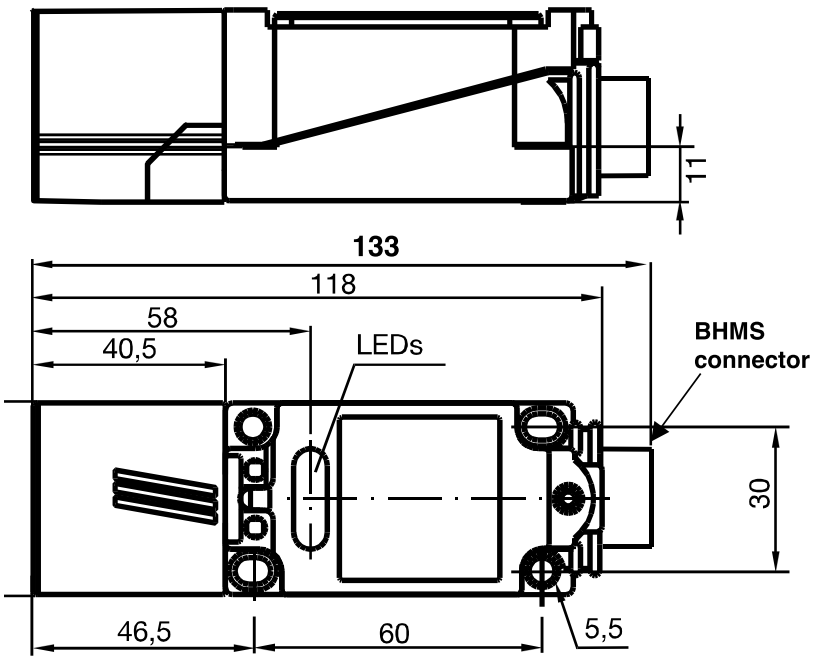
■ E2Q2-...-G type



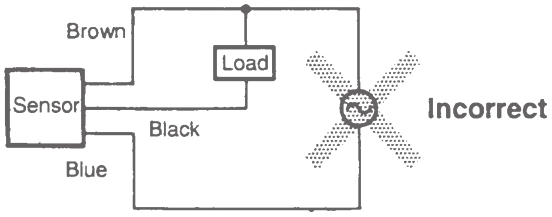
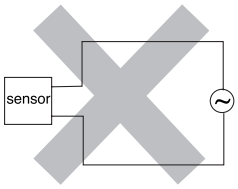
■ **E2Q2-...**-U and -51 type



■ **E2Q2-...**-50 and -52 type



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.	
Do not connect the AC types without load to the power supply. The sensor will be damaged.	

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

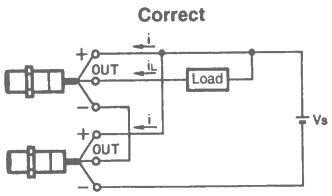
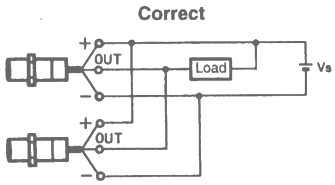
Water-resistivity

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

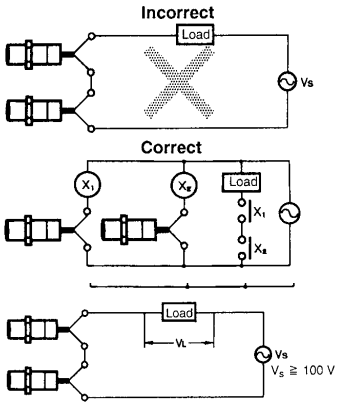
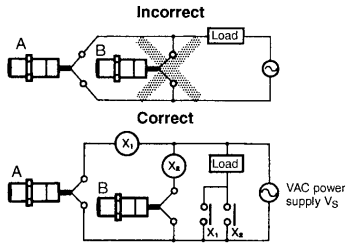
Operating Environment

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 $V_S - N \times V_R \geq$ Load operating voltage N = No. of Sensors V_R = Residual voltage of each Sensor V_S = Supply voltage i = Current consumption of the Sensor i_L = Load current If the MY Relay, which operate at 24 VDC, is used as a load for example, a maximum of two Proximity Sensors can be connected to 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.

AC Type

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)		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 B, Proximity Sensor B will not operate because the voltage imposed on Proximity Sensor B is 10 V, which is too low. When 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.