

## Inductive Proximity Sensor

## E2Q2

### Limit Switch Style Proximity Sensor with 5-Position Sensing Head

- Sensing face easily adjusts to one of five directions
- Easy to install and same mounting dimensions as a standard limit switch
- Integrated short circuit and reverse polarity protection
- Plastic body with stainless steel screws
- Weld field immune models available
- Conduit openings 1/2"-NPT and Brad Harrison MiniChange® connector versions available



## Ordering Information

### ■ DC INPUT TYPE

| Type       | Sensing distance | Output type | Part number              |                             |
|------------|------------------|-------------|--------------------------|-----------------------------|
|            |                  |             | 1/2"-NPT conduit opening | 4-pin MiniChange connector* |
| Shielded   | 20 mm (0.79 in)  | NPN (NO+NC) | E2Q2-N20E3-U             | E2Q2-N20E3-50               |
|            |                  | PNP (NO+NC) | E2Q2-N20F3-U             | E2Q2-N20F3-50               |
| Unshielded | 30 mm (1.18 in)  | NPN (NO+NC) | E2Q2-N30ME3-U            | E2Q2-N30ME3-50              |
|            |                  | PNP (NO+NC) | E2Q2-N30MF3-U            | E2Q2-N30MF3-50              |

Note: \*Use Brad Harrison connector #104000A01F120 (12 foot) or equivalent.

### ■ AC INPUT TYPE

| Type       | Sensing distance | Output type    | Part number              |                             |
|------------|------------------|----------------|--------------------------|-----------------------------|
|            |                  |                | 1/2"-NPT conduit opening | 4-pin MiniChange connector* |
| Shielded   | 15 mm (0.59 in)  | SCR (NO or NC) | E2Q2-N15Y4-U             | E2Q2-N15Y4-50               |
| Unshielded | 30 mm (1.18 in)  | SCR (NO or NC) | E2Q2-N30MY4-U            | E2Q2-N30MY4-50              |

Note: \*Use Brad Harrison connector #103000A01F120 (12 foot) or equivalent.

### ■ WELD FIELD IMMUNE TYPES

These sensors withstand 25,400 amps at 1 inch (100 mT).

| Type     | Sensing distance | Input type | Output type    | Part number              |                      |
|----------|------------------|------------|----------------|--------------------------|----------------------|
|          |                  |            |                | 1/2"-NPT conduit opening | MiniChange connector |
| Shielded | 15 mm (0.59 in)  | DC         | PNP (NO)       | E2Q2-N15F1-51            | E2Q2-N15F1-52*       |
|          |                  | AC         | SCR (NO or NC) | E2Q2-N15Y4-51            | E2Q2-N15Y4-52**      |

Note: \*Use 4-pin Brad Harrison connector #104000A01F120 (12 foot) or equivalent.

\*\*Use 3-pin Brad Harrison connector #103000A01F120 (12 foot) or equivalent.

# Specifications

## ■ DC INPUT TYPES

|                                                              |                            |                                                                                                        |                                                     |                                                     |
|--------------------------------------------------------------|----------------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|
| Part number                                                  |                            | E2Q2-N15□                                                                                              | E2Q2-N20□                                           | E2Q2-N30□                                           |
| Operating voltage                                            |                            | 10 to 60 VDC; 10 to 30 VDC for weld-field immune types                                                 |                                                     |                                                     |
| Current consumption                                          |                            | 20 mA max.                                                                                             |                                                     | 10 mA max.                                          |
| Sensing object                                               |                            | Ferrous metals                                                                                         |                                                     |                                                     |
| Sensing distance                                             |                            | 15 mm ±10%, shielded                                                                                   | 20 mm ±10%, shielded                                | 30 mm ±10%, unshielded                              |
| Setting distance with standard sensing object (L x W x H mm) |                            | 0 to 12 mm; 0 to 15 mm (45 x 45 x 1 mm, mild steel)                                                    | 0 to 16 mm, 0 to 20 mm (60 x 60 x 1 mm, mild steel) | 0 to 24 mm, 0 to 30 mm (90 x 90 x 1 mm, mild steel) |
| Differential travel                                          |                            | 15% max. of sensing distance                                                                           |                                                     |                                                     |
| Control output                                               | Type                       | F1: PNP-NO                                                                                             | E3: NPN (NO+NC)<br>F3: PNP (NO+NC)                  | ME3: NPN (NO+NC)<br>MF3: PNP (NO+NC)                |
|                                                              | Max. load                  | 200 mA                                                                                                 |                                                     |                                                     |
|                                                              | Max. on-state voltage drop | 3 VDC at 200 mA load current                                                                           |                                                     |                                                     |
| Response frequency                                           |                            | 10 Hz (weld field immune)                                                                              | 150 Hz                                              | 100 Hz                                              |
| Circuit protection                                           |                            | Reverse polarity, output short-circuit                                                                 |                                                     |                                                     |
| Weld field immunity                                          |                            | 25,400 amps at 1 inch (100 mT)                                                                         | —                                                   | —                                                   |
| Indicator                                                    |                            | Operating indicator (yellow LED)                                                                       |                                                     |                                                     |
| Material                                                     | Case                       | PBT                                                                                                    |                                                     |                                                     |
|                                                              | Terminal base              | Aluminum                                                                                               |                                                     |                                                     |
|                                                              | Sensing face               | PBT                                                                                                    |                                                     |                                                     |
| Connections                                                  |                            | -U, -51: 1/2"-NPT conduit opening; -G: PG 13.5 conduit opening<br>-50, -52: 4-pin MiniChange connector |                                                     |                                                     |
| Enclosure rating                                             |                            | IP67 (EN 60947-1)                                                                                      |                                                     |                                                     |
| Approvals                                                    |                            | UL listed, CSA certified                                                                               |                                                     |                                                     |
| Operating ambient temperature                                |                            | -25° to 70°C (-13° to 158°F)                                                                           |                                                     |                                                     |
| Relative humidity                                            |                            | 35% to 95% RH                                                                                          |                                                     |                                                     |
| Influence of temperature                                     |                            | ±10% max. of sensing distance at 23°C (73.4°F) in temperature range of -25° to 70°C (-13° to 158°F)    |                                                     |                                                     |
| Dielectric strength                                          |                            | 1,500 VAC, 50/60 Hz for 1 minute between current carrying parts and case                               |                                                     |                                                     |
| Electromagnetic compatibility                                |                            | 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                                                     |                                                     |                                                     |

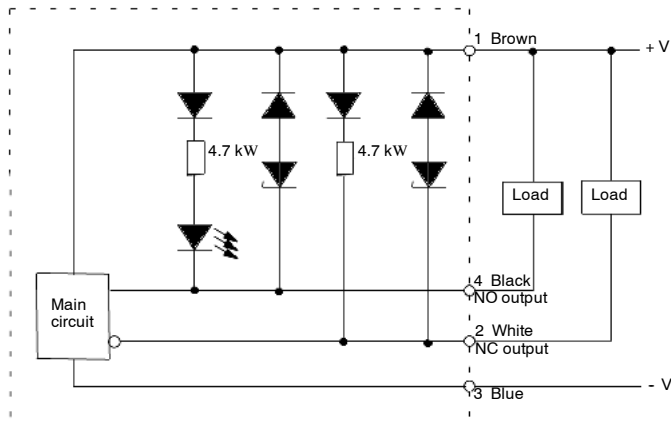
## ■ AC INPUT TYPES

|                                                              |                            |                                                                                                        |                                                        |
|--------------------------------------------------------------|----------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| Part number                                                  |                            | E2Q2-N15Y□                                                                                             | E2Q2-N30MY4□                                           |
| Operating voltage                                            |                            | 20 to 253 VAC, 50/60 Hz                                                                                |                                                        |
| Current consumption                                          |                            | 20 mA max.                                                                                             | 10 mA max.                                             |
| Leakage current                                              |                            | 1.9 mA max. (2.5 mA max. for weld field immune types)                                                  |                                                        |
| Sensing object                                               |                            | Ferrous metals                                                                                         |                                                        |
| Sensing distance                                             |                            | 15 mm ±10%, shielded                                                                                   | 30 mm ±10%, unshielded                                 |
| Setting distance with standard sensing object (L x W x H mm) |                            | 0 to 12 mm; 0 to 15 mm<br>(45 x 45 x 1 mm, mild steel)                                                 | 0 to 24 mm, 0 to 30 mm<br>(90 x 90 x 1 mm, mild steel) |
| Differential travel                                          |                            | 15% max. of sensing distance                                                                           |                                                        |
| Control output                                               | Type                       | SCR (NO or NC)                                                                                         |                                                        |
|                                                              | Max. load                  | 500 mA                                                                                                 |                                                        |
|                                                              | Min. load                  | 8 mA (10 mA for weld field immune types)                                                               |                                                        |
|                                                              | Max. on-state voltage drop | 12 VDC at 500 mA load current                                                                          |                                                        |
| Response frequency                                           |                            | 20 Hz                                                                                                  |                                                        |
| Circuit protection                                           |                            | None                                                                                                   |                                                        |
| Weld field immunity                                          |                            | 25,400 amps at 1 inch (100 mT)                                                                         |                                                        |
| Indicator                                                    |                            | Operating indicator (yellow LED)                                                                       |                                                        |
| Material                                                     | Case                       | PBT                                                                                                    |                                                        |
|                                                              | Terminal base              | Aluminum                                                                                               |                                                        |
|                                                              | Sensing face               | PBT                                                                                                    |                                                        |
| Connections                                                  |                            | -U, -51: 1/2"-NPT conduit opening;<br>-50, -52: 3-pin MiniChange connector                             |                                                        |
| Enclosure rating                                             |                            | IP67 (EN 60947-1)                                                                                      |                                                        |
| Approvals                                                    |                            | UL listed, CSA certified                                                                               |                                                        |
| Operating ambient temperature                                |                            | -25° to 70°C (-13° to 158°F)                                                                           |                                                        |
| Relative humidity                                            |                            | 35% to 95% RH                                                                                          |                                                        |
| Influence of temperature                                     |                            | ±10% max. of sensing distance at 23°C (73.4°F) in temperature range of<br>-25° to 70°C (-13° to 158°F) |                                                        |
| Dielectric strength                                          |                            | 1,500 VAC, 50/60 Hz for 1 minute between current carrying parts and case                               |                                                        |
| Electromagnetic compatibility                                |                            | 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                                                     |                                                        |

# Operation

## ■ OUTPUT CIRCUIT DIAGRAMS AND TIMING CHARTS

### NPN (NO + NC) Output

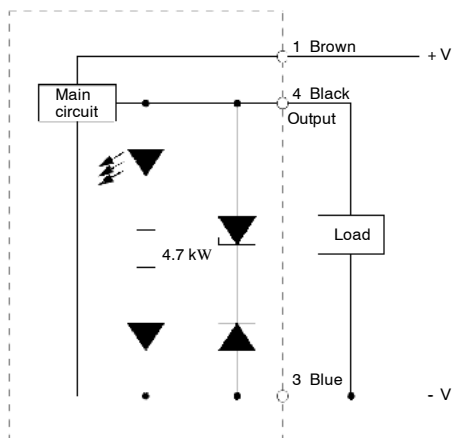


E2Q2-N□□□E3-□

#### Output

|                     |          | NO | NC |
|---------------------|----------|----|----|
| Target              | Present  |    |    |
| Target              | Absent   |    |    |
| Load (output)       | Operates |    |    |
| Load (output)       | Releases |    |    |
| Operation indicator | ON       |    |    |
| Operation indicator | OFF      |    |    |

### PNP-NO Output (Weld Field Immune Models)

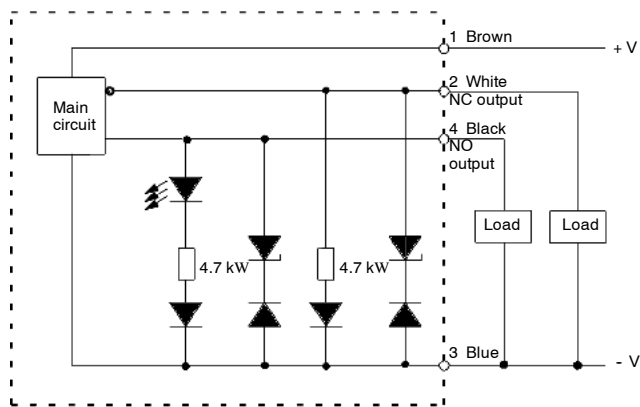


E2Q2-N15F1-5□

#### Output

|                     |          | NO |
|---------------------|----------|----|
| Target              | Present  |    |
| Target              | Absent   |    |
| Load (output)       | Operates |    |
| Load (output)       | Releases |    |
| Operation indicator | ON       |    |
| Operation indicator | OFF      |    |

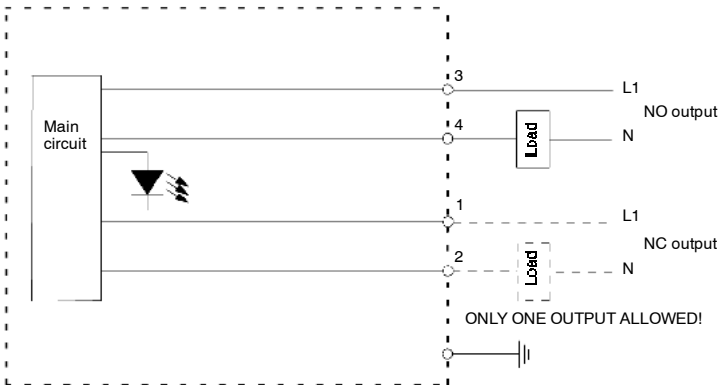
PNP (NO + NC) Output



E2Q2-N□□□F3-□

| Output              |          | NO | NC |
|---------------------|----------|----|----|
| Target              | Present  |    |    |
|                     | Absent   |    |    |
| Load (output)       | Operates |    |    |
|                     | Releases |    |    |
| Operation indicator | ON       |    |    |
|                     | OFF      |    |    |

AC (NO or NC) Output



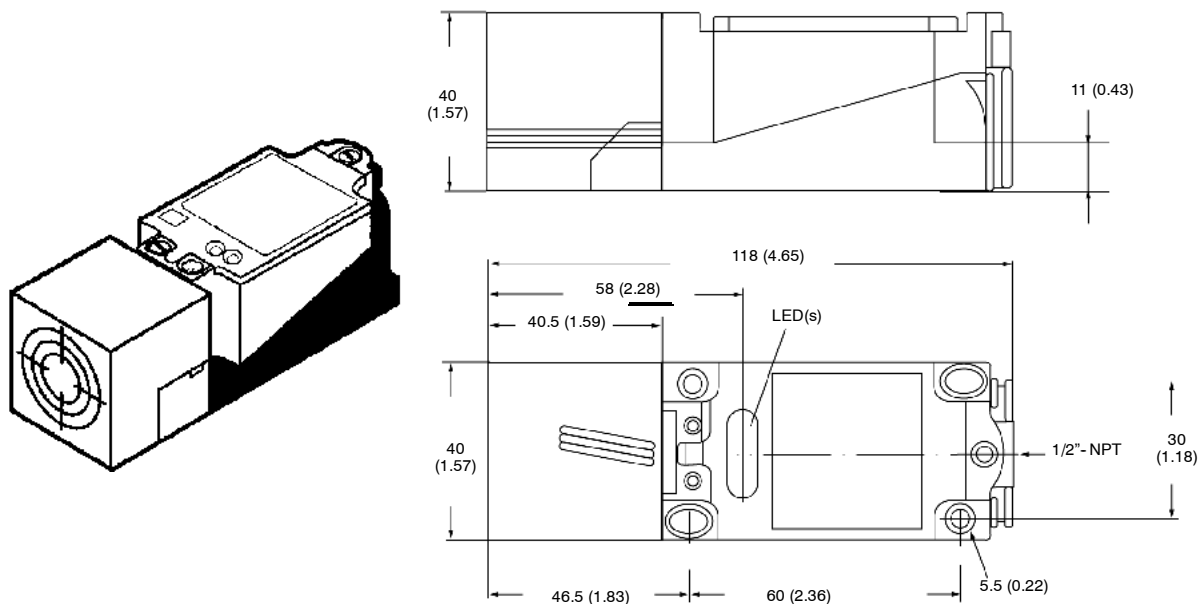
E2Q2-N□□□Y4-□

| Output              |          | NO | NC |
|---------------------|----------|----|----|
| Target              | Present  |    |    |
|                     | Absent   |    |    |
| Load (output)       | Operates |    |    |
|                     | Releases |    |    |
| Operation indicator | ON       |    |    |
|                     | OFF      |    |    |

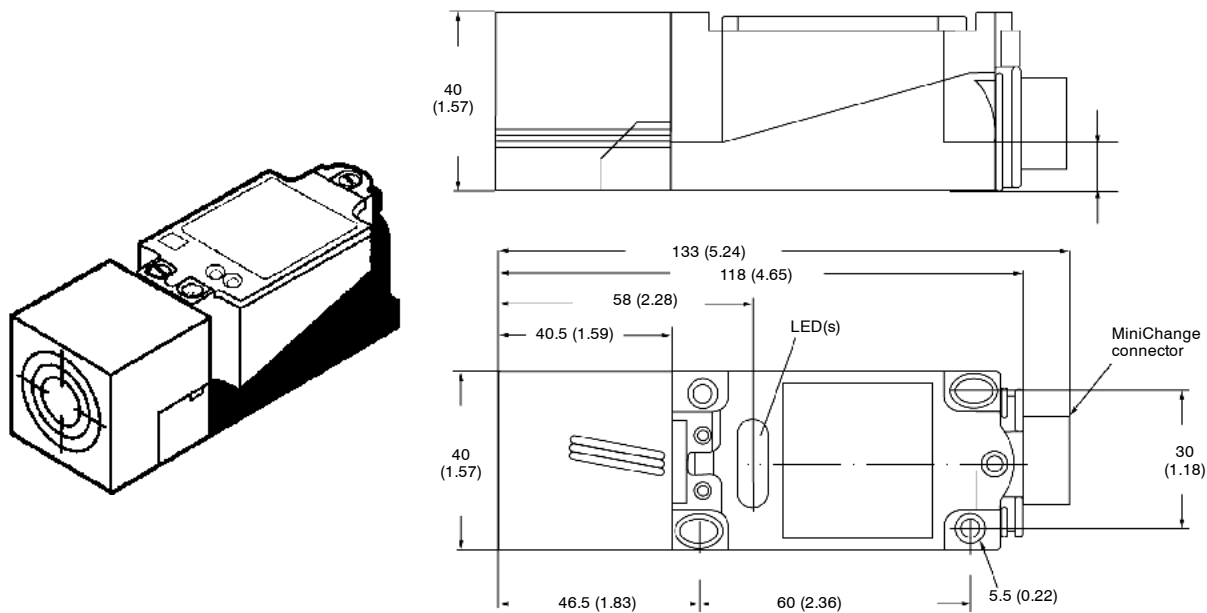
# Dimensions

Unit: mm (inch)

## ■ E2Q2-N□□□□-U AND -51 TYPE



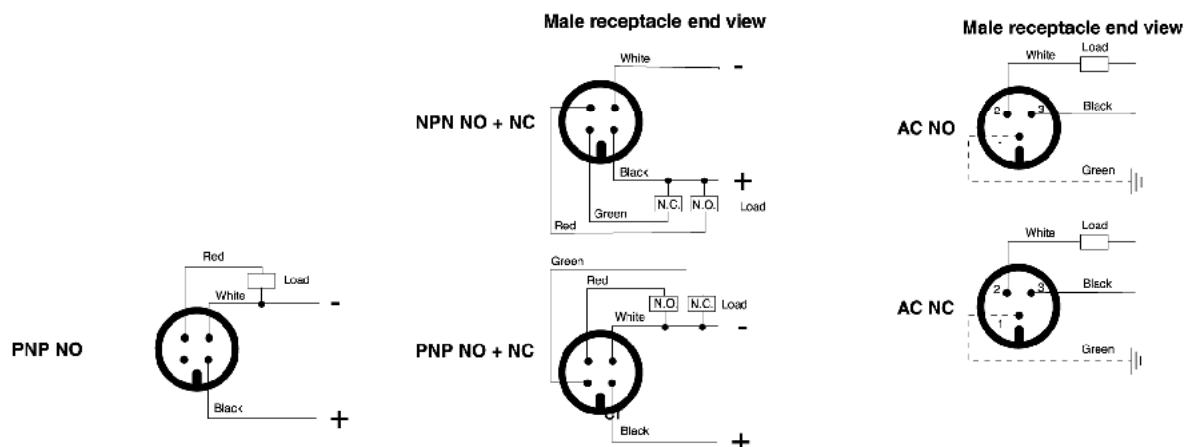
## ■ E2Q2-N□□□□-50 AND -52 TYPE



# Installation

## ■ PIN ARRANGEMENT

### MiniChange connections



## Precautions

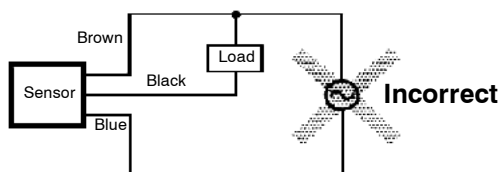


### CAUTION

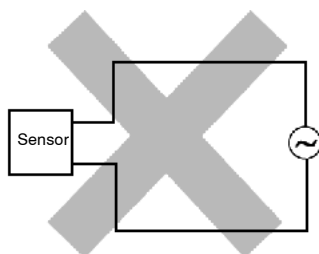
#### Power supply

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.



## ■ 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 will vary with the metal coating on sensing objects.

## ■ 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.

## ■ 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.

## ■ ENVIRONMENT

### Water Resistance

Do not use the proximity sensor underwater, outdoors or in the rain.

### Operating Environment

Be sure to use the Proximity Sensor with 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 resistant, 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).

**NOTE: DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters to inches divide by 25.4.**

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