

# Weld Field Immune Inductive Proximity Sensors

## E2AW

### Cylindrical Weld Field Immune DC 3-Wire & AC/DC 2-Wire Proximity Sensors Resist Weld Slag Build-up

- Weld field immunity and noise immunity ideal for automotive welding environments
- Coated metal housings resist weld slag
- High-temperature abrasion-resistant coating on sensing face sheds weld slag
- Choose from M12, M18 and M30 connector versions
- DC 3-wire PNP-N.O. or AC/DC 2-wire shielded and unshielded models
- WFI rated to 20,000 Amps @ 1 inch



## Ordering Information

**Note:** Shaded models are normally stocked. Un-shaded models require 2-3 weeks delivery.

### ■ Sensors With Built-in 4-pin Euro Connector DC 3-Wire, PNP-N.O.

| Type                                                                                              | Barrel size | Sensing distance | Connector type | Model<br>PNP N.O.  |
|---------------------------------------------------------------------------------------------------|-------------|------------------|----------------|--------------------|
| Shielded<br>   | M12         | 2mm              | 4-Pin Euro     | E2AW-M12LS02-M1-B1 |
|                                                                                                   | M18         | 5mm              | 4-Pin Euro     | E2AW-M18LS05-M1-B1 |
|                                                                                                   | M30         | 10mm             | 4-Pin Euro     | E2AW-M30LS10-M1-B1 |
| Unshielded<br> | M12         | 4mm              | 4-Pin Euro     | E2AW-M12LN04-M1-B1 |
|                                                                                                   | M18         | 8mm              | 4-Pin Euro     | E2AW-M18LN08-M1-B1 |
|                                                                                                   | M30         | 15mm             | 4-Pin Euro     | E2AW-M30LN15-M1-B1 |

### ■ Sensors With Built-in 3-pin Micro Connector or Mini Connector AC/DC 2-Wire, N.O.

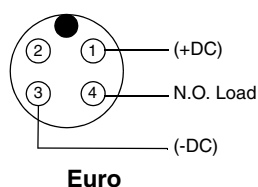
| Type                                                                                              | Barrel size | Sensing distance | Connector type | Model<br>AC/DC 2-Wire N.O.     |
|---------------------------------------------------------------------------------------------------|-------------|------------------|----------------|--------------------------------|
| Shielded<br>   | M18         | 5mm              | 3-Pin Micro    | E2AW-M18LS05-M4-T1             |
|                                                                                                   | M18         | 5mm              | 3-Pin Mini     | E2AW-M18LS05-MN3-T1            |
|                                                                                                   | M18         | 5mm              | 3-Pin Mini     | E2AW-M18LS05-MN390-T1 See Note |
|                                                                                                   | M30         | 10mm             | 3-Pin Micro    | E2AW-M30LS10-M4-T1             |
|                                                                                                   | M30         | 10mm             | 3-Pin Mini     | E2AW-M30LS10-MN3-T1            |
|                                                                                                   | M30         | 10mm             | 3-Pin Mini     | E2AW-M30LS10-MN390-T1          |
| Unshielded<br> | M18         | 8mm              | 3-Pin Micro    | E2AW-M18LN08-M4-T1             |
|                                                                                                   | M18         | 8mm              | 3-Pin Mini     | E2AW-M18LN08-MN3-T1            |
|                                                                                                   | M18         | 8mm              | 3-Pin Mini     | E2AW-M18LN08-MN390-T1 See Note |
|                                                                                                   | M30         | 15mm             | 3-Pin Micro    | E2AW-M30LN15-M4-T1             |
|                                                                                                   | M30         | 15mm             | 3-Pin Mini     | E2AW-M30LN15-MN3-T1            |
|                                                                                                   | M30         | 15mm             | 3-Pin Mini     | E2AW-M30LN15-MN390-T1          |

**Note:** The connector end of the sensor is rotated down 90 degrees. See dimensional drawing.

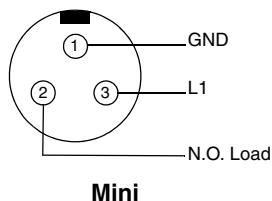
## ■ Mating Connector Cordsets

Male views shown

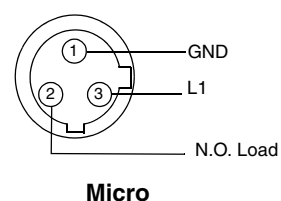
3 Wire DC N.O.



2 Wire AC/DC N.O.

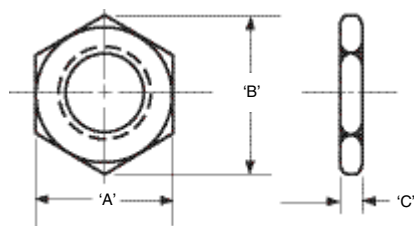


2 Wire AC/DC N.O.



## ■ Replacement Parts

| I.D. | Metal mounting nuts for E2AW |        |       | Model             |                            |
|------|------------------------------|--------|-------|-------------------|----------------------------|
|      | Dimensions in millimeters    |        |       | Clamping locknuts | Black serrated lock washer |
|      | A                            | B      | C     |                   |                            |
| 12mm | (17)                         | (19.5) | (5.6) | Y92E-80003        | Y92E-00139                 |
| 18mm | (23.8)                       | (26.9) | (4.1) | Y92E-80002        | Y92E-00137                 |
| 30mm | (36.6)                       | (42.2) | (4.8) | Y92E-80001        | Y92E-00138                 |



**Note:** All E2AW Cylindrical Proximity sensors are originally supplied with two (2) clamping locknuts and two (2) serrated lock washers. The replacement hardware listed above is sold in packages of 10.  
 Example: Quantity 1 Y92E-80003 consists of 10 12mm mounting nuts only, quantity 1 Y92E-00139 consists of 10 12mm serrated lock washers only.

## ■ Accessories

Please refer to the Y92E data sheet, publication number D04I-E-01, for a complete listing of proximity sensor accessories.

# Specifications

## ■ DC 3-Wire Sensors

| Model                                    | E2AW-M12LS□                                                                                                                                                                                                                                                                                                                                                                                           | E2AW-M12LN□                                                                                           | E2AW-M18LS□                                             | E2AW-M18LN□ | E2AWM30LS□ | E2AW-M30LN□ |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-------------|------------|-------------|
| Size                                     | M12                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                       | M18                                                     |             | M30        |             |
| Type                                     | Shielded                                                                                                                                                                                                                                                                                                                                                                                              | Unshielded                                                                                            | Shielded                                                | Unshielded  | Shielded   | Unshielded  |
| Sensing distance                         | 2mm ± 10%                                                                                                                                                                                                                                                                                                                                                                                             | 4mm ± 10%                                                                                             | 5mm ± 10%                                               | 8mm ± 10%   | 10mm ± 10% | 15mm± 10%   |
| Sensing object                           | Ferrous metals approximately the same size as the proximity sensing face for shielded models and twice the size of the sensing face for unshielded models. The specified sensing distances above are based upon tests with mild steel standard targets. Other materials will reduce the sensing range (Sn) as follows: Stainless Steel Sn x 0.85, Brass Sn x 0.5, Copper Sn x 0.46 Aluminum Sn x 0.40 |                                                                                                       |                                                         |             |            |             |
| Hysteresis                               | 10% max. of sensing distance                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                       |                                                         |             |            |             |
| Repeatability                            | < ±1%                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                       |                                                         |             |            |             |
| Supply voltage (operating voltage range) | 12 to 24 VDC ripple (p-p): 10% max.<br>(10 to 30 VDC)<br>Use a class 2 power source only.                                                                                                                                                                                                                                                                                                             |                                                                                                       |                                                         |             |            |             |
| Current consumption                      | 10 mA max.                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                       |                                                         |             |            |             |
| Power-up time                            | < 45ms                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                       |                                                         |             |            |             |
| Response frequency                       | 16Hz (See note)                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                       |                                                         |             |            |             |
| Response time                            | 30ms                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                       |                                                         |             |            |             |
| Control output                           | PNP-NO                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                       |                                                         |             |            |             |
| Switching capacity                       | 200mA                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                       |                                                         |             |            |             |
| Max. switching frequency                 | 15Hz                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                       |                                                         |             |            |             |
| Voltage drop                             | < 2 VDC @ <100mA, < 2.5 VDC @ 200mA                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                       |                                                         |             |            |             |
| Leakage current                          | 10μA                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                       |                                                         |             |            |             |
| Circuit protection                       | Reverse Polarity, Short Circuit Protection Non-Latching Type                                                                                                                                                                                                                                                                                                                                          |                                                                                                       |                                                         |             |            |             |
| Indicators                               | One bi-color LED Green = Power, Amber = Target, Flashing = SCP                                                                                                                                                                                                                                                                                                                                        |                                                                                                       | Dual LEDs Green = Power, Amber = Target, Flashing = SCP |             |            |             |
| Ambient temperature                      | Storage: 0 to 70°C<br>Operation: 0 to 70°C                                                                                                                                                                                                                                                                                                                                                            |                                                                                                       |                                                         |             |            |             |
| Temperature drift                        | 10% max. @ 0 to 70°C                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                       |                                                         |             |            |             |
| Ambient humidity                         | Operating and Storage: 35% to 95%                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                       |                                                         |             |            |             |
| Voltage influence                        | ±1% max. of sensing distance in rated voltage range ±10%                                                                                                                                                                                                                                                                                                                                              |                                                                                                       |                                                         |             |            |             |
| Insulation resistance                    | 50 MΩ min. (at 500 VDC) between current carrying parts and case                                                                                                                                                                                                                                                                                                                                       |                                                                                                       |                                                         |             |            |             |
| Dielectric strength                      | 1,000 VAC at 50/60 Hz for 1 minute between current carrying 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/s², 10 times each in X, Y and Z directions                                                                                                                                                                                                                                                                                                                                                    |                                                                                                       |                                                         |             |            |             |
| Connection method                        | M12 4-Pin Euro Connector refer to dimension drawings for pin arrangements                                                                                                                                                                                                                                                                                                                             |                                                                                                       |                                                         |             |            |             |
| Standards & listings                     | —                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                       |                                                         |             |            |             |
| Enclosure rating                         | IEC<br>NEMA                                                                                                                                                                                                                                                                                                                                                                                           | IP67 Degree of protection<br>1,3,4,6,13                                                               |                                                         |             |            |             |
| Material                                 | Body<br>Sensing Face<br>Locknuts                                                                                                                                                                                                                                                                                                                                                                      | Hard Coat Metal Body<br><br>PBT with High-Temperature Abrasion-Resistant Coating<br>Anodized Aluminum |                                                         |             |            |             |
| Shipping weight                          | 4 oz.                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                       |                                                         |             | 5 oz.      |             |

**Note:** 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.

## ■ AC/DC 2-Wire Sensors

| Model                    | E2AW-M18LS□                                                                                                                                                                                                                                                                                                                                                                                           | E2AW-M18LN□                                                                                           | E2AWM30LS□ | E2AW-M30LN□ |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------|-------------|
| Size                     | M18                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                       | M30        |             |
| Type                     | Shielded                                                                                                                                                                                                                                                                                                                                                                                              | Unshielded                                                                                            | Shielded   | Unshielded  |
| Sensing distance         | 5mm ± 10%                                                                                                                                                                                                                                                                                                                                                                                             | 8mm ± 10%                                                                                             | 10mm ± 10% | 15mm± 10%   |
| Sensing object           | Ferrous metals approximately the same size as the proximity sensing face for shielded models and twice the size of the sensing face for unshielded models. The specified sensing distances above are based upon tests with mild steel standard targets. Other materials will reduce the sensing range (Sn) as follows: Stainless Steel Sn x 0.85, Brass Sn x 0.5, Copper Sn x 0.46 Aluminum Sn x 0.40 |                                                                                                       |            |             |
| Hysteresis               | 10% max. of sensing distance                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                       |            |             |
| Repeatability            | < ±1%                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                       |            |             |
| Supply voltage           | AC/DC 20 to 230V                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                       |            |             |
| Current consumption      | N/A                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                       |            |             |
| Power-up time            | < 45ms                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                       |            |             |
| Response frequency       | 16Hz (See note)                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                       |            |             |
| Response time            | 30ms                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                       |            |             |
| Control output operation | 2 Wire Normally Open                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                       |            |             |
| Switching capacity       | 500mA                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                       |            |             |
| Max. switching frequency | 15Hz                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                       |            |             |
| Voltage drop             | < 10V                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                       |            |             |
| Leakage current          | 1.7μA                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                       |            |             |
| Circuit protection       | Reverse Polarity, Short Circuit Protection Latching Type                                                                                                                                                                                                                                                                                                                                              |                                                                                                       |            |             |
| Indicators               | Dual LEDs Red = Power, Green = Target, Flashing = SCP                                                                                                                                                                                                                                                                                                                                                 |                                                                                                       |            |             |
| Ambient temperature      | Storage: 0 to 70°C<br>Operation: 0 to 70°C                                                                                                                                                                                                                                                                                                                                                            |                                                                                                       |            |             |
| Temperature drift        | 10% max. @ 0 to 70°C                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                       |            |             |
| Ambient humidity         | Operating and Storage: 35% to 95%                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                       |            |             |
| Voltage influence        | ±1% max. of sensing distance in rated voltage range ±10%                                                                                                                                                                                                                                                                                                                                              |                                                                                                       |            |             |
| Insulation resistance    | 50 MΩ min. (at 500 VDC) between current carrying parts and case                                                                                                                                                                                                                                                                                                                                       |                                                                                                       |            |             |
| Dielectric strength      | 1,000 VAC at 50/60 Hz for 1 minute between current carrying 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 <sup>2</sup> , 10 times each in X, Y and Z directions                                                                                                                                                                                                                                                                                                                                       |                                                                                                       |            |             |
| Connection method        | Micro 3-Pin or Mini 3-Pin (refer to dimension drawings for pin arrangements)                                                                                                                                                                                                                                                                                                                          |                                                                                                       |            |             |
| Standards & listings     | <a href="#">UL File E196555 cULus</a>                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                       |            |             |
| Enclosure rating         | IEC<br>NEMA                                                                                                                                                                                                                                                                                                                                                                                           | IP67 Degree of protection<br>1,3,4,6,13                                                               |            |             |
| Material                 | Body<br>Sensing Face<br>Locknuts                                                                                                                                                                                                                                                                                                                                                                      | Hard Coat Metal Body<br><br>PBT with High-Temperature Abrasion-Resistant Coating<br>Anodized Aluminum |            |             |
| Shipping weight          | 4 oz.                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                       | 5 oz.      |             |

**Note:** 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.

# Engineering Data

## ■ Operating Range (Typical)

| Description    | Standard size<br>(1008 C.R.S.) | Nominal range<br>$\pm 10\%$ | Recommended | Min. | Max.  |
|----------------|--------------------------------|-----------------------------|-------------|------|-------|
| M12 Shielded   | 2" x 2" x .030"                | 2mm                         | 1.6mm       | 1mm  | 1.8mm |
| M12 Unshielded | 2" x 2" x .030"                | 4mm                         | 3.2mm       | 1mm  | 3.6mm |
| M18 Shielded   | 2" x 2" x .030"                | 5mm                         | 4mm         | 1mm  | 4.5mm |
| M18 Unshielded | 2" x 2" x .030"                | 8mm                         | 6.5mm       | 1mm  | 7mm   |
| M30 Shielded   | 2" x 2" x .030"                | 10mm                        | 8mm         | 1mm  | 9mm   |
| M30 Unshielded | 2" x 2" x .030"                | 15mm                        | 12mm        | 1mm  | 13mm  |

## ■ Influence of Sensing Object Size and Materials

| Target size in %                     | 150 | 125 | 100<br>(standard target) | 75 | 50  | 25  | 12.5 |
|--------------------------------------|-----|-----|--------------------------|----|-----|-----|------|
| Deviation from sensing distance in % | +10 | +7  | 0                        | -7 | -14 | -27 | -45  |

# Operation

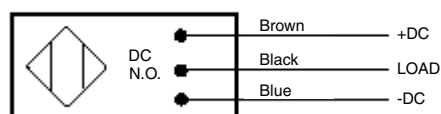
## ■ Timing Chart

|                             | Green LED | Amber LED | Control output |
|-----------------------------|-----------|-----------|----------------|
| Power off                   | Off       | Off       | Off            |
| Power on (no object sensed) | On        | Off       | Off            |
| Sense object (w/ power on)  | On        | On        | On             |

## ■ DC 3-Wire PNP N.O. Output

Output circuit:

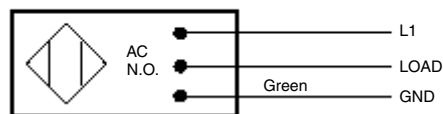
(3-wire DC N.O.)



## ■ AC/DC 2-Wire N.O. Output

Output circuit:

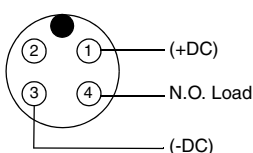
(2-wire AC/DC N.O.)



# Connection

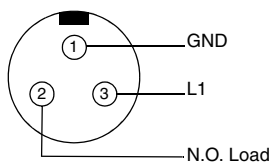
Male views shown

3 Wire DC N.O.



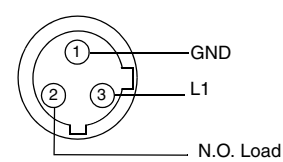
Euro

2 Wire AC/DC N.O.



Mini

2 Wire AC/DC N.O.



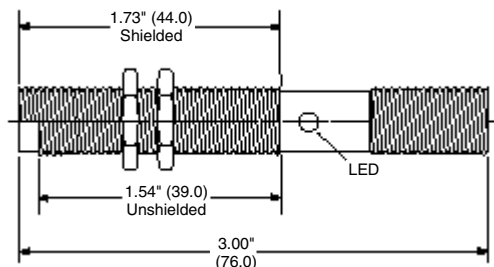
Micro

# Sensor Dimensions

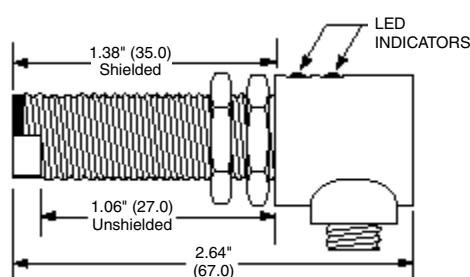
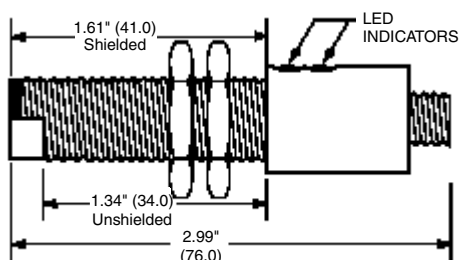
**Note:** Dimensions are in inches and (millimeters).

## ■ Connector Models (Shielded and Unshielded)

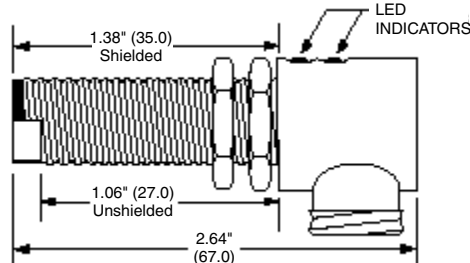
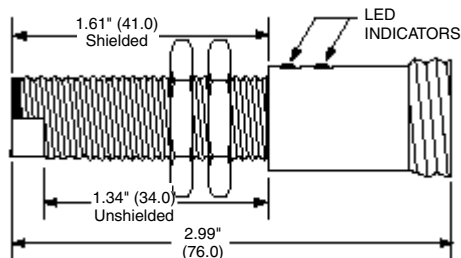
12mm Euro Connector      Body threads M12x1



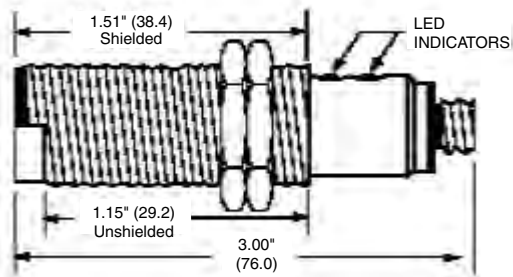
M18 Euro Connector      Body threads M18x1



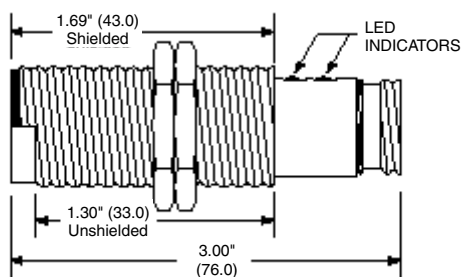
M18 Mini Connector



M30 Euro or Micro Connector      Body threads M30x1.5

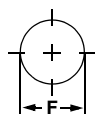


M30 Mini Connector



**Note:** Mounting hole dimensions are in mm and (inches).

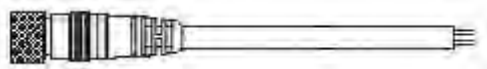
## ■ Mounting Holes



| Dimensions | M12              | M18              | M30              |
|------------|------------------|------------------|------------------|
| F (mm)     | 12.5 (0.49) dia. | 18.5 (0.73) dia. | 30.5 (1.20) dia. |

## Precautions

### ■ Sensor Cordsets



Sensor cordsets should never be under tension.



Always allow sufficient slack when connecting.

### LED Functions

|                            | 10-30V DC     |       | 20-230V AC/DC |       |
|----------------------------|---------------|-------|---------------|-------|
|                            | Green         | Amber | Red           | Green |
| Power off                  | Off           | Off   | Off           | Off   |
| Power on load de-energized | On            | Off   | On            | Off   |
| Power on load energized    | On            | On    | Off           | On    |
| *SCP mode activated        | Both flashing |       | Both flashing |       |

## Operating Precautions

### ■ Operating Recommendations

- Always operate the sensor with a resistive load that will limit the current in the circuit to levels that are within the sensor's specifications. Frequent activation of the sensor's short circuit protection could be an indication that a problem exists between the sensor and the load.
- A proximity sensor should not directly control devices such as motors and incandescent bulbs, due to the high inrush currents that typically exceed the maximum load current rating for the sensor.
- Some low voltage control systems may be incompatible with 2-wire AC/DC sensors due to voltage drop or leakage current limitations. Omron recommends careful inspection of the specifications of both the sensor and the system before attempting to install a 2-wire AC/DC sensor in a low-voltage application.
- Never install a sensor such that the target or actuator will make actual contact with the sensing face. Damage to the sensor's face can cause a malfunction or failure.
- Do not attempt to modify the sensor by cutting, grinding, filing, etc.
- All sensors are completely epoxy potted, and as such do not have any serviceable parts inside. Do not remove the cover or tamper with the cable or connector.
- The user should refer to NFPA 70B, RECOMMENDED PRACTICE FOR ELECTRICAL EQUIPMENT MAINTENANCE, published by the National Fire Protection Association, for additional information.

### Short Circuit Protection

If the sensor is shorted, the sensor's short circuit protection (SCP) will be activated. SCP is designed to protect the sensor's internal circuitry against damage caused by accidental short circuits. SCP is not intended for protection of external control circuits; the use of short-circuit-protected sensors does **not** eliminate the need for appropriate branch circuit fusing. When a short circuit occurs, both LEDs will flash and the sensor will limit current flow to approximately 2.0mA. The WFI sensors are non-latching type (self-resetting) SCP. The occurrence of a short circuit condition will cause the sensor output to turn off and flash both indicators as long as the shorted condition is present. **This state will automatically self-reset within 120ms after removal of the short circuit.**

### LEDs

M12 models have one bi-color LED, but operate the same as the two LED models.

### Power Supply

Do not impose an excessive voltage on the E2AW otherwise it may be damaged. Do not impose AC current (100 to 240 VAC) on any DC model otherwise it may be damaged.

### Wiring

Be sure to wire the E2AW and load correctly otherwise it may be damaged.

### Connection with no loads

Be sure to insert loads when wiring. Make sure to connect a proper load to the E2AW in operation otherwise it may damage internal elements of the sensor.

**Do not expose the product to flammable or explosive gases.**

**Do not disassemble, repair or modify the product.**

### Tightening torque specifications

Do not tighten locknuts in excess of 10 n.m.

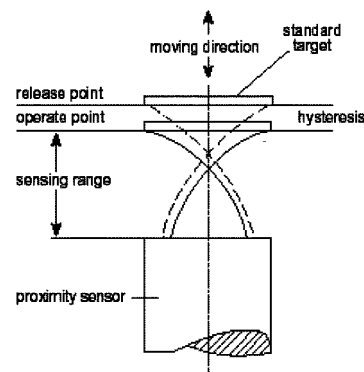
### ■ Mounting

#### Sensing Direction

When mounting a sensor it is always preferred to position the target so that it "slides by" the sensor face. This type of mounting will ensure that the sensor face is not damaged by contact with the target. If your application dictates a "head on" approach, it is essential that the target does not use the sensor face as a physical stop. Failure to provide clearance in either the slide-by or head-on modes will result in damage to the sensor and possible failure of the device.

## Hysteresis

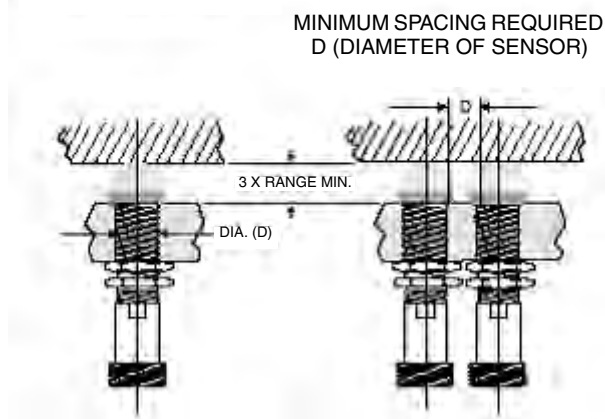
Hysteresis must be allowed for as the target must move far enough away from the sensing field so that the sensor cannot detect it. If a target is placed within the hysteresis band, vibration of the target can cause the switch to turn on and off rapidly ("chatter"). All sensor manufacturers build in a certain amount of hysteresis to minimize chatter.



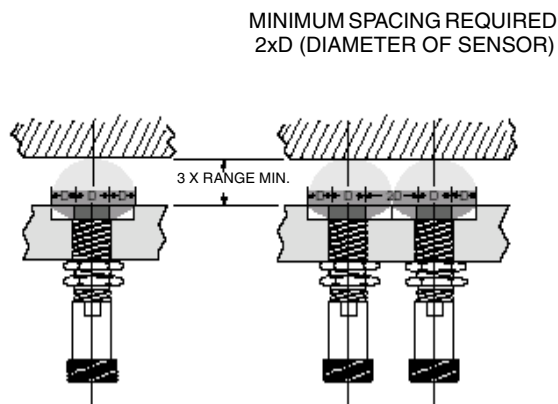
## ■ Mounting Clearances

Mounting of sensors should follow industry-accepted practices as shown. Failure to properly position the sensor is the single largest cause of field problems.

### SHEILDED SENSORS (FLUSH MOUNTABLE)

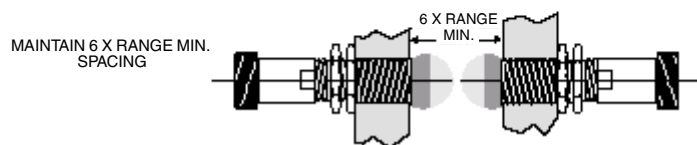


### UNSHEILDED SENSORS (FLUSH MOUNTABLE)



**SENSORS MUST BE MOUNTED SUCH THAT SURROUNDING METAL IS NOT IN THE SENSING AREA.**

### OPPOSING SENSORS



#### ⚠ WARNING

A switch in a protective interlocking circuit should be used with at least one other device that will provide a redundant protective function, and the circuit should be so arranged that either device will interrupt the intended operation of the controlled equipment. (proposed NEMA ICS 2-225.95 St'd.)

#### ⚠ WARNING

Servicing energized industrial control equipment can be hazardous. Severe injury or death can result from electrical shock, burn or unintended actuation of controlled equipment. Recommended practice is to disconnect and lock out control equipment from power sources, and discharge stored energy in capacitors, if present. If it is necessary to work in the vicinity of energized equipment, only qualified personnel should be permitted to perform such work, using all applicable safety practices and protective equipment.

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