**iProx Sensors**

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## iProx Sensors

### Product Description

The iProx represents the highest performance, most versatile tubular inductive sensor offered by Eaton's Electrical Sector. By utilizing an embedded microprocessor and exclusive SmartSense™ technology, iProx can sense up to three times farther than typical sensors of its class, while providing an unheard-of level of customization.

Both shielded and unshielded versions of iProx feature extended sensing ranges. This allows the sensor to be mounted farther from the target, thereby reducing the potential for target impacts and increasing the sensing reliability of your application.

The iProx also includes a wide range of advanced features that can be enabled via optional programming tools. Using the ProxView Windows-based software package, an entirely custom sensor can be programmed to perfectly fit an application.

Sensor characteristics, such as sensing range, can be customized down to the nearest tenth of a millimeter. Outputs can be changed from NO to NC. The iProx even features built-in timing delays and speed detection logic—no PLC programming is necessary.

With extended sensing range, quality construction and the ability to adapt to its environment, iProx is the ideal choice for even the most demanding inductive sensing applications.

### Application Description

**Typical Applications**
- Automotive
- Machine tool
- Material handling
- Metalworking

### Features
- Available in AC two-wire, DC three-wire and unique DC four-wire with complementary (NO-NC) or dual NO outputs
- Reliably detect metal targets at up to three times the range of conventional shielded or unshielded tubular inductive sensors
- Quality construction using a stainless steel barrel, 360-degree dual-color LED indicator, Ryton® impact-resistant face cap and vibration-absorbing potting compound
- Auto-configure technology automatically detects a sinking (NPN) or sourcing (PNP) connection and switches the sensor accordingly, without any user intervention
- Exclusive SmartSense embedded microprocessor technology allows for customizable range, band sensing, nuisance metal rejection, timing delays and over/under speed detection
- Optional computer programming cable and Windows-based ProxView configuration software makes it easy to customize sensors
- Withstands high electrical noise (up to 20 V/m)
- Resistant to extreme temperatures (–40 °F [–40 °C])

**Note:** Ryton® is a registered trademark of Phillips Chemical (division of Phillips Petroleum).

### Standards and Certifications
- UL Listed, E166051
- UL Tested to Canadian safety standards
- CE
- RoHS Compliant

⚠ **DANGER**

**THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.**

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578. For Application Assistance in the U.S. and Canada call 1-800-426-9184.

For the most current information on this product, visit our Web site: www.eaton.com

## Product Selection

### iProx Sensors

**Note:** Custom iProx models can also be ordered directly from the factory with pre-set ranges, outputs and connectors.
Consult the Eaton Application Engineers at 1-800-426-9184 for more information.

### Two-Wire Sensors

| | Operating Voltage | Sensing Range | Shielding | Connection Type [1] | NO Output Catalog Number [2] | NC Output Catalog Number [2] |
|---|---|---|---|---|---|---|
| **Standard Range** | **12 mm Diameter** | | | | | |
| | 20–132 Vac | 4 mm | Shielded | 3-pin micro AC connector | E59-M12A105A01-A1 ⊙ | E59-M12A105A01-A2 ⊙ |
| | | | | 3-pin micro AC pigtail [3] | E59-M12A105A01P-A1 ⊙ | E59-M12A105A01P-A2 ⊙ |
| | | | | 3-pin mini AC pigtail [3] | E59-M12A105A01PB-A1 ⊙ | E59-M12A105A01PB-A2 ⊙ |
| **Extended Range** | | | | 2-meter cable | E59-M12A105C02-A1 | E59-M12A105C02-A2 |
| | | 10 mm | Unshielded | 3-pin micro AC connector | E59-M12C110A01-A1 ⊙ | E59-M12C110A01-A2 ⊙ |
| | | | | 3-pin micro AC pigtail [3] | E59-M12C110A01P-A1 ⊙ | E59-M12C110A01P-A2 ⊙ |
| | | | | 3-pin mini AC pigtail [3] | E59-M12C110A01PB-A1 ⊙ | E59-M12C110A01PB-A2 ⊙ |
| | | | | 2-meter cable | E59-M12C110C02-A1 | E59-M12C110C02-A2 |
| **Standard Range** | **18 mm Diameter** | | | | | |
| | 20–132 Vac | 8 mm | Shielded | 3-pin micro AC connector | E59-M18A109A01-A1 ⊙ | E59-M18A109A01-A2 ⊙ |
| | | | | 3-pin micro AC pigtail [3] | E59-M18A109A01P-A1 ⊙ | E59-M18A109A01P-A2 ⊙ |
| | | | | 3-pin mini AC pigtail [3] | E59-M18A109A01PB-A1 ⊙ | E59-M18A109A01PB-A2 ⊙ |
| **Extended Range** | | | | 2-meter cable | E59-M18A109C02-A1 | E59-M18A109C02-A2 |
| | | 18 mm | Unshielded | 3-pin micro AC connector | E59-M18C118A01-A1 ⊙ | E59-M18C118A01-A2 ⊙ |
| | | | | 3-pin micro AC pigtail [3] | E59-M18C118A01P-A1 ⊙ | E59-M18C118A01P-A2 ⊙ |
| | | | | 3-pin mini AC pigtail [3] | E59-M18C118A01PB-A1 ⊙ | E59-M18C118A01PB-A2 ⊙ |
| | | | | 2-meter cable | E59-M18C118C02-A1 | E59-M18C118C02-A2 |
| **Standard Range** | **30 mm Diameter** | | | | | |
| | 20–132 Vac | 15 mm | Shielded | 3-pin micro AC connector | E59-M30A115A01-A1 ⊙ | E59-M30A115A01-A2 ⊙ |
| | | | | 3-pin micro AC pigtail [3] | E59-M30A115A01P-A1 ⊙ | E59-M30A115A01P-A2 ⊙ |
| | | | | 3-pin mini AC pigtail [3] | E59-M30A115A01PB-A1 ⊙ | E59-M30A115A01PB-A2 ⊙ |
| **Extended Range** | | | | 2-meter cable | E59-M30A115C02-A1 | E59-M30A115C02-A2 |
| | | 29 mm | Unshielded | 3-pin micro AC connector | E59-M30C129A01-A1 ⊙ | E59-M30C129A01-A2 ⊙ |
| | | | | 3-pin micro AC pigtail [3] | E59-M30C129A01P-A1 ⊙ | E59-M30C129A01P-A2 ⊙ |
| | | | | 3-pin mini AC pigtail [3] | E59-M30C129A01PB-A1 ⊙ | E59-M30C129A01PB-A2 ⊙ |
| | | | | 2-meter cable | E59-M30C129C02-A1 | E59-M30C129C02-A2 |

### Notes

⊙ See listing of compatible connector cables on **Page V8-T3-15**.

[1] For sensors with custom cable lengths or PUR jackets, contact Application Engineering at 1-800-426-9184.

[2] Sensors are ordered with pre-set outputs from the factory, but can be later programmed either NO or NC using the ProxView software.

[3] Standard pigtail cable length is 12 in.

**Note:** Custom iProx models can also be ordered directly from the factory with pre-set ranges, outputs and connectors.
Consult the Eaton Application Engineers at 1-800-426-9184 for more information.

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### Three-Wire Sensors

| Operating Voltage | Sensing Range | Shielding | Connection Type ① | NO Output Catalog Number ② | NC Output Catalog Number ② |
|---|---|---|---|---|---|
| **Standard Range** | **12 mm Diameter** | | | | |
| 6–48 Vdc | 4 mm | Shielded | 4-pin micro DC connector | **E59-M12A105D01-D1** ⊞ | **E59-M12A105D01-D2** ⊞ |
| | | | 4-pin micro DC pigtail ③ | **E59-M12A105D01P-D1** ⊞ | **E59-M12A105D01P-D2** ⊞ |
| **Extended Range** | | | 2-meter cable | **E59-M12A105C02-D1** | **E59-M12A105C02-D2** |
| | 10 mm | Unshielded | 4-pin micro DC connector | **E59-M12C110D01-D1** ⊞ | **E59-M12C110D01-D2** ⊞ |
| | | | 4-pin micro DC pigtail ③ | **E59-M12C110D01P-D1** ⊞ | **E59-M12C110D01P-D2** ⊞ |
| | | | 2-meter cable | **E59-M12C110C02-D1** | **E59-M12C110C02-D2** |
| **Standard Range** | **18 mm Diameter** | | | | |
| 6–48 Vdc | 8 mm | Shielded | 4-pin micro DC connector | **E59-M18A108D01-D1** ⊞ | **E59-M18A108D01-D2** ⊞ |
| | | | 4-pin micro DC pigtail ③ | **E59-M18A108D01P-D1** ⊞ | **E59-M18A108D01P-D2** ⊞ |
| **Extended Range** | | | 2-meter cable | **E59-M18A108C02-D1** | **E59-M18A108C02-D2** |
| | 18 mm | Unshielded | 4-pin micro DC connector | **E59-M18C116D01-D1** ⊞ | **E59-M18C116D01-D2** ⊞ |
| | | | 4-pin micro DC pigtail ③ | **E59-M18C116D01P-D1** ⊞ | **E59-M18C116D01P-D2** ⊞ |
| | | | 2-meter cable | **E59-M18C116C02-D1** | **E59-M18C116C02-D2** |
| **Standard Range** | **30 mm Diameter** | | | | |
| 6–48 Vdc | 15 mm | Shielded | 4-pin micro DC connector | **E59-M30A115D01-D1** ⊞ | **E59-M30A115D01-D2** ⊞ |
| | | | 4-pin micro DC pigtail ③ | **E59-M30A115D01P-D1** ⊞ | **E59-M30A115D01P-D2** ⊞ |
| | | | 2-meter cable | **E59-M30A115C02-D1** | **E59-M30A115C02-D2** |
| **Extended Range** | 29 mm | Unshielded | 4-pin micro DC connector | **E59-M30C129D01-D1** ⊞ | **E59-M30C129D01-D2** ⊞ |
| | | | 4-pin micro DC pigtail ③ | **E59-M30C129D01P-D1** ⊞ | **E59-M30C129D01P-D2** ⊞ |
| | | | 2-meter cable | **E59-M30C129C02-D1** | **E59-M30C129C02-D2** |

*Notes*
⊞ See listing of compatible connector cables on **Page V8-T3-15**.

① For sensors with custom cable lengths or PUR jackets, contact Application Engineering at 1-800-426-9184.
② Sensors are ordered with pre-set outputs from the factory, but can be later programmed either NO or NC using the ProxView software.
③ Standard pigtail cable length is 12 in.

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***Complementary and Dual Output Sensors***

### Four-Wire Sensors

| Operating Voltage | Sensing Range | Shielding | Output Type | Connection Type | Complementary Output (1NO-1NC) Catalog Number | Dual NO Output Catalog Number ① |
|---|---|---|---|---|---|---|
| **Standard Range** | **12 mm Diameter** | | | | | |
| 6–48 Vdc | 4 mm | Shielded | NPN (sinking) | 4-pin micro DC connector | **E59-M12A105D01-D3NN** ⊞ | **E59-M12A105D01-D1NN** ⊞ |
| | | | | 2-meter cable | **E59-M12A105C02-D3NN** | **E59-M12A105C02-D1NN** |
| | | | PNP (sourcing) | 4-pin micro DC connector | **E59-M12A105D01-D3PP** ⊞ | **E59-M12A105D01-D1PP** ⊞ |
| | | | | 2-meter cable | **E59-M12A105C02-D3PP** | **E59-M12A105C02-D1PP** |
| | 10 mm | Unshielded | NPN (sinking) | 4-pin micro DC connector | **E59-M12C110D01-D3NN** ⊞ | **E59-M12C110D01-D1NN** ⊞ |
| | | | | 2-meter cable | **E59-M12C110C02-D3NN** | **E59-M12C110C02-D1NN** |
| | | | PNP (sourcing) | 4-pin micro DC connector | **E59-M12C110D01-D3PP** ⊞ | **E59-M12C110D01-D1PP** ⊞ |
| | | | | 2-meter cable | **E59-M12C110C02-D3PP** | **E59-M12C110C02-D1PP** |
| **Standard Range** | **18 mm Diameter** | | | | | |
| 6–48 Vdc | 8 mm | Shielded | NPN (sinking) | 4-pin micro DC connector | **E59-M18A108D01-D3NN** ⊞ | **E59-M18A108D01-D1NN** ⊞ |
| | | | | 2-meter cable | **E59-M18A108C02-D3NN** | **E59-M18A108C02-D1NN** |
| | | | PNP (sourcing) | 4-pin micro DC connector | **E59-M18A108D01-D3PP** ⊞ | **E59-M18A108D01-D1PP** ⊞ |
| | | | | 2-meter cable | **E59-M18A108C02-D3PP** | **E59-M18A108C02-D1PP** |
| | 18 mm | Unshielded | NPN (sinking) | 4-pin micro DC connector | **E59-M18C116D01-D3NN** ⊞ | **E59-M18C116D01-D1NN** ⊞ |
| | | | | 2-meter cable | **E59-M18C116C02-D3NN** | **E59-M18C116C02-D1NN** |
| | | | PNP (sourcing) | 4-pin micro DC connector | **E59-M18C116D01-D3PP** ⊞ | **E59-M18C116D01-D1PP** ⊞ |
| | | | | 2-meter cable | **E59-M18C116C02-D3PP** | **E59-M18C116C02-D1PP** |
| **Standard Range** | **30 mm Diameter** | | | | | |
| 6–48 Vdc | 15 mm | Shielded | NPN (sinking) | 4-pin micro DC connector | **E59-M30A115D01-D3NN** ⊞ | **E59-M30A115D01-D1NN** ⊞ |
| | | | | 2-meter cable | **E59-M30A115C02-D3NN** | **E59-M30A115C02-D1NN** |
| | | | PNP (sourcing) | 4-pin micro DC connector | **E59-M30A115D01-D3PP** ⊞ | **E59-M30A115D01-D1PP** ⊞ |
| | | | | 2-meter cable | **E59-M30A115C02-D3PP** | **E59-M30A115C02-D1PP** |
| | 29 mm | Unshielded | NPN (sinking) | 4-pin micro DC connector | **E59-M30C129D01-D3NN** ⊞ | **E59-M30C129D01-D1NN** ⊞ |
| | | | | 2-meter cable | **E59-M30C129C02-D3NN** | **E59-M30C129C02-D1NN** |
| | | | PNP (sourcing) | 4-pin micro DC connector | **E59-M30C129D01-D3PP** ⊞ | **E59-M30C129D01-D1PP** ⊞ |
| | | | | 2-meter cable | **E59-M30C129C02-D3PP** | **E59-M30C129C02-D1PP** |

Standard Range / Extended Range (12 mm Diameter)

Standard Range / Extended Range (18 mm Diameter)

Standard Range / Extended Range (30 mm Diameter)

**Notes**

⊞ See listing of compatible connector cables on **Page V8-T3-15**.

① At this time, iProx Complementary and Dual Output models are not available with auto-sink/source detection. Therefore, PNP (sourcing) and NPN (sinking) models must be ordered separately.

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## Compatible Connector Cables

### Standard Cables ①

| | Current Rating at 600 V | Voltage Style | Number of Pins | Gauge | Length | Pin Configuration/Wire Colors (Face View Female Shown) | PVC Jacket Catalog Number | PUR Jacket Catalog Number |
|---|---|---|---|---|---|---|---|---|
| **Micro-Style Straight Female** | **Micro-Style, Straight Female** | | | | | | | |
| | — | AC | 3-pin, 3-wire | 22 AWG | 6.0 ft (2m) | 1-Green 2-Red/Black 3-Red/White | CSAS3F3CY2202 | CSAS3F3RY2202 |
| | — | DC | 4-pin, 4-wire | 22 AWG | 6.0 ft (2m) | 1-Brown 2-White 3-Blue 4-Black | CSDS4A4CY2202 | CSDS4A4RY2202 |
| **Mini-Style Straight Female** | **Mini-Style, Straight Female** | | | | | | **Catalog Number** | |
| | 13 A | — | 3-pin | 16 AWG | 6 ft (2m) | 1-Green 2-Black 3-White | CSMS3F3CY1602 | |

## Accessories

### iProx Sensors

| | Description | Catalog Number |
|---|---|---|
| **Software** | Step-by-step programming software required to program iProx. Compatible with Microsoft Windows® and Windows® Mobile devices. | E59SW1 |
| **Cable** | The iProx programming cable is used to program individual iProx sensors, providing a connection between the computer and the sensor. Connects to computer via a serial (RS-232) or USB port. (USB connection requires an adapter which is included with purchase.) | E59RP1 |
| **Labels** | Field applied labels for iProx sensor (100 pcs) | E59LABEL |

**Note**
① For a full selection of connector cables, see **Tab 10**, **section 10.1**.

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## iProx Starter Kits

| Description | Catalog Number |
|---|---|
| **Interested in custom programming iProx sensors to fit your application?** | |
| These kits include everything needed to get the most out of iProx: a sensor, a programming cable (E59RP1), a micro connector cable (CSDS4A4CY2202) and ProxView software on CD-ROM (E59SW1). | |
| Starter kit includes: | |
| 12 mm AC unshielded iProx sensor (E59-M12C110A01-A1) | **E5912ACKIT** |
| 12 mm DC unshielded iProx sensor (E59-M12C110D01-D1) | **E5912DCKIT** |
| 18 mm AC unshielded iProx sensor (E59-M18C118A01-A1) | **E5918ACKIT** |
| 18 mm DC unshielded iProx sensor (E59-M18C116D01-D1) | **E5918DCKIT** |
| 30 mm AC unshielded iProx sensor (E59-M30C129A01-A1) | **E5930ACKIT** |
| 30 mm DC unshielded iProx sensor (E59-M30C129D01-D1) | **E5930DCKIT** |

## Technical Data and Specifications

### iProx Sensors

| Description | Two-Wire Sensors | Three-Wire Sensors |
|---|---|---|
| Input voltage | 20–132 Vac | 6–48 Vdc |
| Load current | 250 mA | 300 mA |
| Leakage current | ≤1.7 mA at 32 °F (0 °C), 2.0 mA at −40 °F (−40 °C) | ≤150 µA |
| Voltage drop | <5 Vac | ≤2.5 Vdc |
| Burden current | — | ≤15 mA |
| Protection | None | Auto reset |
| Switching hysteresis | <15% rated sensing distance | <15% rated sensing distance |
| Repeat accuracy | Shielded models: <1% sensing distance; Unshielded models: <3% sensing distance | Shielded models: <1% sensing distance; Unshielded models: <3% sensing distance |
| Surge capacity | 3 A/30 ms | — |
| Temperature range | −40 to 158 °F (−40 to 70 °C) | −40 to 158 °F (−40 to 70 °C) |
| Material of construction | 303 stainless steel; end bells: polycarbonate; face caps: Ryton®; cable: AWM style 20387 (PVC) | 303 stainless steel; end bells: polycarbonate; face caps: Ryton®; cable: AWM style 20387 (PVC) |
| Vibration and shock | Vibration: 10 to 55 Hz, 1 mm amplitude, IEC 60068-2-6; shock: 30 g, 11 ms per IEC 68-2-27 | Vibration: 10 to 55 Hz, 1 mm amplitude, IEC 60068-2-6; shock: 30 g, 11 ms per IEC 68-2-27 |
| Indicator LED | 360° viewable LED | 360° viewable LED |
| Enclosure ratings | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67) IP69K [1] | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67) IP69K [1] |

### Response Time [2]

| Description | Two-Wire Sensors All Two-Wire Models | Three-Wire Sensors Shielded 12 mm | 18 mm | 30 mm | Unshielded 12 mm | 18 mm | 30 mm |
|---|---|---|---|---|---|---|---|
| Factory default mode | Shipped in "Side by Side Mode" by default (20 V/m) | 580 Hz (10 V/m) | 390 Hz (10 V/m) | 240 Hz (10 V/m) | 300 Hz (10 V/m) | 150 Hz (10 V/m) | 145 Hz (10 V/m) |
| Side by side [3] | 30 Hz (10 V/m) | 50 Hz (20 V/m) | 50 Hz (20 V/m) | 50 Hz (20 V/m) | 50 Hz (20 V/m) | 50 Hz (20 V/m) | 50 Hz (20 V/m) |
| High noise immunity mode | 10 Hz (>20 V/m) | 10 Hz (>20 V/m) | 10 Hz (>20 V/m) | 10 Hz (>20 V/m) | 10 Hz (>20 V/m) | 10 Hz (>20 V/m) | 10 Hz (>20 V/m) |

*Notes*

Ryton® is a registered trademark of Phillips Chemical (division of Phillips Petroleum).

[1] Our products conform to NEMA® tests as indicated, however, some severe washdown applications can exceed these NEMA test specifications.

[2] iProx sensors may be programmed to perform in side by side or high noise immunity applications using the iProx programming cable (E59RP1) and ProxView software (E59SW1).

[3] Use the side by side response time parameter when using the iProx Tray Programmer (E59TP1), iProx programming cable (E59RP1) and ProxView software (E59SW1).

## Wiring Diagrams

Pin numbers are for reference, rely on pin location when wiring.
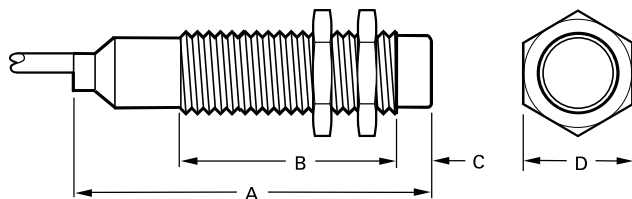
### iProx Sensors

<table>
<tr><td rowspan="2">Operating Voltage</td><td rowspan="2">Output</td><td rowspan="2">Cable Models</td><td colspan="2">Connector Models (Face View Male Shown)</td></tr>
<tr><td>Micro</td><td>Mini</td></tr>
</table>

**Two-Wire Sensors**

| 20–132 Vac | NO and NC | | | |



**Three-Wire Sensors**

| 6–48 Vdc | NO and NC (NPN and PNP) [1] | | | — |



**Four-Wire Dual Output and Complementary Sensors**

| 6–48 Vdc | NO and NC (NPN) | | | — |
| | NO and NC (PNP) | | | — |



## Dimensions

Approximate Dimensions in Inches (mm)

### Cable Models



| Size | Shielding | A | B | C | D |
|------|-----------|---|---|---|---|
| 12 mm | Shielded | 2.46 (62.4) | 1.98 (50.3) | 0.02 (0.5) | 0.67 (17) |
| | Unshielded | 2.46 (62.4) | 1.64 (41.6) | 0.36 (9) | 0.67 (17) |
| 18 mm | Shielded | 2.54 (64.5) | 2.00 (50.9) | 0.02 (0.5) | 0.94 (24) |
| | Unshielded | 2.54 (64.5) | 1.47 (37.4) | 0.55 (14) | 0.94 (24) |
| 30 mm | Shielded | 2.74 (69.6) | 2.13 (54.1) | 0.03 (0.75) | 1.41 (36) |
| | Unshielded | 2.74 (69.6) | 1.41 (35.8) | 0.75 (19) | 1.41 (36) |

### Micro-Connector Models
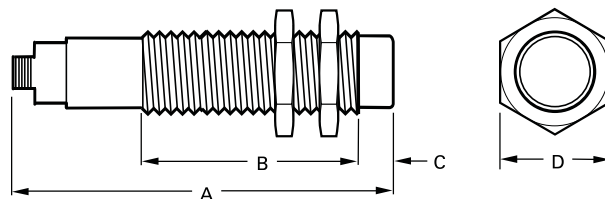


| Size | Shielding | A | B | C | D |
|------|-----------|---|---|---|---|
| 12 mm | Shielded | 2.71 (68.7) | 1.98 (50.3) | 0.02 (0.5) | 0.67 (17) |
| | Unshielded | 2.71 (68.7) | 1.64 (41.6) | 0.36 (9) | 0.67 (17) |
| 18 mm | Shielded | 2.73 (69.3) | 2.00 (50.9) | 0.02 (0.5) | 0.94 (24) |
| | Unshielded | 2.73 (69.3) | 1.47 (37.4) | 0.55 (14) | 0.94 (24) |
| 30 mm | Shielded | 2.92 (74.1) | 2.13 (54.1) | 0.03 (0.75) | 1.41 (36) |
| | Unshielded | 2.92 (74.1) | 1.41 (35.8) | 0.75 (19) | 1.41 (36) |

*Notes*

[1] The three-wire DC version of iProx automatically configures itself to NPN or PNP based on field wiring. No user intervention is required.

[2] Pin numbers 2 and 4 are internally jumpered together. Either pin may be used.

[3] The complementary (1NO-1NC) output models feature the NC output on pin 2 (white).