

Proximity Sensors

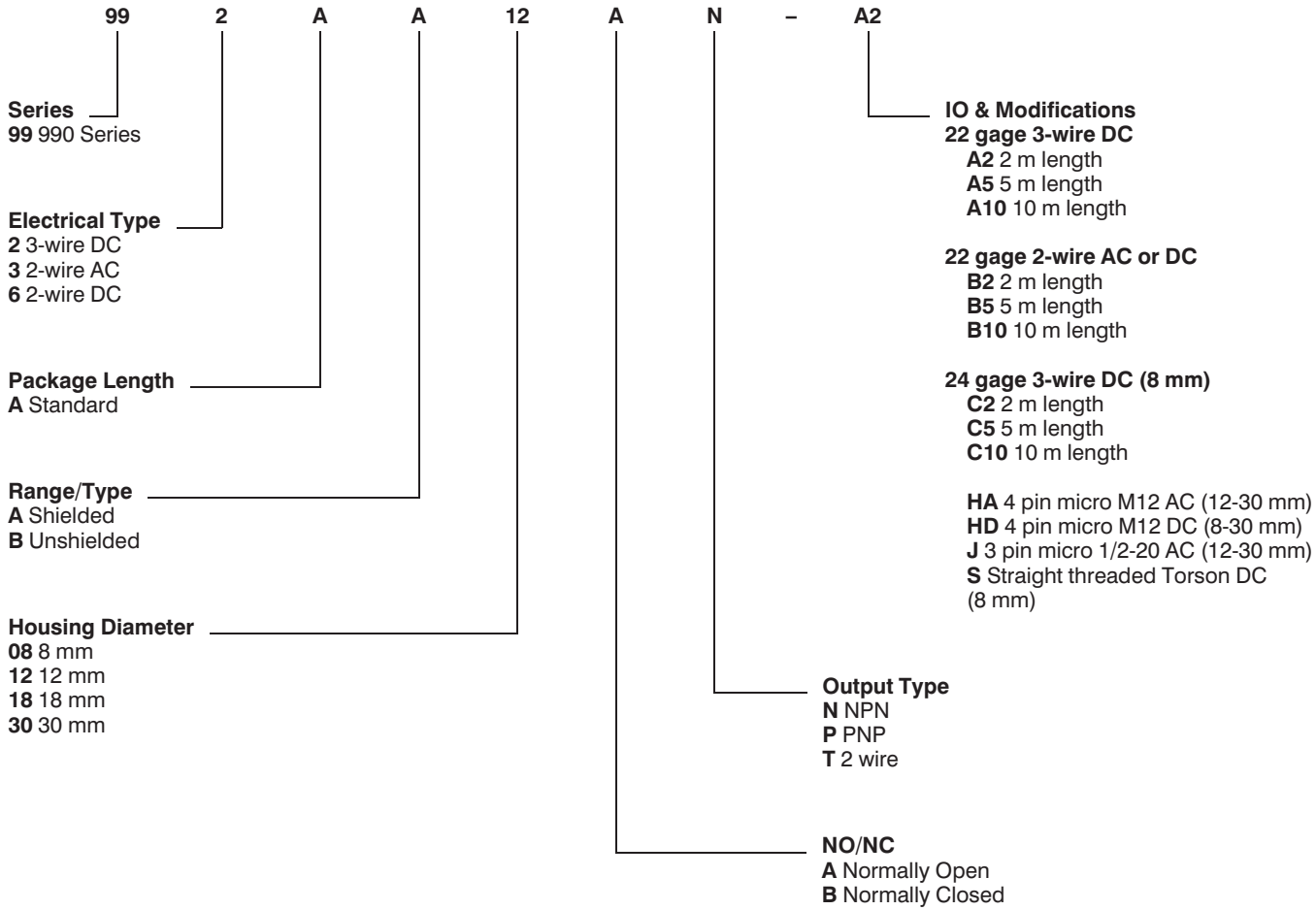
Inductive Proximity Sensors

990 Series



CATALOG NUMBER SYSTEM

PLEASE NOTE: This matrix is intended **only** to aid you in identifying sensor catalog listings. It is not all-inclusive, and **must not be used** to form new listings.



Proximity

Inductive Proximity Sensors

FEATURES

- 3-Wire DC, 2-Wire DC and 2-Wire AC versions
- Standard 8, 12, 18 and 30 mm sizes
- Limited life time warranty
- Preleaded and quick-connect versions
- State-of-the-art plastic encapsulated printed circuit boards ensure reliability
- Sturdy pins replace delicate coil assemblies and termination wiring
- Manufactured with the latest process techniques to ensure quality and performance
- Synchronous switching at high or low voltages
- Ring style 360° LEDs for application visibility
- Operating temperature from -25°C to +80°C
- Meet IEC68.2.27 shock and IEC68.2.6 vibration requirements.
- Exceptional noise immunity
- Meets all appropriate international codes, including the CE mark, UL, CSA
- IP 67



8 mm Diameter Metal Preleaded and Quick-connect Sensors

3-Wire DC



| Dimensions | M8 | | M8 | |
|------------------------------|---|-------------|---|-------------|
| Type of Package | Shielded | Unshielded | Shielded | Unshielded |
| Sensing Distance, mm (in.) | 1,4 (.05) | 2,5 (.10) | 1,4 (.05) | 2,5 (.10) |
| Repeatability/Hysteresis | ±1%/2 - 15% | ±3%/2 - 15% | ±1%/2 - 15% | ±3%/2 - 15% |
| Standard Target, mm (in.) | 50,8 x 50,8 x 12,7 (2 x 2 x 0.5) CRS | | 50,8 x 50,8 x 12,7 (2 x 2 x 0.5) CRS | |
| Circuit Protection | Short circuit, Reverse polarity, False pulse, enhanced EMI/RFI resistance | | Short circuit, Reverse polarity, False pulse, enhanced EMI/RFI resistance | |
| Protection Class | UL, CSA, CE/IP 67 | | UL, CSA, CE/IP 67 | |
| Operating Temperature | -25 to +80°C (-13 to +176°F) | | -25 to +80°C (-13 to +176°F) | |
| Shock/Vibration | 50 g, 11 mSec/10 g - 500 Hz, 3 axes | | 50 g, 11 mSec/10 g - 500 Hz, 3 axes | |
| Housing Material/Termination | Nickel-Brass/PVC 24 gage | | Nickel-Brass/Micro-connector (Torson connector) | |

12 mm Diameter Metal Preloaded and Quick-connect Sensors 3-Wire DC, 2-Wire DC, 2-Wire AC



| Dimensions | | M12 | | M12 | |
|--|--|--|--|--|-------------------|
| Type of Package | | Shielded | Unshielded | Shielded | Unshielded |
| Sensing Distance, mm (in.) | | 2,0 (.08) | 5,0 (.20) | 2,0 (.08) | 5,0 (.20) |
| Repeatability/Hysteresis | | ±1%/2 – 15% | ±3%/2 – 15% | ±1%/2 – 15% | ±3%/2 – 15% |
| Standard Target | | 12 (.47) | 15 (.59) | 12 (.47) | 15 (.59) |
| Circuit Protection | | Short circuit (DC), Reverse polarity (DC), False pulse, enhanced EMI/RFI resistance | | Short circuit (DC), Reverse polarity (DC), False pulse, enhanced EMI/RFI resistance | |
| Protection Class | | UL, CSA, CE/IP 67 | | UL, CSA, CE/IP 67 | |
| Operating Temperature | | -25 to +80°C (-13 to +176°F) | | -25 to +80°C (-13 to +176°F) | |
| Shock and Vibration | | 50 g, 11 mSec/10 g – 500 Hz, 3 axes | | 50 g, 11 mSec/10 g – 500 Hz, 3 axes | |
| Housing Material/Termination | | Nickel-Brass/PVC 22 gage | | Nickel-Brass/Micro-connector | |
| 3-Wire DC | Supply Voltage | 9 to 30 VDC | | 9 to 30 VDC | |
| | Load Current | 200 mA, max. | | 200 mA, max. | |
| | Leakage Current | 50 µA, max. | | 50 µA, max. | |
| | Current Consumption | 15 mA max. | | 15 mA max. | |
| | Voltage Drop | 1.75 V max. @ I _L = 200 mA @ 25°C | | 1.75 V max. @ I _L = 200 mA @ 25°C | |
| | Switching Frequency | 2 kHz | .75 kHz | 2 kHz | .75 kHz |
| | NPN, N.O. | 992AA12AN-A2 | 992AB12AN-A2 | 992AA12AN-HD | 992AB12AN-HD |
| | NPN, N.C. | 992AA12BN-A2 | 992AB12BN-A2 | 992AA12BN-HD | 992AB12BN-HD |
| | PNP, N.O. | 992AA12AP-A2 | 992AB12AP-A2 | 992AA12AP-HD | 992AB12AP-HD |
| | PNP, N.C. | 992AA12BP-A2 | 992AB12BP-A2 | 992AA12BP-HD | 992AB12BP-HD |
| 2-Wire DC | Supply Voltage | 9 to 30 VDC | | 9 to 30 VDC | |
| | Load Current | 5 - 100 mA | | 5 - 100 mA | |
| | Leakage Current | 1 mA, max. | | 1 mA, max. | |
| | Voltage Drop | 6.0 V max. | | 6.0 V max. | |
| | Switching Frequency | 1.5 kHz | .75 kHz | 1.5 kHz | .75 kHz |
| | N.O. | 996AA12AT-B2 | 996AB12AT-B2 | 996AA12AT-HD | 996AB12AT-HD |
| | N.C. | 996AA12BT-B2 | 996AB12BT-B2 | 996AA12BT-HD | 996AB12BT-HD |
| 2-Wire AC | Supply Voltage | 20 to 250 VAC | | 20 to 250 VAC | |
| | Load Current | 5 - 350 mA | | 5 - 350 mA | |
| | Leakage Current | 1.7 mA, max. @ 120 V @ 25°C | | 1.7 mA, max. @ 120 V @ 25°C | |
| | Inrush Current | 2.7 A, 8.3 mSec, max. | | 2.7 A, 8.3 mSec, max. | |
| | Voltage Drop | 7.0 V, max. @ 120 V @ 25°C @ ≥ 25 mA | | 7.0 V, max. @ 120 V @ 25°C @ ≥ 25 mA | |
| | Switching Frequency | 25 Hz | 25 Hz | 25 Hz | 25 Hz |
| | N.O. | 993AA12AT-B2 | 993AB12AT-B2 | 993AA12AT-HA (-J) | 993AB12AT-HA (-J) |
| | N.C. | 993AA12BT-B2 | 993AB12BT-B2 | 993AA12BT-HA (-J) | 993AB12BT-HA (-J) |
| CONNECTOR PINOUT | | | | | |
| "HD" Style "HA" Style "J" Style | M12 x 1, 1.0, .04, 39.1, 1.54, 48.0, 1.89, 51.8, 2.04, 360° LED *2-Wire AC 69,12.72 | M, 6.8, .27, 33.3, 1.31, 48.0, 1.89, 51.8, 2.04, 360° LED *2-Wire AC 69,12.72 | M12 x 1, 1.0, .04, 39.1, 1.54, 48.0, 1.89, 61.1, 2.40, 360° LED "HD" or "HA" Style 1/2-20 "J" Style *2-Wire AC 69,12.72 | M12 x 1, 6.8, .27, 33.3, 1.31, 48.0, 1.89, 61.1, 2.40, 360° LED "HD" or "HA" Style 1/2-20 "J" Style *2-Wire AC 69,12.72 | |

18 mm Diameter Metal Preloaded and Quick-connect Sensors 3-Wire DC, 2-Wire DC, 2-Wire AC



| Dimensions | | M18 | | M18 | |
|------------------------------|---------------------|---|--------------|---|--------------------|
| Type of Package | | Shielded | Unshielded | Shielded | Unshielded |
| Sensing Distance, mm (in.) | | 5,0 (.20) | 8,0 (.31) | 5,0 (.20) | 8,0 (.31) |
| Repeatability/Hysteresis | | ±1%/2 - 15% | ±3%/2 - 15% | ±1%/2 - 15% | ±3%/2 - 15% |
| Standard Target | | 18 (.71) | 24 (.94) | 18 (.71) | 24 (.94) |
| Circuit Protection | | Short circuit (DC), Reverse polarity (DC), False pulse, enhanced EMI/RFI resistance | | Short circuit (DC), Reverse polarity (DC), False pulse, enhanced EMI/RFI resistance | |
| Protection Class | | UL, CSA, CE/IP 67 | | UL, CSA, CE/IP 67 | |
| Operating Temperature | | -25 to +80°C (-13 to +176°F) | | -25 to +80°C (-13 to +176°F) | |
| Shock and Vibration | | 50 g, 11 mSec/10 g - 500 Hz, 3 axes | | 50 g, 11 mSec/10 g - 500 Hz, 3 axes | |
| Housing Material/Termination | | Nickel-Brass/PVC 22 gage | | Nickel-Brass/Micro-connector | |
| 3-Wire DC | Supply Voltage | 9 to 30 VDC | | 9 to 30 VDC | |
| | Load Current | 200 mA, max. | | 200 mA, max. | |
| | Leakage Current | 50 µA, max. | | 50 µA, max. | |
| | Current Consumption | 15 mA max. | | 15 mA max. | |
| | Voltage Drop | 1.75 V max. @ I _L = 200 mA @ 25°C | | 1.75 V max. @ I _L = 200 mA @ 25°C | |
| | Switching Frequency | 1 kHz | 500 Hz | 1 kHz | 500 Hz |
| | NPN, N.O. | 992AA18AN-A2 | 992AB18AN-A2 | 992AA18AN-HD | 992AB18AN-HD |
| | NPN, N.C. | 992AA18BN-A2 | 992AB18BN-A2 | 992AA18BN-HD | 992AB18BN-HD |
| | PNP, N.O. | 992AA18AP-A2 | 992AB18AP-A2 | 992AA18AP-HD | 992AB18AP-HD |
| | PNP, N.C. | 992AA18BP-A2 | 992AB18BP-A2 | 992AA18BP-HD | 992AB18BP-HD |
| 2-Wire DC | Supply Voltage | 9 to 30 VDC | | 9 to 30 VDC | |
| | Load Current | 5 - 100 mA | | 5 - 100 mA | |
| | Leakage Current | 1 mA, max. | | 1 mA, max. | |
| | Voltage Drop | 6.0 V max. | | 6.0 V max. | |
| | Switching Frequency | 1 kHz | 500 Hz | 1 kHz | 500 Hz |
| | N.O. | 996AA18AT-B2 | 996AB18AT-B2 | 996AA18AT-HD | 996AB18AT-HD |
| | N.C. | 996AA18BT-B2 | 996AB18BT-B2 | 996AA18BT-HD | 996AB18BT-HD |
| 2-Wire AC | Supply Voltage | 20 to 250 VAC | | 20 to 250 VAC | |
| | Load Current | 5 - 350 mA | | 5 - 350 mA | |
| | Leakage Current | 1.7 mA, max. @ 120 V @ 25°C | | 1.7 mA, max. @ 120 V @ 25°C | |
| | Inrush Current | 2.7 A, 8.3 mSec, max. | | 2.7 A, 8.3 mSec, max. | |
| | Voltage Drop | 7.0 V, max. @ 120 V @ 25°C @ ≥ 25 mA | | 7.0 V, max. @ 120 V @ 25°C @ ≥ 25 mA | |
| | Switching Frequency | 25 Hz | 25 Hz | 25 Hz | 25 Hz |
| | N.O. | 993AA18AT-B2 | 993AB18AT-B2 | 993AA18AT-HA (-J) | 993AB18AT-HA (-J) |
| | N.C. | 993AA18BT-B2 | 993AB18BT-B2 | 993AA18BT-HA (-J) | 993AB18BT-HA (-J) |
| CONNECTOR PINOUT | | | | | |
| "HD" Style | | | | | |
| O, N.O. | | | | | |
| O, N.C. | | | | | |
| "HA" Style | | | | | |
| L1 | | | | | |
| L2 | | | | | |
| "J" Style | | | | | |
| L1 | | | | | |
| L2 | | | | | |
| | | M18 x 1 | M18 x 1 | M18 x 1 | M18 x 1 |
| | | 1,0 .04 | 9,5 .38 | 1,0 .04 | 9,5 .38 |
| | | 39,4 1,55 | 48,0 1,89 | 39,4 1,55 | 48,0 1,89 |
| | | 48,0 1,89 | 52,1 2,05 | 48,0 1,89 | 52,1 2,05 |
| | | | 360° LED | | 360° LED |
| | | | | 61,2 2,41 | 61,2 2,41 |
| | | | | M12 x 1 | M12 x 1 |
| | | | | "HD" or "HA" Style | "HD" or "HA" Style |
| | | | | 1/2-20 "J" Style | 1/2-20 "J" Style |

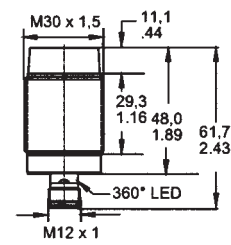
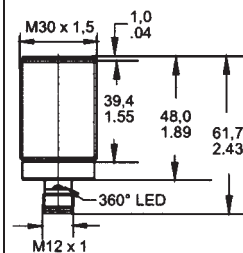
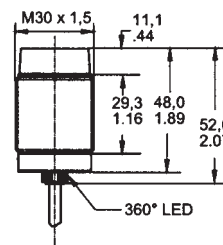
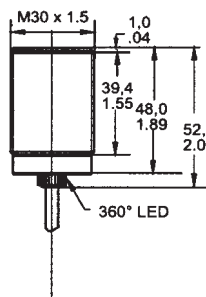
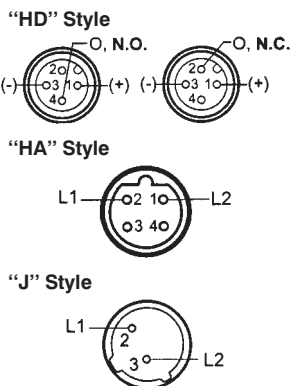
Proximity

30 mm Diameter Metal Preleaded and Quick-connect Sensors 3-Wire DC, 2-Wire DC, 2-Wire AC



| Dimensions | | M30 | | M30 | |
|------------------------------|---------------------|---|--------------|---|-------------------|
| Type of Package | | Shielded | Unshielded | Shielded | Unshielded |
| Sensing Distance, mm (in.) | | 10,0 (.39) | 16,0 (.63) | 10,0 (.39) | 16,0 (.63) |
| Repeatability and Hysteresis | | ±1%/2 - 15% | ±3%/2 - 15% | ±1%/2 - 15% | ±3%/2 - 15% |
| Standard Target | | 30 (1.18) | 40 (1.89) | 30 (1.18) | 40 (1.89) |
| Circuit Protection | | Short circuit (DC), Reverse polarity (DC), False pulse, enhanced EMI/RFI resistance | | Short circuit (DC), Reverse polarity (DC), False pulse, enhanced EMI/RFI resistance | |
| Protection Class | | UL, CSA, CE/IP 67 | | UL, CSA, CE/IP 67 | |
| Operating Temperature | | -25 to +80°C (-13 to +176°F) | | -25 to +80°C (-13 to +176°F) | |
| Shock and Vibration | | 50 g, 11 mSec/10 g - 500 Hz, 3 axes | | 50 g, 11 mSec/10 g - 500 Hz, 3 axes | |
| Housing Material/Termination | | Nickel-Brass/PVC 22 gage | | Nickel-Brass/Micro-connector | |
| 3-Wire DC | Supply Voltage | 9 to 30 VDC | | 9 to 30 VDC | |
| | Load Current | 200 mA, max. | | 200 mA, max. | |
| | Leakage Current | 50 µA, max. | | 50 µA, max. | |
| | Current Consumption | 15 mA max. | | 15 mA max. | |
| | Voltage Drop | 1.75 V max. @ I _L = 200 mA @ 25°C | | 1.75 V max. @ I _L = 200 mA @ 25°C | |
| | Switching Frequency | 400 Hz | 250 Hz | 400 Hz | 250 Hz |
| | NPN, N.O. | 992AA30AN-A2 | 992AB30AN-A2 | 992AA30AN-HD | 992AB30AN-HD |
| | NPN, N.C. | 992AA30BN-A2 | 992AB30BN-A2 | 992AA30BN-HD | 992AB30BN-HD |
| | PNP, N.O. | 992AA30AP-A2 | 992AB30AP-A2 | 992AA30AP-HD | 992AB30AP-HD |
| | PNP, N.C. | 992AA30BP-A2 | 992AB30BP-A2 | 992AA30BP-HD | 992AB30BP-HD |
| 2-Wire DC | Supply Voltage | 9 to 30 VDC | | 9 to 30 VDC | |
| | Load Current | 5 - 100 mA | | 5 - 100 mA | |
| | Leakage Current | 1 mA, max. | | 1 mA, max. | |
| | Voltage Drop | 6.0 V, max. | | 6.0 V, max. | |
| | Switching Frequency | 400 Hz | 200 Hz | 400 Hz | 200 Hz |
| | N.O. | 996AA30AT-B2 | 996AB30AT-B2 | 996AA30AT-HD | 996AB30AT-HD |
| | N.C. | 996AA30BT-B2 | 996AB30BT-B2 | 996AA30BT-HD | 996AB30BT-HD |
| 2-Wire AC | Supply Voltage | 20 to 250 VAC | | 20 to 250 VAC | |
| | Load Current | 5 - 350 mA | | 5 - 350 mA | |
| | Leakage Current | 1.7 mA, max. @ 120 V @ 25°C | | 1.7 mA, max. @ 120 V @ 25°C | |
| | Inrush Current | 2.7 A, 8.3 mSec, max. | | 2.7 A, 8.3 mSec, max. | |
| | Voltage Drop | 7.0 V, max. @ 120 V @ 25°C @ ≥ 25 mA | | 7.0 V, max. @ 120 V @ 25°C @ ≥ 25 mA | |
| | Switching Frequency | 25 Hz | 25 Hz | 25 Hz | 25 Hz |
| | N.O. | 993AA30AT-B2 | 993AB30AT-B2 | 993AA30AT-HA (-J) | 993AB30AT-HA (-J) |
| | N.C. | 993AA30BT-B2 | 993AB30BT-B2 | 993AA30BT-HA (-J) | 993AB30BT-HA (-J) |

CONNECTOR PINOUT



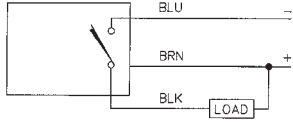
"HD" or "HA" Style
1/2-20 "J" Style

"HD" or "HA" Style
1/2-20 "J" Style

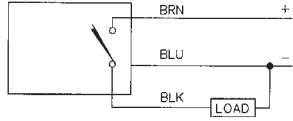
8, 12, 18 and 30 mm Diameter Metal Quick-Connect Cables and Accessories

WIRING DIAGRAMS

3-WIRE DC NPN (Sinking) N.O.

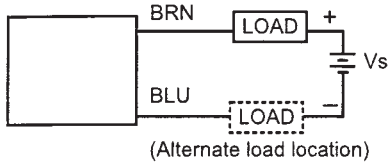


PNP (Sourcing) N.O.



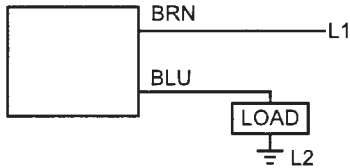
Do not place connecting cables of DC sensors in conduit with AC control wiring. Place in separate conduit or with wiring to other low voltage low current solid state devices.

2-WIRE DC



LH0-0037

2-WIRE AC



LH0-0038

NOTICE

A load must be used when power is applied to AC sensors. Wiring without a load will cause permanent damage.

S STYLE CONNECTORS (TORSON, 8mm Sensors Only)

| Type | Style | Length | Catalog Listing |
|----------|-------------|--------|-----------------|
| 3 pin DC | Straight | 2m | 423●04082●020 |
| | | 5m | 423●04082●050 |
| | Right Angle | 2m | 423●04081●020 |
| | | 5m | 423●04081●050 |

HD STYLE CONNECTORS

| Type | Style | Length | Catalog Listing N.O. 3 Conductor | Catalog Listing N.C. 4-Conductor |
|------------------------|------------------------|--------|----------------------------------|----------------------------------|
| 4 pin DC Standard Key | Straight | 2 m | 803000A09M020 | 804000A09M020 |
| | | 5 m | 803000A09M050 | 804000A09M050 |
| Micro (M12 x 1) | Right Angle | 2 m | 803001A09M020 | 804001A09M020 |
| | | 5 m | 803001A09M050 | 804001A09M050 |
| | Right Angle w/LED, NPN | 2 m | 8030N1A09M020 | — |
| | | 5 m | 8030N1A09M050 | — |
| Right Angle w/LED, PNP | 2 m | 2 m | 8030P1A09M020 | — |
| | | 5 m | 8030P1A09M050 | — |

HA STYLE CONNECTORS

| Type | Style | Length | Catalog Listing N.O. 3 Conductor | Catalog Listing N.C. 4-Conductor |
|-----------------------|-------------|--------|----------------------------------|----------------------------------|
| 4 pin AC Inverted Key | Straight | 2 m | B03000A11M020 | B04000A11M050 |
| | | 5 m | B03000A11M050 | |
| Micro (M12 x 1) | Right Angle | 2 m | B03001A11M020 | B04001A11M050 |
| | | 5 m | B03001A11M050 | |

J STYLE CONNECTORS

| Type | Style | Length | Catalog Listing |
|--------------------|-------------|--------|-----------------|
| 3 pin AC Dual Slot | Straight | 2m | 703000D02F060 |
| | | 5m | 703000D02F120 |
| Micro (1/2-20 UNF) | Right Angle | 2m | 703001D02F060 |
| | | 5m | 703001D02F120 |

CONDUIT ADAPTERS

| Sensor Diameter | Standard Catalog Listings | | Heavy Duty Catalog Listings | | "SW" |
|-----------------|---------------------------|----------|-----------------------------|-----------|-------------|
| | NiBrass | Aluminum | NiBrass | Aluminum | |
| 12 mm | 925AZ12S-NI | 925AZ12S | — | — | 28,6 (1.12) |
| 18 mm | 925AZ18S-NI | 925AZ18S | 925AZ18HD-NI | 925AZ18HD | 28,6 (1.12) |
| 30 mm | 925AZ30S-NI | 925AZ30S | 925AZ30HD-NI | 925AZ30HD | 38,1 (1.50) |

MOUNTING NUTS (2 per order)

| Sensor Diameter | Catalog Listings | |
|-----------------|------------------|---------|
| | Stainless | NiBrass |
| 8 mm | 925BZ08 | — |
| 12 mm | — | 925BZ12 |
| 18 mm | — | 925BZ18 |
| 30 mm | — | 925BZ30 |

MOUNTING BRACKETS

| Sensor Diameter | Catalog Listings | |
|-----------------|------------------|-----------|
| | Stainless | NiBrass |
| 8 mm | 925BZ08S | — |
| 12 mm | — | 925BZ12HD |
| 18 mm | 925BZ18S | 925BZ18HD |
| 30 mm | 925BZ30S | 925BZ30HD |

Proximity