

# Proximity Sensors

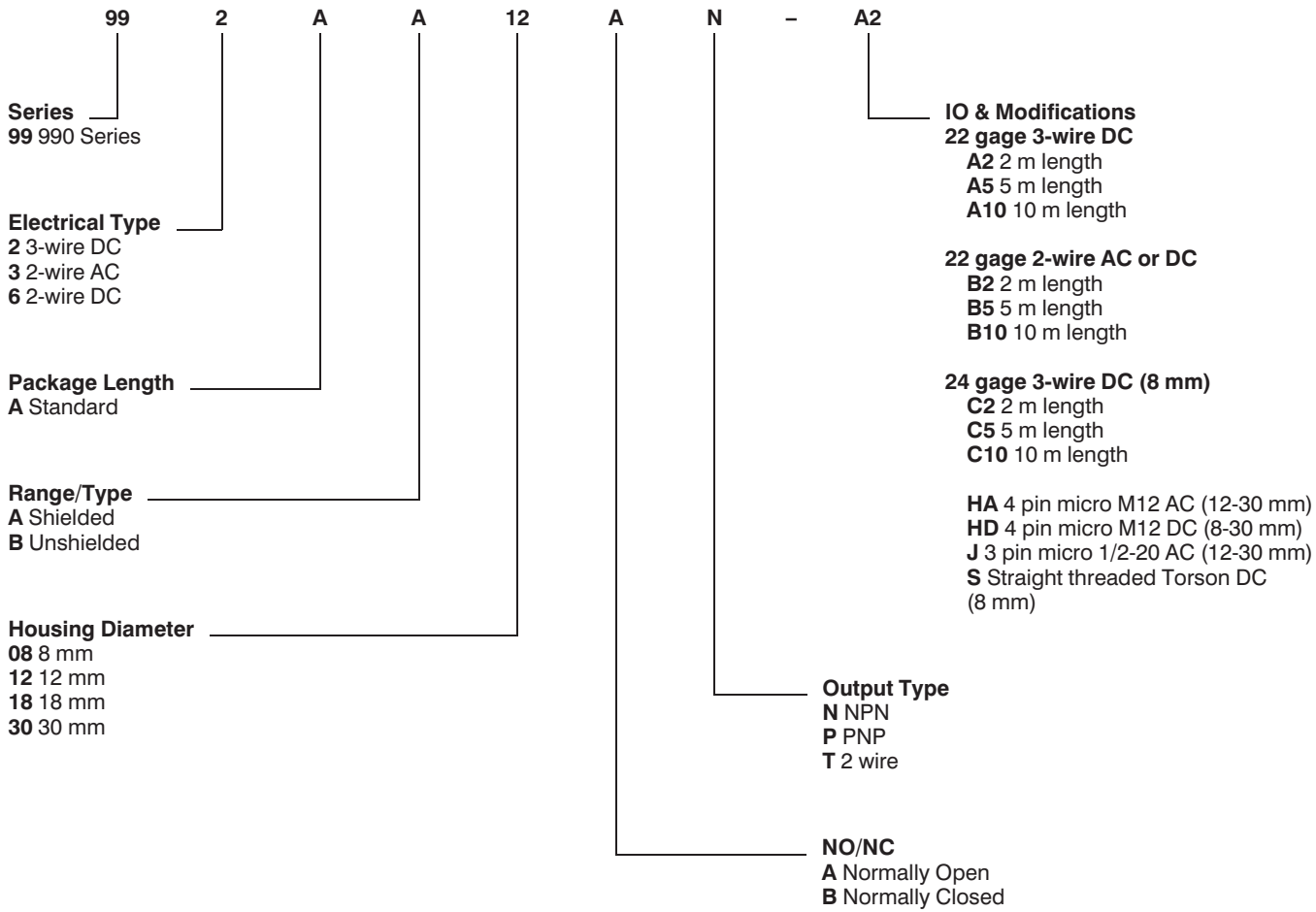
## Inductive Proximity Sensors

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.



## Inductive Proximity Sensors

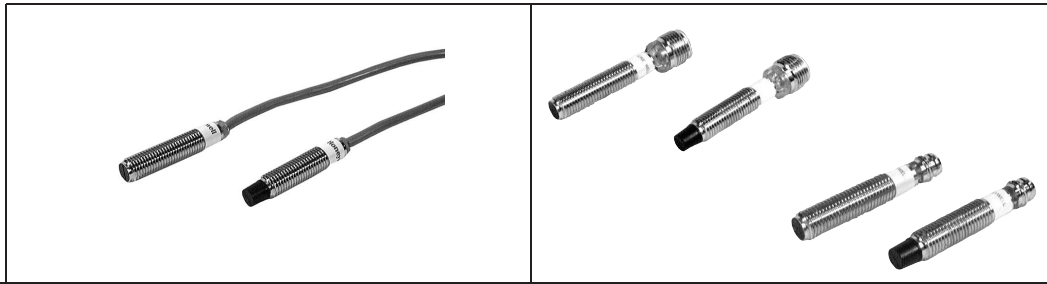
### FEATURES

- 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 Prelead 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)	
<b>3-Wire DC</b>	Supply Voltage	9 to 30 VDC		9 to 30 VDC	
	Load Current	100 mA, max.		100 mA, max.	
	Leakage Current	50 µA, max.		50 µA, max.	
	Current Consumption	15 mA max.		15 mA max.	
	Voltage Drop	1.7 V max. @ I <sub>L</sub> = 100 mA @ 25°C		1.7 V max. @ 100 mA @ 25°C	
	Switching Frequency	3 kHz	2 kHz	3 kHz	2 kHz
	NPN, N.O.	992AA08AN-C2	992AB08AN-C2	992AA08AN-HD (-S)	992AB08AN-HD (-S)
	NPN, N.C.	992AA08BN-C2	992AB08BN-C2	992AA08BN-HD (-S)	992AB08BN-HD (-S)
	PNP, N.O.	992AA08AP-C2	992AB08AP-C2	992AA08AP-HD (-S)	992AB08AP-HD (-S)
	PNP, N.C.	992AA08BP-C2	992AB08BP-C2	992AA08BP-HD (-S)	992AB08BP-HD (-S)
<b>CONNECTOR PINOUT HD</b>					
<b>CONNECTOR PINOUT S (Torson)</b>					

Proximity

## 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	
<b>3-Wire DC</b>	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 <sub>L</sub> = 200 mA @ 25°C		1.75 V max. @ I <sub>L</sub> = 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
<b>2-Wire DC</b>	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
<b>2-Wire AC</b>	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)
<b>CONNECTOR PINOUT</b>					
<b>"HD" Style</b>  <b>"HA" Style</b>  <b>"J" Style</b> 	 M12 x 1 1.0 .04 39,1 1.54 48,0 1.89 51,8 2.04 360° LED	 M 6,8 .27 48,0* 1.89 33,3 1.31 51,8 2.04 360° LED	 M12 x 1 1.0 .04 39,1 1.54 48,0 1.89 61,1 2.40 360° LED M12 x 1 <b>"HD" or "HA" Style 1/2-20 "J" Style *2-Wire AC 69,12.72</b>	 M12 x 1 6,8 .27 48,0* 1.89 33,3 1.31 61,1 2.40 360° LED M12 x 1 <b>"HD" or "HA" Style 1/2-20 "J" Style *2-Wire AC 69,12.72</b>	

## 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	
<b>3-Wire DC</b>	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 <sub>L</sub> = 200 mA @ 25°C		1.75 V max. @ I <sub>L</sub> = 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
<b>2-Wire DC</b>	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
<b>2-Wire AC</b>	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)
<b>CONNECTOR PINOUT</b>					
<b>"HD" Style</b>					
O, N.O.					
O, N.C.					
<b>"HA" Style</b>					
L1					
L2					
<b>"J" Style</b>					
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

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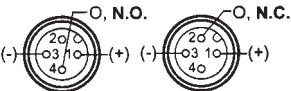
## 30 mm Diameter Metal Preleaded and Quick-connect Sensors 3-Wire DC, 2-Wire DC, 2-Wire AC



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	
<b>3-Wire DC</b>	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 <sub>L</sub> = 200 mA @ 25°C		1.75 V max. @ I <sub>L</sub> = 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
<b>2-Wire DC</b>	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
<b>2-Wire AC</b>	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

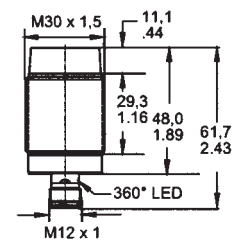
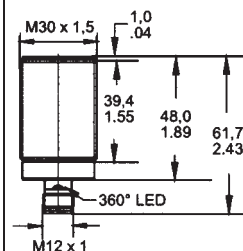
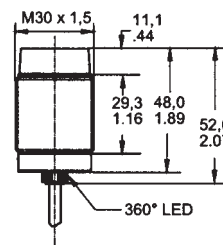
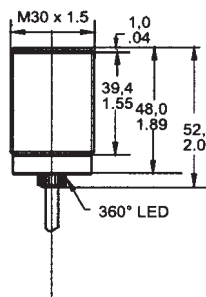
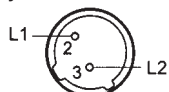
#### "HD" Style



#### "HA" Style



#### "J" Style



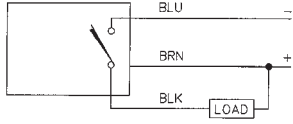
"HD" or "HA" Style  
1/2-20 "J" Style

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

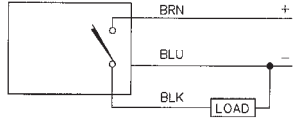
## 8, 12, 18 and 30 mm Diameter Metal Quick-Connect Cables and Accessories

### WIRING DIAGRAMS

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

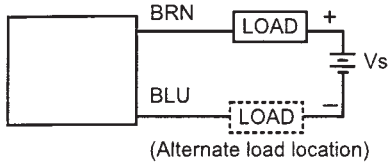


#### PNP (Sourcing) N.O.



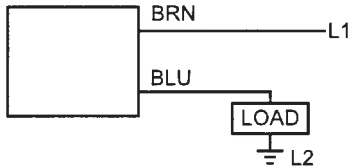
Do not place connecting cables of DC sensors in conduit with AC control wiring. Place in separate conduit or with wiring to other low voltage low current solid state devices.

#### 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	Right Angle	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

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