

# UK1 Series Ultrasonic Sensors

## M18 (18 mm) plastic – Discrete or analog output



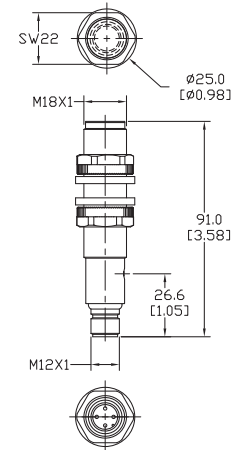
- 15 to 30VDC
- Discrete models available with adjustable sensitivity
- Analog output models available
- Complete overload protection
- IP67 rated
- LED status indicators
- Mounting hex nuts included
- Purchase cable separately
- Lifetime warranty



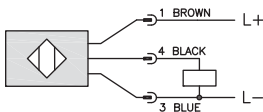
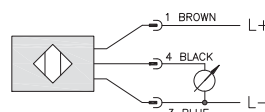
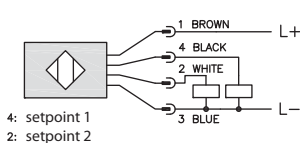
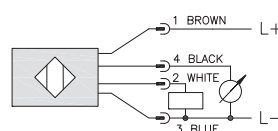
UK Series Ultrasonic Discrete or Analog Output Sensor Selection Chart						
Part Number	Price	Sensing Range	Output State	Connection	Wiring	Function
UK1A-EP-0E	<-->	50 to 400mm (1.97 to 15.75 in)	PNP, N.O./ N.C. selectable	M12 quick disconnect	Diagram 1	1
UK1A-E1-0E	<-->		0 to 10 VDC analog output		Diagram 2	2
UK1A-E2-0E	<-->		4 to 20 mA analog output		Diagram 2	2
UK1A-E5-0E	<-->		PNP, 2 N.O./ N.C. selectable		Diagram 3	3
UK1A-E6-0E	<-->		4 to 20 mA analog output, PNP, N.O./ N.C. selectable		Diagram 4	4
UK1A-E7-0E	<-->		0 to 10 VDC analog output PNP, N.O./ N.C. selectable		Diagram 4	4
UK1C-EP-0E	<-->		100 to 900mm (3.94 to 35.43 in)		PNP, N.O./ N.C. selectable	Diagram 1
UK1C-E1-0E	<-->	0 to 10 VDC analog output			Diagram 2	2
UK1C-E2-0E	<-->	4 to 20 mA analog output			Diagram 2	2
UK1C-E5-0E	<-->	PNP, 2 N.O./ N.C. selectable			Diagram 3	3
UK1C-E6-0E	<-->	4 to 20 mA analog output, PNP, N.O./ N.C. selectable			Diagram 4	4
UK1C-E7-0E	<-->	0 to 10 VDC analog output PNP, N.O./ N.C. selectable			Diagram 4	4
UK1D-EP-0E	<-->	150 to 1600mm (5.90 to 62.99 in)			PNP, N.O./ N.C. selectable	Diagram 1
UK1D-E1-0E	<-->		0 to 10 VDC analog output		Diagram 2	2
UK1D-E2-0E	<-->		4 to 20 mA analog output	Diagram 2	2	
UK1D-E5-0E	<-->		PNP, 2 N.O./ N.C. selectable	Diagram 3	3	
UK1D-E6-0E	<-->		4 to 20 mA analog output, PNP, N.O./ N.C. selectable	Diagram 4	4	
UK1D-E7-0E	<-->		0 to 10 VDC analog output PNP, N.O./ N.C. selectable	Diagram 4	4	
UK1F-EP-0E	<-->		200 to 2200mm (7.87 to 86.61 in)	PNP, N.O./ N.C. selectable	Diagram 1	1
UK1F-E1-0E	<-->	0 to 10 VDC analog output		Diagram 2	2	
UK1F-E2-0E	<-->	4 to 20 mA analog output		Diagram 2	2	
UK1F-E5-0E	<-->	PNP, 2 N.O./ N.C. selectable		Diagram 3	3	
UK1F-E6-0E	<-->	4 to 20 mA analog output, PNP, N.O./ N.C. selectable		Diagram 4	4	
UK1F-E7-0E	<-->	0 to 10 VDC analog output PNP, N.O./ N.C. selectable		Diagram 4	4	

## Dimensions

mm [inches]



## Wiring Diagrams

**Diagram 1**
**PNP**

**Diagram 2**

**Diagram 3**
**PNP**

**Diagram 4**


## Connector

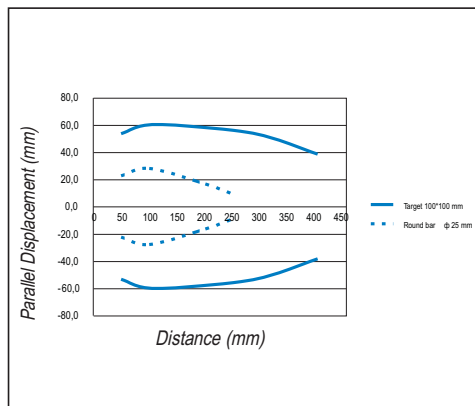
**M12 connector**


# UK1 Series Ultrasonic Sensors

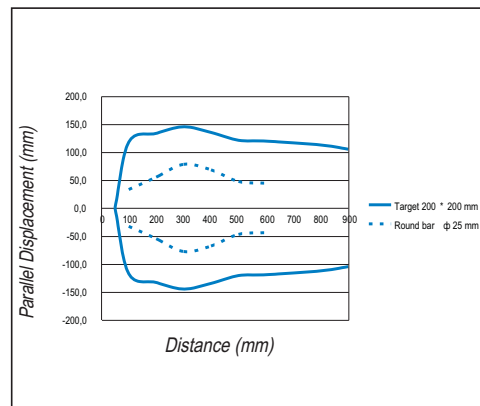
Specifications				
Model	UK1A	UK1C	UK1D	UK1F
Nominal Sensing Distance	50 to 400 mm (1.97 to 15.75 in)	100 to 900 mm (3.94 to 35.43 in)	150 to 1600 mm (5.90 to 62.99 in)	200 to 2200 mm (7.87 to 86.61 in)
Operating Distance (Sensing Range)	100 to 400 mm (3.94 to 15.75 in)	100 to 900 mm (3.94 to 35.43 in)	150 to 1600 mm (5.90 to 62.99 in)	200 to 2200 mm (7.87 to 86.61 in)
Output Type	See "Output State" column in selection chart			
Operating Voltage	15 to 30VDC			
No-load Supply Current	≤50mA			
Operating (Load) Current	100mA			
Off-state (Leakage) Current	10µA @ 30VDC			
Analog Output	Voltage: minimum load is 3 kohms / Current: maximum load is 500 ohms at 24 VDC supply			
Voltage Drop	2.2 volts max @ 100mA			
Switching Frequency	10 Hz	4 Hz	2 Hz	1 Hz
Repeat Accuracy	0.5%			
Time Delay Before Availability (tv)	≤500ms; <900 ms (UK1*-E5-0E****)			
Reverse Polarity Protection	Yes			
Short-Circuit Protection	Yes			
Linearity Error	<1%			
Ultrasonic Frequency	400kHz	300kHz	230kHz	200kHz
Ultrasonic Beam Angle	±8°	±7°	±8°	±7°
Max. Response Time (digital output)	50ms	125ms	250ms	500ms
Sensitivity Adjustment	Yes, via teach-in button			
Input Voltage Transient Protection	Yes			
Operating Temperature	-10° to 60°C (14° to 140°F)	-20° to 60°C (-4° to 140°F)		
Temperature Compensation	Yes			
Protection Degree	IEC IP67			
Indication/Switch Status	Multi-function LED indicator			
Housing Material	Polybutylene Terephthalate (PBT)			
Shock/Vibration	See Terminology Section			
Tightening Torque	1 Nm (0.737 lb-ft)			
Weight (cable/connector)	35g (1.23oz.)			
Connection	M12 (12mm) connector			
Agency Approvals	CE, cULus file E187310, RoHS			

## Characteristic Curves

### UK1A models



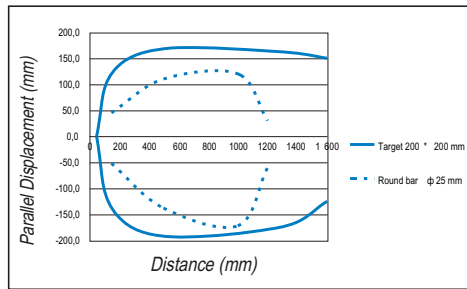
### UK1C models



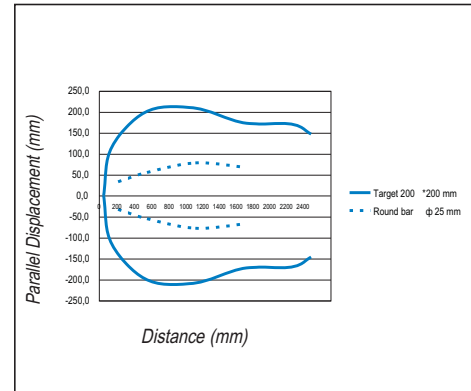
# UK1 Series Ultrasonic Sensors

## Characteristic Curves (continued)

### UK1D models



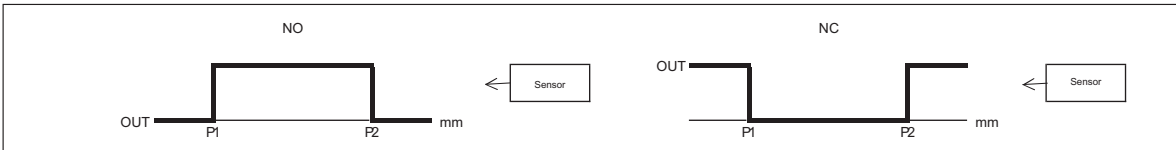
### UK1F models



## Functions

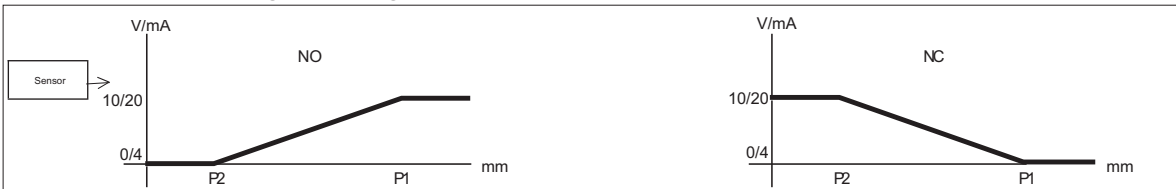
### Function Models with single digital output

#1



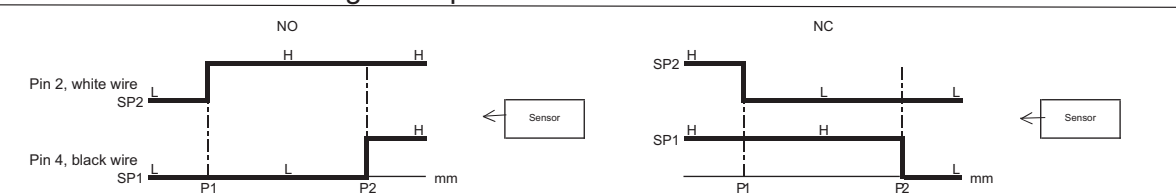
### Models with single analog output

#2



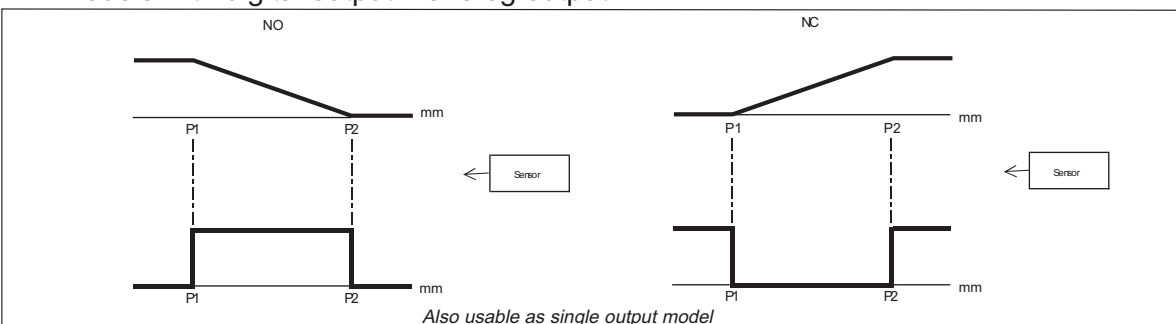
### Models with double digital output

#3



### Models with digital output + analog output

#4



Also usable as single output model

Note: P1 maximum selected working distance and first point to select  
P2 minimum selected working distance and second point to select



Company Information

Systems Overview

Programmable Controllers

Field I/O

Software

C-more & other HMI

Drives

Soft Starters

Motors & Gearbox

Steppers/ Servos

Motor Controls

Proximity Sensors

Photo Sensors

Limit Switches

Encoders

Current Sensors

Pressure Sensors

Temperature Sensors

Pushbuttons/ Lights

Process

Relays/ Timers

Comm.

Terminal Blocks & Wiring

Power

Circuit Protection

Enclosures

Tools

Pneumatics

Safety

Appendix

Product Index

Part # Index

# Sensor Cables and Connectors

## Cables with quick-disconnect plugs

- Industry standard axial and right-angle M8/M12 screw-lock connectors with open leads. The cables listed can be used with patch cables
- 2m, 5m, 7m and 10m cable lengths
- PVC (polyvinyl chloride) jacket for typical industrial applications
- PUR (polyurethane) jacket for oily and direct sunlight applications
- IP67 rated



CD12M-0B-050-C1 and -A1 shown

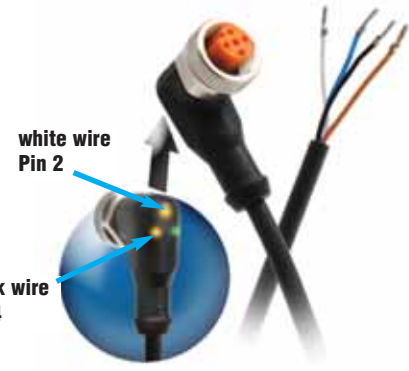
M8 Quick-Disconnect Cables (Pico, Nano)							
Part Number	Price	Length	Poles	Connector	LED	Jacket	Dimensions
<b>M8 Quick-Disconnects</b>							
CD08-0A-020-A1	<--->	2m (6.5ft.)	3	Axial	No	PVC	Figure 1
CD08-0A-020-C1	<--->	2m (6.5ft.)	3	Right-angle	No	PVC	Figure 2
CD08-0A-050-A1	<--->	5m (16.4ft.)	3	Axial	No	PVC	Figure 4
CD08-0C-050-A1	<--->	5m (16.4ft.)	3	Axial	No	PUR	Figure 3
CD08-0A-050-C1	<--->	5m (16.4ft.)	3	Right-angle	No	PVC	Figure 5
CD08-0C-050-C1	<--->	5m (16.4ft.)	3	Right-angle	No	PUR	Figure 5
CD08-0A-070-A1	<--->	7m (23ft.)	3	Axial	No	PVC	Figure 1
CD08-0A-070-C1	<--->	7m (23ft.)	3	Right-angle	No	PVC	Figure 2

M12 Quick-Disconnect Cables (Euro, Micro DC-Single Key)							
Part Number	Price	Length	Poles	Connector	LED	Jacket	Dimensions
<b>M12 Quick-Disconnects</b>							
CD12L-0B-020-A0	<--->	2m (6.5ft)	4	Axial	No	PVC	Figure 6
CD12L-0B-020-C0	<--->	2m (6.5ft)	4	Right-angle	No	PVC	Figure 7
CD12M-0B-050-A1*	<--->	5m (16.4ft)	3	Axial	No	PVC	Figure 8
CD12M-0D-050-A1*	<--->	5m (16.4ft)	3	Axial	No	PUR	Figure 9
CD12M-0B-050-C1*	<--->	5m (16.4ft)	3	Right-angle	No	PVC	Figure 10
CD12M-0D-050-C1*	<--->	5m (16.4ft)	3	Right-angle	No	PUR	Figure 11
CD12M-0B-070-A1	<--->	7m (23ft)	4	Axial	No	PVC	Figure 6
CD12M-0B-070-C1	<--->	7m (23ft)	4	Right-angle	No	PVC	Figure 7

\* Note: Do not use with sensors that require 4-pole cables.

## Cables with LED and quick-disconnect plugs

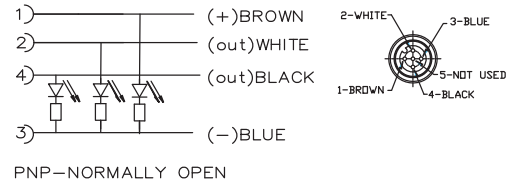
- Industry standard M12 right angle female plug with open leads
- These cables can be used with patch cables
- 2m, 5m and 10m cable lengths
- PUR (polyurethane) jacket for oily and direct sunlight applications
- IP67 /IP68 / IP69K, II rated
- LED indication for 10 -36 VDC PNP sensors only



M12 Quick-Disconnect Cables with LED Indicator (Euro, Micro DC-Single Key)							
Part Number	Price	Length	Poles	Connector	LED	Jacket	Dimensions
<b>M12 Quick-Disconnects</b>							
EVC178*	<--->	2m (6.5ft)	4	Right-angle	Yes	PUR	Figure 12
EVC179*	<--->	5m (16.4ft)	4	Right-angle	Yes	PUR	Figure 12
EVC180*	<--->	10m (32.8ft)	4	Right-angle	Yes	PUR	Figure 12

\*Note: LED for 10 to 36 VDC PNP only.  
 Do not use with NPN or analog output devices.  
 Do not use when white wire (Pin 2) is used for selection of a sensor function.  
 Do not use when emitter has check function.

### LED Models' Wiring



# Sensor Cables and Connectors

Cable Specifications					
Specification	M8		M12		M12 with LED
<b>Length</b>	2m (6.5ft) / 7m (23ft)	5m (16.4ft)	2m (6.5ft) / 7m (23ft)	5m (16.4ft)	2m (6.5 ft) / 5m (16.4ft) / 10m (32.8ft)
<b>Nominal Voltage</b>	50VAC/75VDC	60VAC/DC	300VAC	250VAC/DC	10 to 36VDC
<b>Max Current</b>	4A		4A		4A
<b>LED Current Loading</b>	N/A	N/A	N/A	N/A	<b>10V input</b> Brown wire LED: 1.7mA White and/or Black LED: 0.9mA <b>36V input</b> Brown wire LED: 7.3mA White and/or Black LED: 4.7mA
<b>Protection Degree</b>	IP67	IP65 / IP68 / IP69K	IP67	PVC: IP68 PUR: IP68 / IP69K	IP67 / IP68 / IP69K
<b>Material Nut</b>	brass; nickel plated		brass; nickel plated		brass; nickel plated
<b>Jacket Material</b>	PolyVinyl Chloride, (PVC)	PVC:CD08-0A-xxx. PUR:CD08-0C-xxx	PVC	PVC:CD12M-0B-xxx. PUR:CD12M-0D-xxx	PolyURethane (PUR)
<b>Housing Material</b>	Polyurethane (PUR)		Polyurethane (PUR)		Polyurethane (PUR)
<b>Contacts Material</b>	Copper-Tin Alloy (CuSn) -gold plated		Copper-Tin Alloy (CuSn) -gold plated		Gold plated brass
<b>Tightening Torque</b>	0.5 Nm	≤ 0.4 Nm	0.5 Nm	≤ 0.4 Nm	0.6 to 1.5 Nm
<b>Conductors Cross Section (AWG)</b>	0.25mm <sup>2</sup> (24 AWG)	0.25mm <sup>2</sup> (24 AWG)	0.25mm <sup>2</sup> (24 AWG)	0.34mm <sup>2</sup> (22 AWG)	4 x 0.34mm <sup>2</sup> (4 x 22 AWG)
<b>Ø Outer Cable</b>	5mm	PVC: 4 mm PUR: 4 mm	5mm	PVC: 4.2 mm PUR: 4.3 mm	5mm
<b>Temperature Range</b>	-25° to +80°C (-13° to 176°F)	-25° to 90°C (-13° to 194°F)	-25° to +80°C (-13° to 176°F)	PVC: -30° to 70°C (-22° to 158°F) PUR: -50° to 90°C (-58° to 194°F)	-25° to +90°C (-13° to 194°F)
<b>Environmental</b>	N/A	Halogen free, Silicone free	N/A	Halogen free, Silicone free	Halogen free, Silicone free
<b>Function Display Power LED</b>	N/A	N/A	N/A	N/A	Green
<b>Switching Status LED</b>	N/A	N/A	N/A	N/A	2 x Yellow
<b>Drag Chain (Roller Cable Tray) Suitability</b>	<b>Bending Radius</b>	min. 10 x cable diameter			
	<b>Bending Cycles</b>	N/A	N/A	N/A	>5 million
	<b>Travel Speed</b>	N/A	N/A	N/A	Max. 3.3 m/s for a horizontal travel length of 5 meters and max. acceleration of 5 m/s <sup>2</sup>
	<b>Torsional Strain</b>	N/A	N/A	N/A	±180°/m
<b>Agency Approvals</b>	RoHS				UL File E191684, RoHS

UL Reference	
Part Number	Mini-Series Female Cord Connectors Series M12, UL Catalog Number
<b>EVC178</b>	ADOAH043MSS0002H04
<b>EVC179</b>	ADOAH043MSS0005H04
<b>EVC180</b>	ADOAH043MSS0010H04
<i>Note: Shown in UL file under Mini-series Female Cord Connectors using catalog number</i>	

## Dimensions

mm [inches]

Figure 1

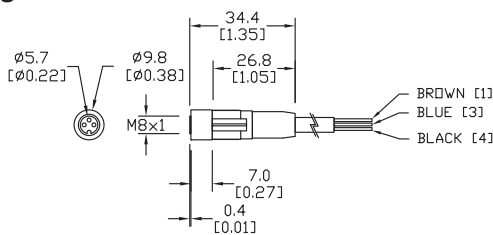
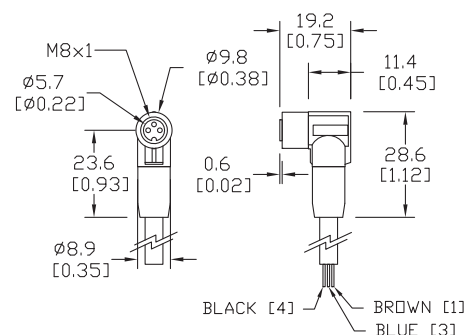


Figure 2



# Sensor Cables and Connectors



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Appendix

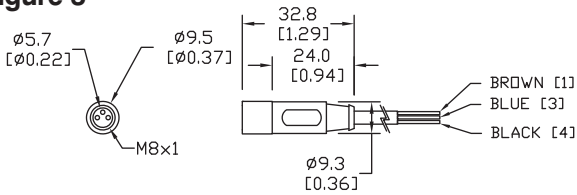
Product Index

Part # Index

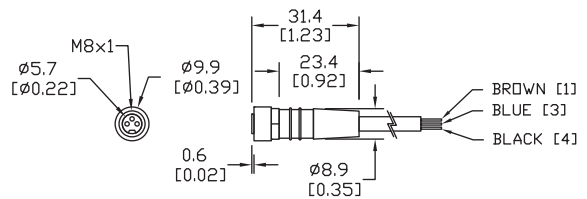
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mm [inches]

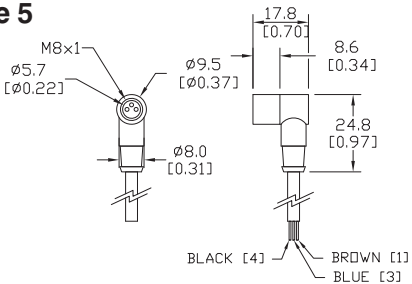
**Figure 3**



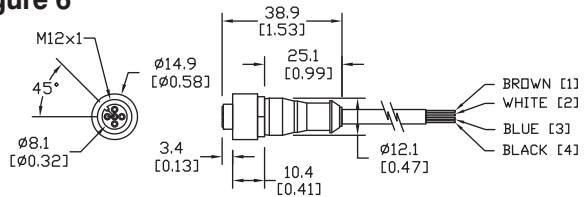
**Figure 4**



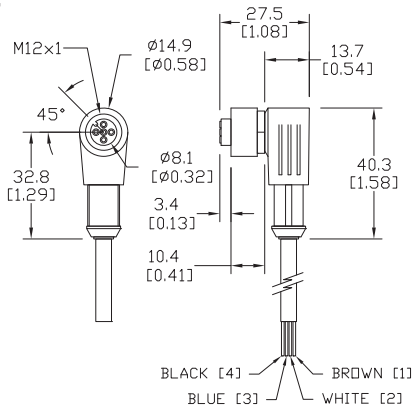
**Figure 5**



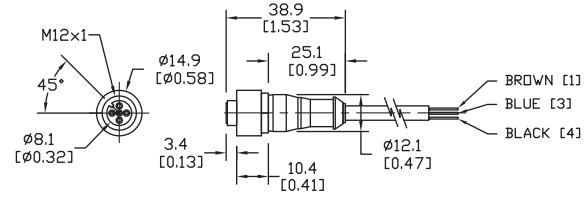
**Figure 6**



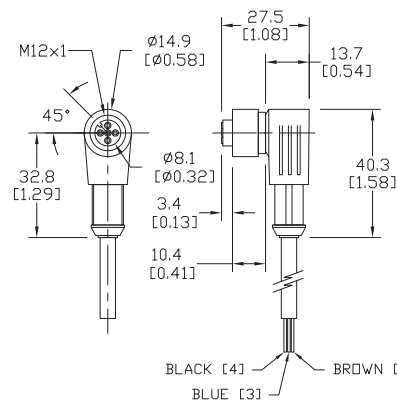
**Figure 7**



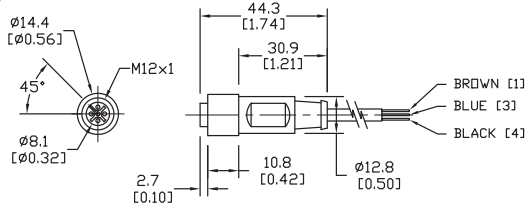
**Figure 8**



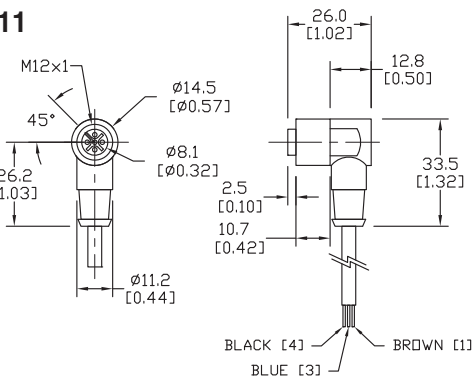
**Figure 10**



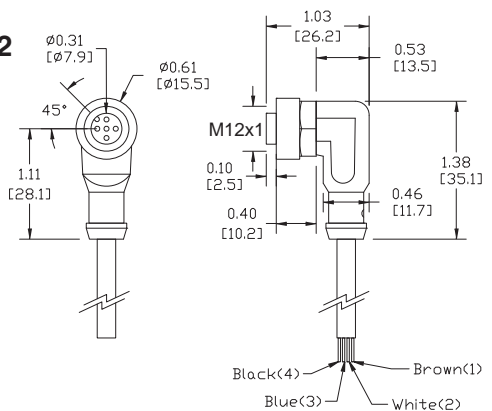
**Figure 9**



**Figure 11**



**Figure 12**



# We sell good proximity sensors at great prices – and we back them up!

## AutomationDirect Lifetime Warranty

### Registration required

For inductive proximity sensors sold to the Original User for the lifetime of the original application.

The following terms apply to the LIFETIME WARRANTY in addition to the General Terms:

1. This warranty is available only to AUTOMATIONDIRECT's authorized Value Added Resellers and to the Original User. In the event the ownership of the product is transferred to a person, firm, or corporation other than the Original User, this WARRANTY shall terminate.
2. This WARRANTY is applicable only to the original installation of the product. In the event the machinery, equipment, or production line to which the product is connected, or on which it is installed, is substituted, changed, moved or replaced, the WARRANTY shall terminate.
3. This WARRANTY shall be valid only if the product was purchased by the Original User from AUTOMATIONDIRECT, or from an authorized AUTOMATIONDIRECT Value Added Reseller, or was an integral part of a piece of machinery and equipment obtained by the Original User from an original equipment manufacturer, where the part was purchased by the original equipment manufacturer directly from AUTOMATIONDIRECT or from an authorized AUTOMATIONDIRECT Value Added Reseller.

### Purchaser's remedies

This remedy shall apply to all WARRANTIES. If an AUTOMATIONDIRECT Value Added Reseller desires to make a WARRANTY claim, the Value Added Reseller shall, if requested by AUTOMATIONDIRECT, ship the product to AUTOMATIONDIRECT's facility in Cumming, GA postage or freight prepaid. If the Original User desires to make a WARRANTY Claim, they shall notify the authorized Value Added Reseller from whom it was purchased or, if purchased directly from AUTOMATIONDIRECT, shall notify AUTOMATIONDIRECT and, if requested by AUTOMATIONDIRECT, ship the Product to AUTOMATIONDIRECT's facility in Cumming, GA postage or freight prepaid. AUTOMATIONDIRECT shall, at its option, take any of the following two courses of action for any products which AUTOMATIONDIRECT determines are defective in materials or workmanship.

1. Repair or replace the product and ship the product to the Original User or to the authorized AUTOMATIONDIRECT Value Added Reseller, postage or freight prepaid; or
2. Repay to the Original User that price paid by the Original User; provided that if the claim is made under the lifetime warranty, and such product is not then being supplied by AUTOMATIONDIRECT, then the amount to be repaid by AUTOMATIONDIRECT to the Original User shall be reduced according to the following schedule:

Number of Years Since Date of Purchase by Original User	Percent of Original Purchase Price To Be Paid by AutomationDirect
10	50 percent
15	25 percent
20	10 percent
More than 20	5 percent

**REMEDIES OF PURCHASER'S AND VALUE ADDED RESELLERS SHALL BE LIMITED EXCLUSIVELY TO THE RIGHT OF REPLACEMENT, REPAIR OR REPAYMENT AS PROVIDED ABOVE AND DOES NOT INCLUDE ANY LABOR COST OR REPLACEMENT AT ORIGINAL USER'S SITE. AUTOMATIONDIRECT.COM SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF ANY WARRANTY, EXPRESSED OR IMPLIED, APPLICABLE TO THE PRODUCT, INCLUDING WITHOUT LIMITATION, ANY DAMAGES RESULTING FROM PROPERTY DAMAGE, PERSONAL INJURY OR BUSINESS INTERRUPTION, EVEN IF NOTIFIED OF THE POSSIBILITY OF SUCH DAMAGES.**

Inductive proximity sensors warranty form may be obtained online at:

<http://www.automationdirect.com/static/specs/proxwarranty.pdf>