

# AK Series Analog Inductive Proximity Sensors



## M18 (18 mm) metal – analog output

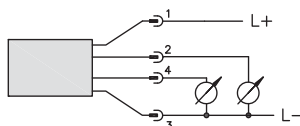
- Voltage or current analog output
- 4 models available
- Metal housing
- Axial cable or M12 quick-disconnect models
- IP67 rated
- Purchase cable separately (for quick-disconnect model)
- Lifetime warranty



AK Series M18 Analog Inductive Prox Selection Chart						
Part Number	Price	Sensing Range	Housing	Output	Connection	Dimensions
AK9-05-1A	<-->	0 to 10mm (0-0.39in)	Shielded	0 - 5VDC or 1-5mA	2m (6.5') axial cable	Figure 1
AK9-05-1H	<-->				M12 (12mm) connector	Figure 2
AK9-10-1A	<-->	0 to 10mm (0-0.39in)		0-10VDC or 4-20mA	2m (6.5') axial cable	Figure 1
AK9-10-1H	<-->				M12 (12mm) connector	Figure 2

Specifications		
Mounting Type	AK9-05-1*	AK9-10-1*
Nominal Sensing Distance	0 to 10mm (0-0.39in)	0 to 10mm (0-0.39in)
Operating Distance	N/A	
Material Correction Factors	See Proximity Sensor Terminology	
Output Type	0-5VDC or 1-5mA	0-10VDC or 4-20mA
Current Output Max. Load / Power Supply	1kΩ / 10VDC; 5kΩ / 30VDC	0.5kΩ / 15VDC; 1kΩ / 30VDC
Voltage Output Min. Load	500Ω	1kΩ
Operating Voltage	10 -30VDC	15 -30VDC
No-load Supply Current	≤10mA	≤12mA
Operating (Load) Current	N/A	
Off-state (Leakage) Current	N/A	
Voltage Drop	≤2.0 V	
Switching Frequency	N/A	
Differential Travel (% of Nominal Distance)	N/A	
Repeat Accuracy	±0.02mm	
Ripple	≤20%	
Time Delay Before Availability (tv)	≤50ms	
Input Voltage Transient Protection	Up to 30VDC	
Reverse Polarity Protection	Yes	
Short-Circuit Protection	Yes (switch auto-resets after overload is removed)	
Operating Temperature	-25° to +70° C (-13° to 158° F)	
Protection Degree (DIN 40050)	IEC IP67	
Indication/Switch Status	N/A	
Housing Material	Chrome-plated brass	
Sensing Face Material	Polybutylene Terephthalate (PBT)	
Shock/Vibration	See Terminology Section	
Tightening Torque	30 Nm (22 lb-ft)	
Weight (cable/M8 connector)	110g (3.88 oz.) / 50g (1.76 oz.)	
Connection	2m (6.5') axial cable or M12 (12mm) connector	
Agency Approvals	UL file E328811	

## Wiring diagram



## Connector

M12 connector



Sensors with M12 connectors must use 2M or 7M cables (4-wire).

## Dimensions

mm [inches]

Figure 1

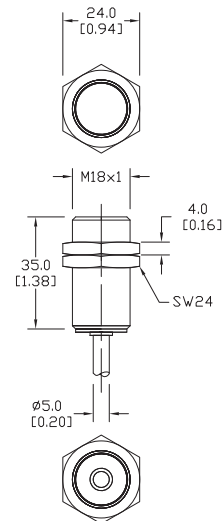
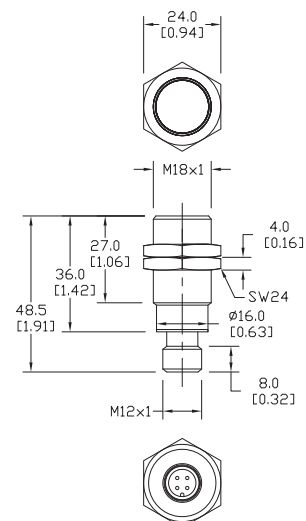


Figure 2



# 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

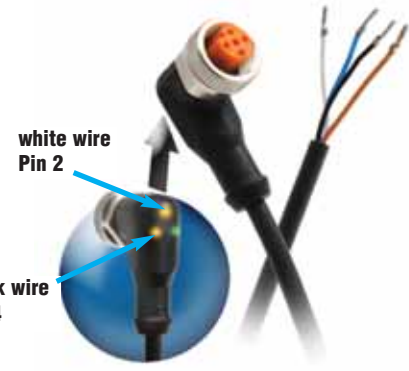
M8 Quick-Disconnect Cables (Pico, Nano)							
Part Number	Price	Length	Poles	Connector	LED	Jacket	Dimensions
<b>M8 Quick-Disconnects</b>							
CD08-0A-020-A1	<--->	2m (6.5ft.)	3	Axial	No	PVC	Figure 1
CD08-0A-020-C1	<--->	2m (6.5ft.)	3	Right-angle	No	PVC	Figure 2
CD08-0A-050-A1	<--->	5m (16.4ft.)	3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

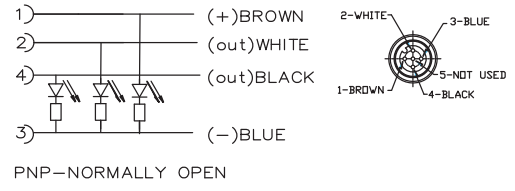
- Industry standard M12 right angle female plug with open leads
- These cables can be used with patch cables
- 2m, 5m and 10m cable lengths
- PUR (polyurethane) jacket for oily and direct sunlight applications
- IP67 /IP68 / IP69K, II rated
- LED indication for 10 -36 VDC PNP sensors only



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

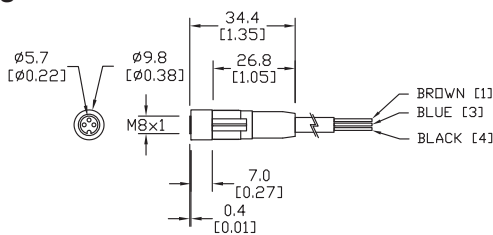
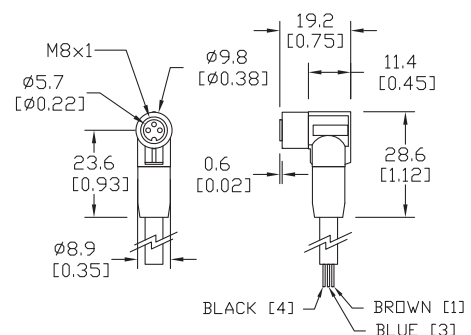


Figure 2



# Sensor Cables and Connectors



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

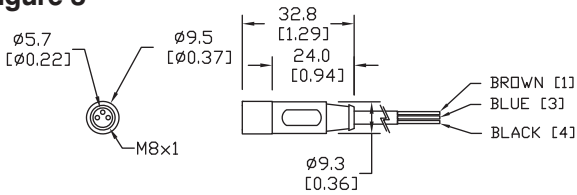
Product Index

Part # Index

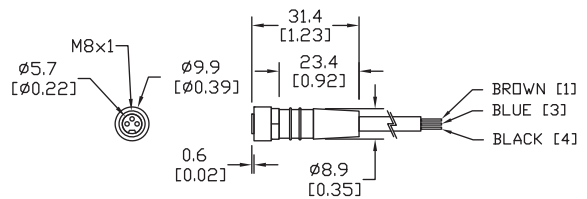
## Dimensions

mm [inches]

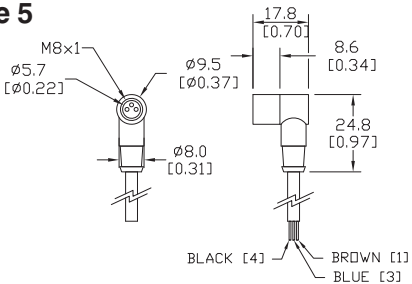
**Figure 3**



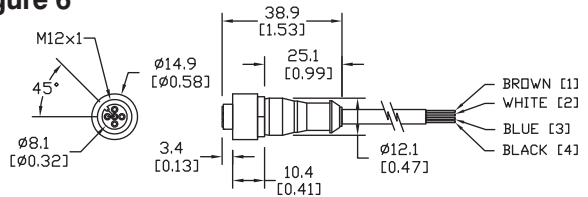
**Figure 4**



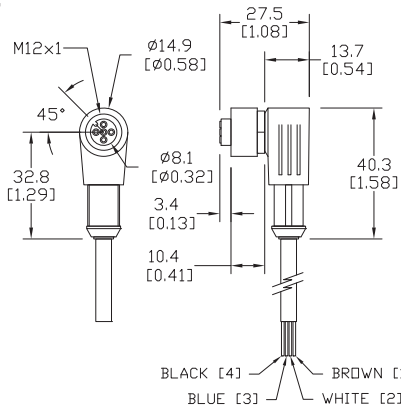
**Figure 5**



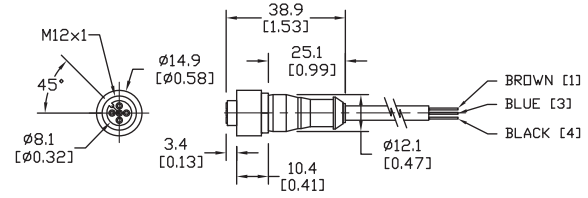
**Figure 6**



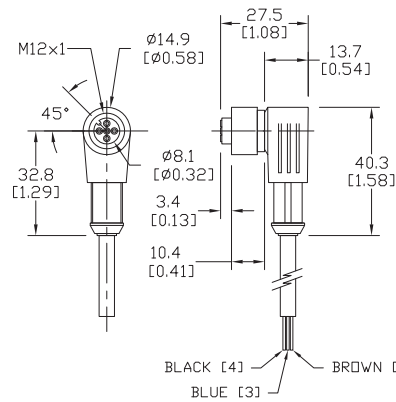
**Figure 7**



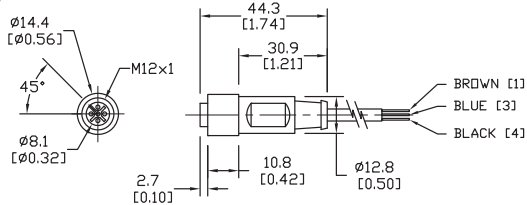
**Figure 8**



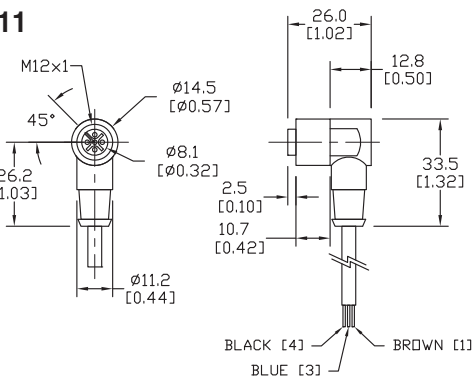
**Figure 10**



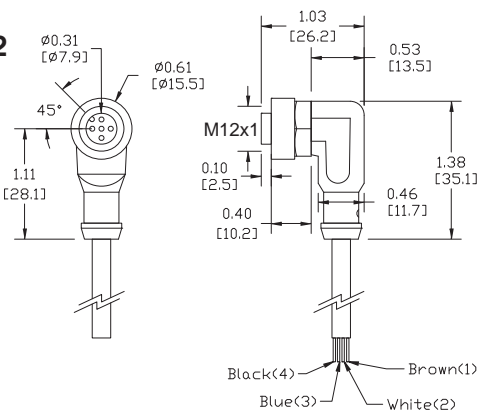
**Figure 9**



**Figure 11**



**Figure 12**



# Sensor Cables and Connectors

## Patch cables with quick-disconnect plugs on each end

Available patch cables include:

- Industry standard M8 and M12 screw-lock connectors
- One male and one female connector

- Axial and right-angle connector models
- 1m and 3m cable lengths
- PVC (polyvinyl chloride) jacket for typical industrial applications
- IP67 rated



M8 Patch Cables with Quick-Disconnect on Each End (Pico, Nano)						
Part Number	Price	Length	Poles	Connectors	Jacket	Dimensions
<b>M8 Quick-Disconnect Patch Cables</b>						
CDP08-0A-010-AA	<--->	1m (3.28ft)	3	2 Axial. One male and one female connector	PVC	Figure 1
CDP08-0A-010-BB	<--->	1m (3.28ft)	3	2 Right-angle. One male and one female connector	PVC	Figure 3
CDP08-0A-030-AA	<--->	3m (9.84ft)	3	2 Axial. One male and one female connector	PVC	Figure 2
CDP08-0A-030-BB	<--->	3m (9.84ft)	3	2 Right-angle. One male and one female connector	PVC	Figure 3

M12 Patch Cables with Quick-Disconnect on Each End (Euro, Micro DC-Single Key)						
Part Number	Price	Length	Poles	Connectors	Jacket	Dimensions
<b>M12 Quick-disconnect Patch Cables</b>						
CDP12-0B-010-AA	<--->	1m (3.28ft.)	4	2 Axial. One male and one female connector	PVC	Figure 4
CDP12-0B-010-BB	<--->	1m (3.28ft.)	4	2 Right-angle. One male and one female connector	PVC	Figure 5
CDP12-0B-030-AA	<--->	3m (9.84ft.)	4	2 Axial. One male and one female connector	PVC	Figure 4
CDP12-0B-030-BB	<--->	3m (9.84ft.)	4	2 Right-angle. One male and one female connector	PVC	Figure 5

## Patch Cables with LED

Available patch cables with LED include:

- Right-angle M12 female plug with LED indication on one end and axial male plug on the other end
- 0.3m, 0.6m, 1m, 2m, 5m, and 10m cable lengths

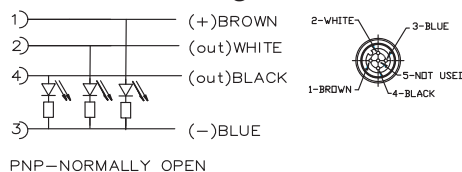
- PUR (polyurethane) jacket for oily and direct sunlight applications
- IP67 /IP68 / IP69K, II rated
- LED indication for 10 -36 VDC PNP sensors only



white wire  
Pin 2

black wire  
Pin 4

### LED Models' Wiring



M12 Patch Cables with LED Indicator (Euro, Micro DC-Single Key)							
Part Number	Price	Length	Poles	Connectors	LED	Jacket	Dimensions
<b>M12 Patch Cables</b>							
EVC322*	<--->	0.3m (0.98ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6
EVC323*	<--->	0.6m (1.97ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6
EVC324*	<--->	1m (3.28ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6
EVC325*	<--->	2m (6.5ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6
EVC326*	<--->	5m (16.4ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6
EVC327*	<--->	10m (32.8ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6

\*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.

# Sensor Cables and Connectors



- 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
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- Terminal Blocks & Wiring
- Power
- Circuit Protection
- Enclosures
- Tools
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- Safety
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- Part # Index

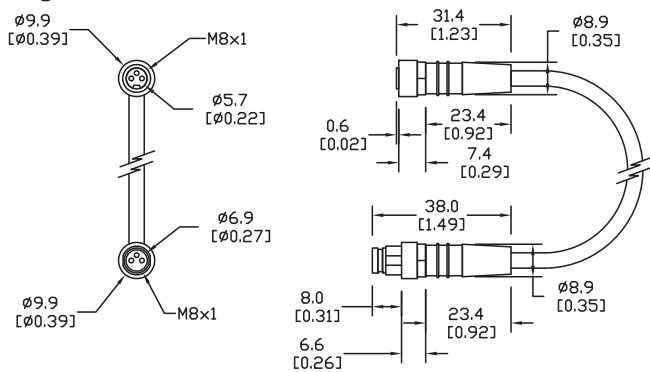
Cable Specifications				
Specification	M8	M12	M12 with LED	
<b>Length</b>	1m (3.28ft.) / 3m (9.84ft.)		0.3m (0.98ft) / 0.6m (1.97ft) / 1m (3.28ft) 2m (6.5ft) / 5m (16.4ft) / 10m (32.8ft)	
<b>Nominal Voltage</b>	60 VAC/DC	250 VAC/DC	10 to 36VDC	
<b>Max Current</b>	4A		4A	
<b>LED Current Consumption</b>	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>	IEC IP67		IEC IP67/IP68/IP69K	
<b>Material Nut</b>	Brass: nickel plated		Brass: nickel plated	
<b>Jacket Material</b>	PolyVinyl Chlorided (PVC)		PolyURethane (PUR)	
<b>Housing Material</b>	PolyURethane (PUR)		Connector: Orange PUR, Socket: Black PUR	
<b>Contacts Material</b>	Copper-tin(CuSn)=Brass		Brass; gold plated	
<b>Conductors Cross Section (AWG)</b>	0.34mm <sup>2</sup>		0.34mm <sup>2</sup> (22 AWG)	
<b>Tightening Torque</b>	0.5 Nm		<b>Plug:</b> 0.6 to 1.5 Nm (take into account the maximum value of the counterpart) <b>Socket:</b> 0.6 to 1.5 Nm	
<b>Ø Outer Cable</b>	5mm		5mm	
<b>Temperature Range</b>	-25° to +70°C (-13° to 158°F)		-25° to +90°C (-13° to 194°F)	
<b>Function Display LED</b>	N/A		Green	
<b>Switching Status LED</b>	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>	>5 million		
	<b>Travel Speed</b>	N/A	Max. 3.3 m/s for a horizontal travel length of 5 m and max. acceleration of 5 m/s <sup>2</sup>	
	<b>Torsional Strain</b>	N/A	±180°/m	
<b>Agency Approvals</b>	RoHS		UL File E191684, RoHS	

UL Reference	
Part Number	Cable Assemblies Series M12, UL Catalog Number
<b>EVC322</b>	VDOAH043MSS00.3H04STGH040MSS
<b>EVC323</b>	VDOAH043MSS00.6H04STGH040MSS
<b>EVC324</b>	VDOAH043MSS0001H04STGH040MSS
<b>EVC325</b>	VDOAH043MSS0002H04STGH040MSS
<b>EVC326</b>	VDOAH043MSS0005H04STGH040MSS
<b>EVC327</b>	VDOAH043MSS0010H04STGH040MSS
<b>Note: Shown in UL file under Cable Assemblies using catalog number</b>	

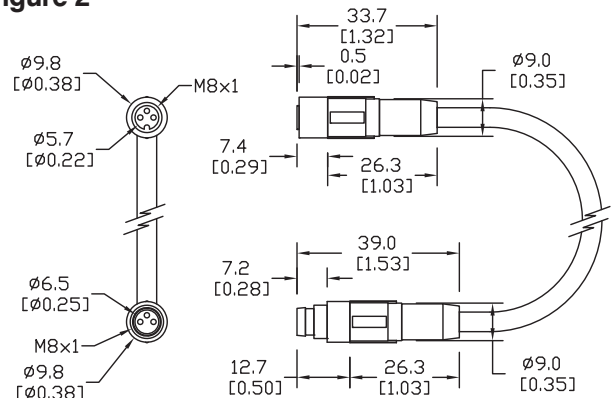
# Sensor Cables and Connectors

Dimensions mm [inches]

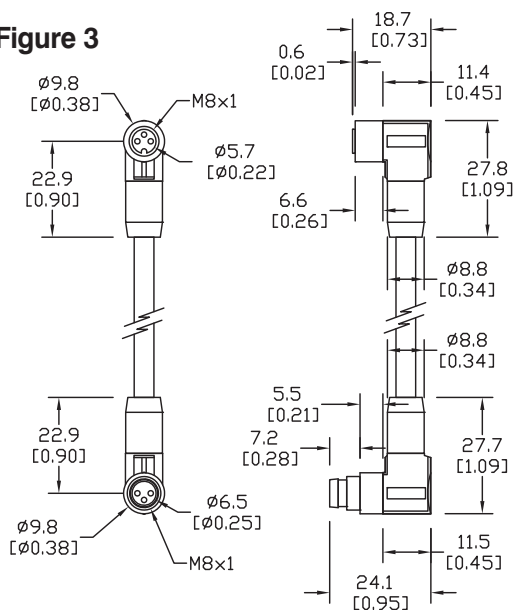
**Figure 1**



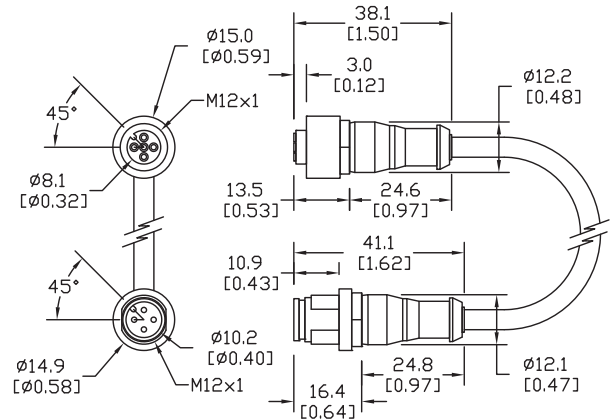
**Figure 2**



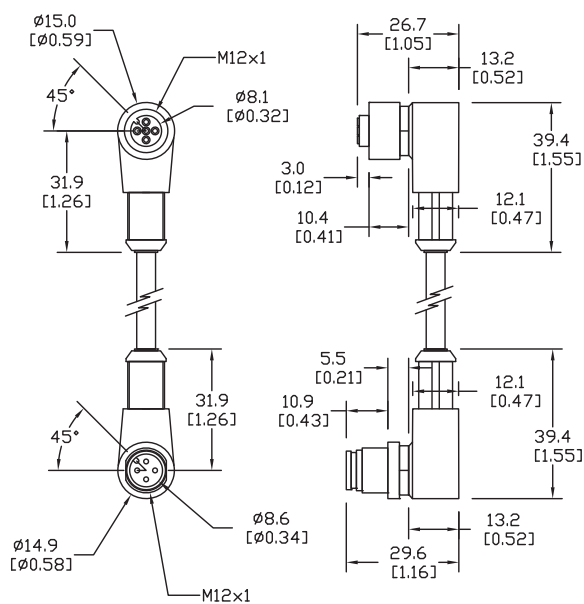
**Figure 3**



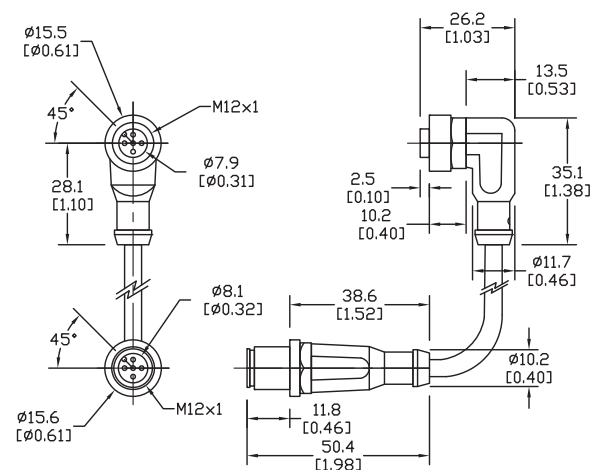
**Figure 4**



**Figure 5**



**Figure 6**





# Accessories: Mounting Brackets

## ST30A axial bracket

Mounting M30 (30 mm) sensors. Has two mounting holes (use 5 mm screws) and allows the rotation of an optical axis for right-beam-angle-adaptor sensors. Hexagonal nuts not included.



## ST30C right-angle bracket

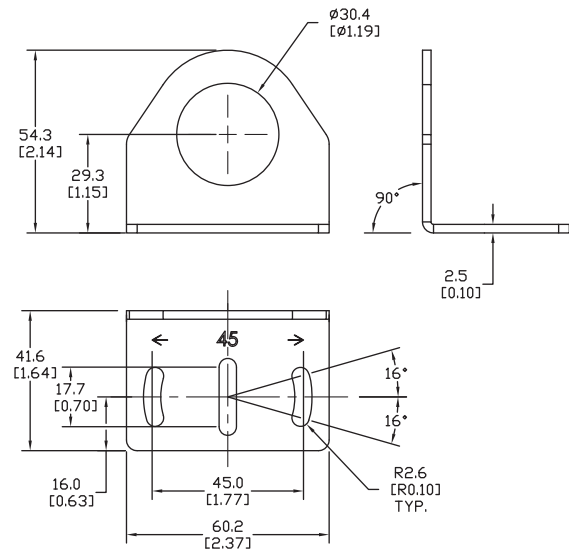
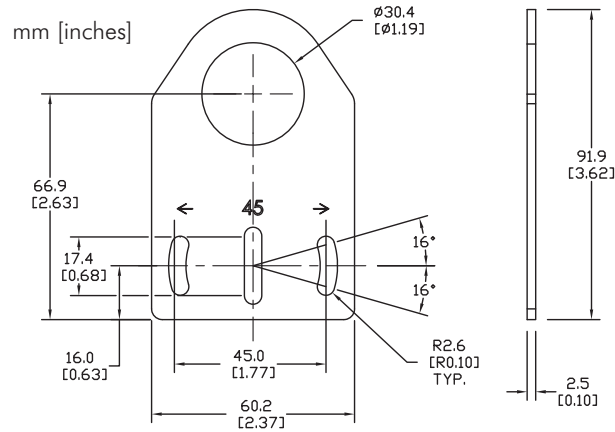
Angular mounting bracket for M30 (30 mm) sensors. Has two mounting holes (use 5 mm screws) and allows the rotation of an optical axis for axial sensors. Hexagonal nuts not included.



Brackets		
Part Number	Price	Description
ST30A	<-->	Metal axial bracket for 30 mm sensors, 1/pk

Brackets		
Part Number	Price	Description
ST30C	<-->	Metal right angle bracket for 30 mm sensors, 1/pk

## All Dimensions





# 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>