

# PB Series Inductive Proximity Sensors

## Nickel-plated Brass - DC



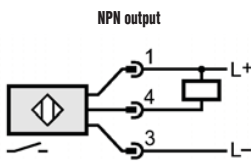
**PBT-AN-1H PBT-AN-2H**

- Low cost/high performance
- Twelve models available
- IP67 rated
- LED status indicators
- M12 quick-disconnect; order cable separately
- Lifetime warranty

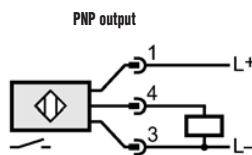
Basic Series Inductive Prox Selection Chart								
Part Number	Price	Sensing Range	Housing	Output State	Logic	Connection	Wiring	Dimensions
<b>M12 Models</b>								
<b>PBM-AN-1H</b>	<--->	2 mm (0.079 in)	Shielded	N.O.	NPN	M12 (12 mm) connector	Diagram 1	Figure 1
<b>PBM-AP-1H</b>	<--->				PNP	M12 (12 mm) connector	Diagram 2	
<b>PBM-AN-2H</b>	<--->	4 mm (0.157 in)	Unshielded		NPN	M12 (12 mm) connector	Diagram 1	
<b>PBM-AP-2H</b>	<--->				PNP	M12 (12 mm) connector	Diagram 2	
<b>M18 Models</b>								
<b>PBK-AN-1H</b>	<--->	5 mm (0.197 in)	Shielded	N.O.	NPN	M12 (12 mm) connector	Diagram 1	Figure 2
<b>PBK-AP-1H</b>	<--->				PNP	M12 (12 mm) connector	Diagram 2	
<b>PBK-AN-2H</b>	<--->	8 mm (0.315 in)	Unshielded		NPN	M12 (12 mm) connector	Diagram 1	
<b>PBK-AP-2H</b>	<--->				PNP	M12 (12 mm) connector	Diagram 2	
<b>M30 Models</b>								
<b>PBT-AN-1H</b>	<--->	10 mm (0.394 in)	Shielded	N.O.	NPN	M12 (12 mm) connector	Diagram 1	Figure 3
<b>PBT-AP-1H</b>	<--->				PNP	M12 (12 mm) connector	Diagram 2	
<b>PBT-AN-2H</b>	<--->	15 mm (0.590 in)	Unshielded		NPN	M12 (12 mm) connector	Diagram 1	
<b>PBT-AP-2H</b>	<--->				PNP	M12 (12 mm) connector	Diagram 2	

## Wiring diagrams

**Diagram 1**



**Diagram 2**



**M12 Connector**



**Cable Assembly Wiring Colors:**  
**Pin 1 - Brown**  
**Pin 3 - Blue**  
**Pin 4 - Black**

# PB Series Inductive Proximity Sensors

Specifications	M12 Models		M18 Models		M30 Models	
	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
<b>Type</b>	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
<b>Operating Distance</b>	2 mm (0.079 in)	4 mm (0.157 in)	5 mm (0.197 in)	8 mm (0.315 in)	10 mm (0.394 in)	15 mm (0.590 in)
<b>Material Correction Factors</b>	See Material Influence table #2 later in this section.					
<b>Switch-point Drift</b>	-10 to 10% Sr					
<b>Hysteresis</b>	1 to 20% Sr					
<b>Operating Voltage</b>	15 to 30 VDC					
<b>Current Consumption</b>	<15 mA					
<b>Load Current</b>	100 mA					
<b>Short-circuit Protection</b>	Yes, pulsed					
<b>Reverse Polarity Protection</b>	Yes					
<b>Overload Protection</b>	Yes					
<b>Voltage Drop</b>	<2.5 V					
<b>Output Type</b>	NPN or PNP, N.O. only					
<b>Leakage Current</b>	<0.1 mA					
<b>Switching Frequency</b>	800Hz		400Hz		300Hz	
<b>Temperature Range (Operating)</b>	-25° to 70°C (-13° to 158°F)					
<b>Protection Degree (DIN 40050)</b>	IEC IP67					
<b>Shock Resistance</b>	IEC 60947-5-2 part 7, 4, 2					
<b>Vibration Resistance</b>	IEC 60947-5-2 part 7, 4, 1					
<b>Agency Approvals</b>	cULus file E328811, CE, RoHS					
<b>LED Indicators / Switching Status</b>	Yellow (output energized)					
<b>Housing Material</b>	Housing: brass, nickel-plated; Lock nuts: brass					
<b>Sensing Face Material</b>	Polybutylene Terephthalate (PBT)					
<b>Tightening Torque</b>	7.0 Nm (5.16 lb./ft.)		35.0 Nm (25.8 lb./ft.)		50.0 Nm (36.8 lb./ft.)	
<b>Weight</b>	1.70 g (0.06 oz)		2.83 g (0.10 oz)		8.50 g (0.30 oz)	
<b>Connectors</b>	M12 connector. 2 lock nuts included					

## Dimensions

mm [inches]

Figure 1

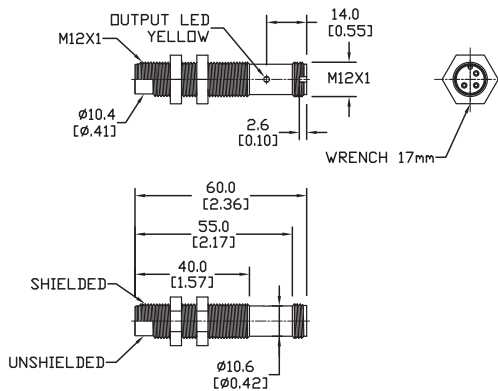


Figure 2

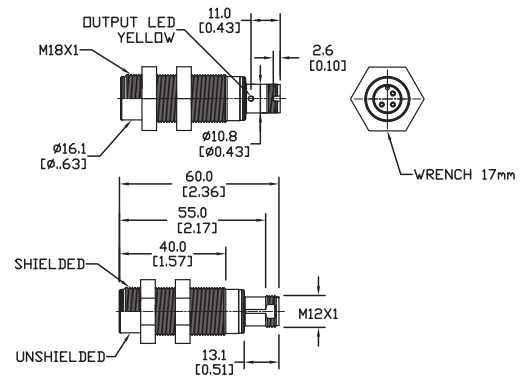
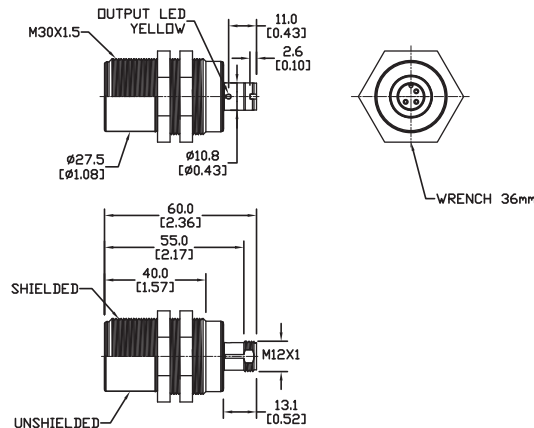


Figure 3



# Sensors Accessories: Cables

## 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

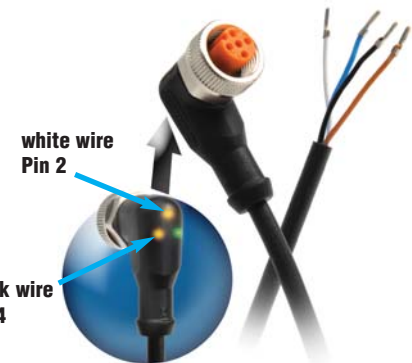
M8 Quick-Disconnect Cables (Pico, Nano)							
Part Number	Price	Length	Poles	Connector	LED	Jacket	Dimensions
<b>M8 Quick-Disconnects</b>							
CD08-0A-020-A1	<--->	2m (6.5ft.)	3	Axial	No	PVC	Figure 1
CD08-0A-020-C1	<--->	2m (6.5ft.)	3	Right-angle	No	PVC	Figure 2
CD08-0A-050-A1	<--->	5m (16.4ft.)	3	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: DM, FA, QX, SS, SSF, SU, TU, VM, VK, MV, MS or MSF series sensors. These sensors require 4-pole cables.

## Cables with LED and quick-disconnect plugs

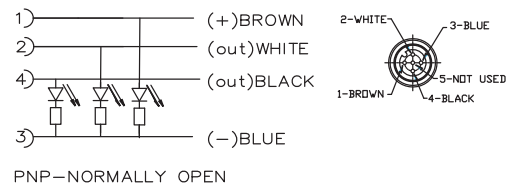
- Industry standard M12 right angle female plug with open leads
- These cables can be used with patch cables
- 2m, 5m and 10m cable lengths
- PUR (polyurethane) jacket for oily and direct sunlight applications
- IP67 /IP68 / IP69K, II rated
- LED indication for 10 -36 VDC PNP sensors only



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 when white wire (Pin 2) is used for selection of a sensor function.

### LED Models' Wiring



# Sensors Accessories: Cables

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	10V input Brown wire LED: 1.7mA White and/or Black LED: 0.9mA 36V input 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>	PVC	PVC:CD08-0A-xxx. PUR:CD08-0C-xxx	PVC	PVC:CD12M-0B-xxx. PUR:CD12M-0D-xxx	PUR
<b>Housing Material</b>	PUR		PUR		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	
<b>Part Number</b>	<b>Mini-Series Female Cord Connectors Series M12, UL Catalog Number</b>
<b>EVC178</b>	ADOAH043MSS0002H04
<b>EVC179</b>	ADOAH043MSS0005H04
<b>EVC180</b>	ADOAH043MSS0010H04
<b>Note: Shown in UL file under Mini-series Female Cord Connectors using catalog number</b>	

# Sensors Accessories: Cables

## Dimensions (in/mm)

Figure 1

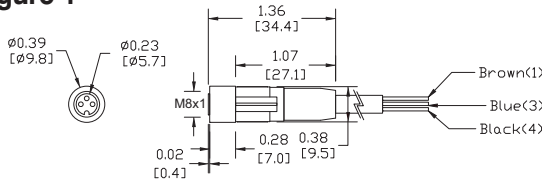


Figure 2

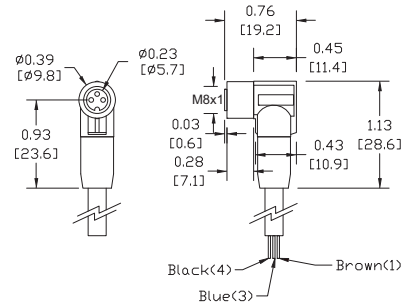


Figure 3

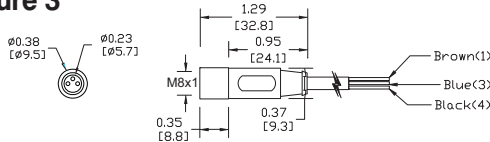


Figure 4

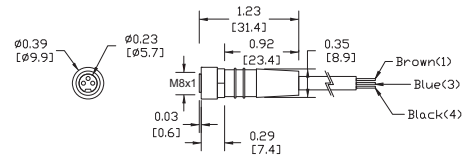


Figure 5

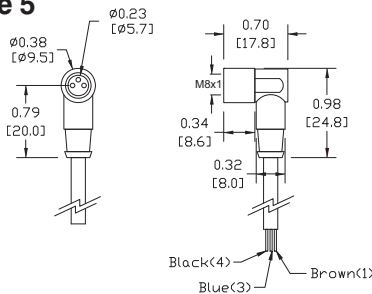


Figure 6

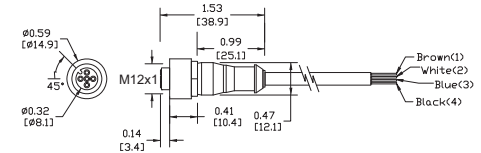


Figure 7

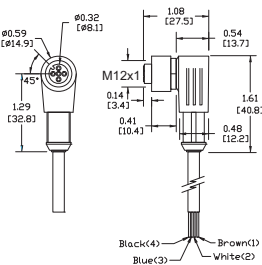


Figure 8

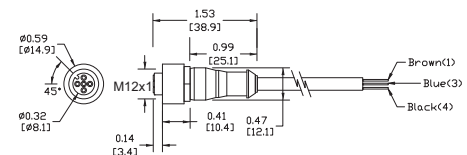


Figure 9

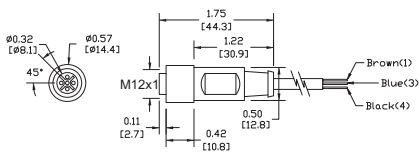


Figure 10

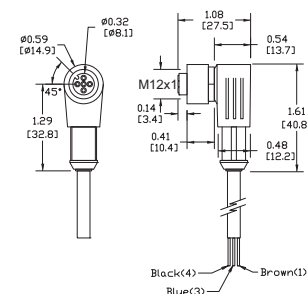


Figure 11

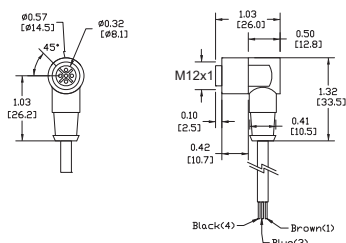
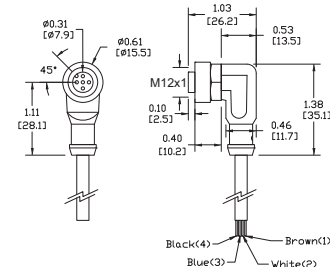


Figure 12



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

Appendix

Product Index

Part # Index

# Sensors Accessories: Cables

## 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>						
<b>CDP08-0A-010-AA</b>	<--->	1m (3.28ft)	3	2 Axial. One male and one female connector	PVC	Figure 1
<b>CDP08-0A-010-BB</b>	<--->	1m (3.28ft)	3	2 Right-angle. One male and one female connector	PVC	Figure 3
<b>CDP08-0A-030-AA</b>	<--->	3m (9.84ft)	3	2 Axial. One male and one female connector	PVC	Figure 2
<b>CDP08-0A-030-BB</b>	<--->	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)

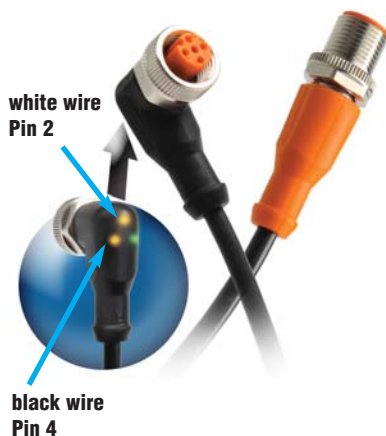
Part Number	Price	Length	Poles	Connectors	Jacket	Dimensions
<b>M12 Quick-disconnect Patch Cables</b>						
<b>CDP12-0B-010-AA</b>	<--->	1m (3.28ft.)	4	2 Axial. One male and one female connector	PVC	Figure 4
<b>CDP12-0B-010-BB</b>	<--->	1m (3.28ft.)	4	2 Right-angle. One male and one female connector	PVC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

## Patch Cables with LED

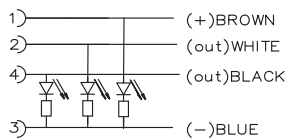
Available patch cables with LED include:

- 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



### 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>							
<b>EVC322*</b>	<--->	0.3m (0.98ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6
<b>EVC323*</b>	<--->	0.6m (1.97ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6
<b>EVC324*</b>	<--->	1m (3.28ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6
<b>EVC325*</b>	<--->	2m (6.5ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6
<b>EVC326*</b>	<--->	5m (16.4ft)	4	Right-angle female, axial male	Yes	PUR	Figure 6
<b>EVC327*</b>	<--->	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 when white wire (Pin 2) is used for selection of a sensor function.

# Sensors Accessories: Cables

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>	PVC		PUR
<b>Housing Material</b>	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>	

# Sensors Accessories: Cables

## Dimensions (in/mm)

Figure 1

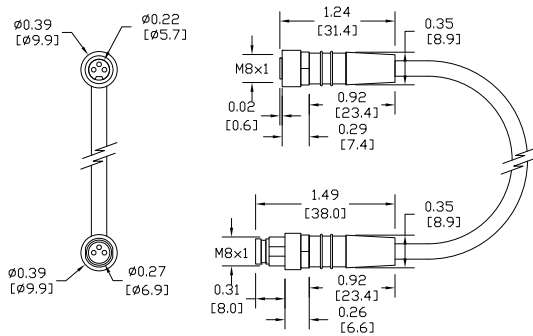


Figure 2

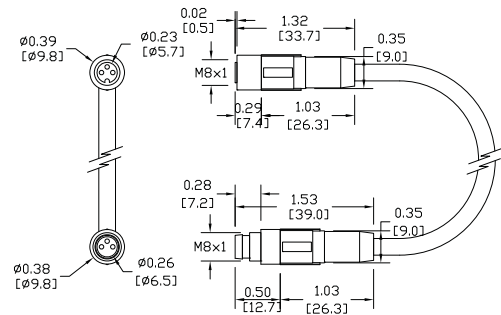


Figure 3

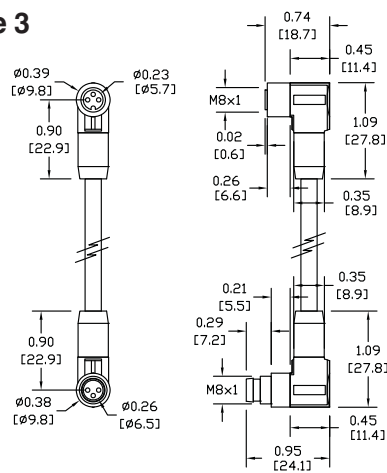


Figure 4

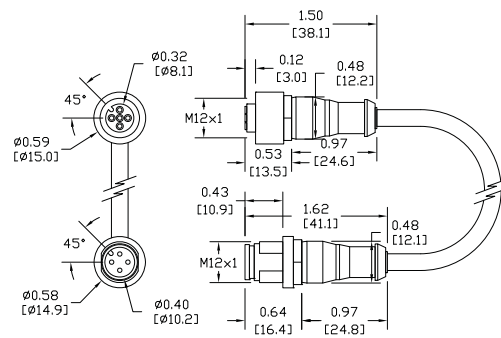


Figure 5

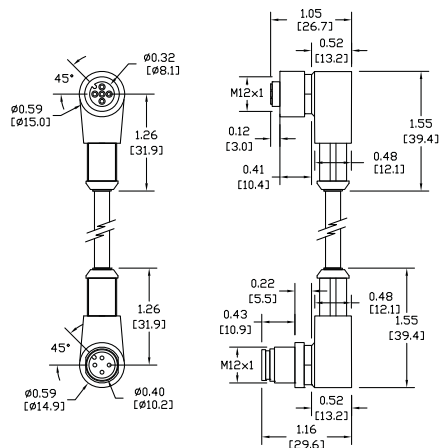
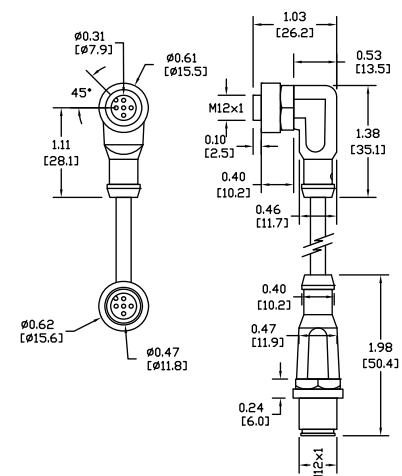


Figure 6





# Accessories: Adapter, Mounting Brackets

## ST12A axial bracket

For mounting M12 (12 mm) sensors. Has two mounting holes (use 3 mm screws) and allows the rotation of an optical axis for right-beam angle adapter sensors. Hexagonal nuts not included.



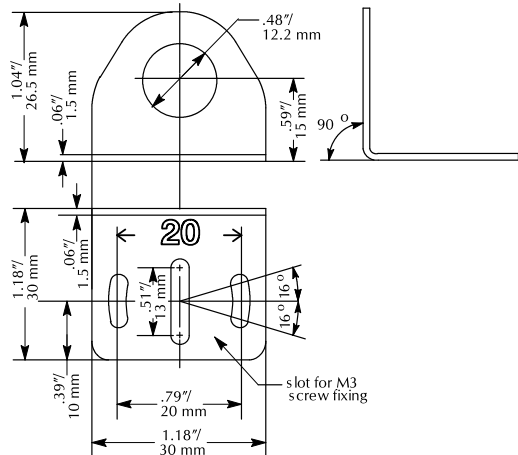
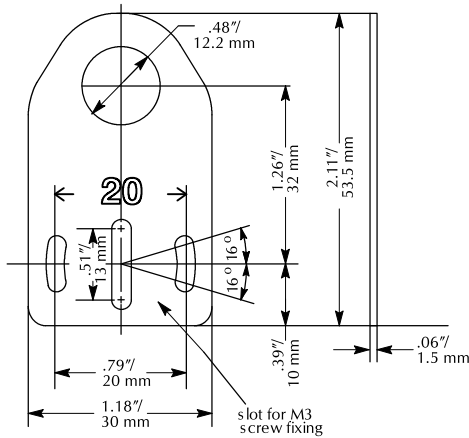
## ST12C right-angle bracket

Angular mounting bracket for use with M12 (12 mm) sensors. Has two mounting holes (use 3 mm screws) and allows the rotation of an optical axis for axial sensors. Hexagonal nuts not included.



Brackets		
Part Number	Price	Description
ST12A	<--->	Metal axial bracket for 12 mm sensors, 1/pk
ST12A7W	<--->	316L stainless steel axial bracket for 12 mm sensors, 1/pk

Brackets		
Part Number	Price	Description
ST12C	<--->	Metal right angle bracket for 12 mm sensors, 1/pk
ST12C7W	<--->	316L stainless steel right angle bracket for 12 mm sensors, 1/pk



## ST18A axial bracket

Mounting bracket for M18 (18 mm) sensors. Has two mounting holes (use 4 mm screws) and allows the rotation of an optical axis for right-beam-angle-adaptor sensors. Hexagonal nuts not included.



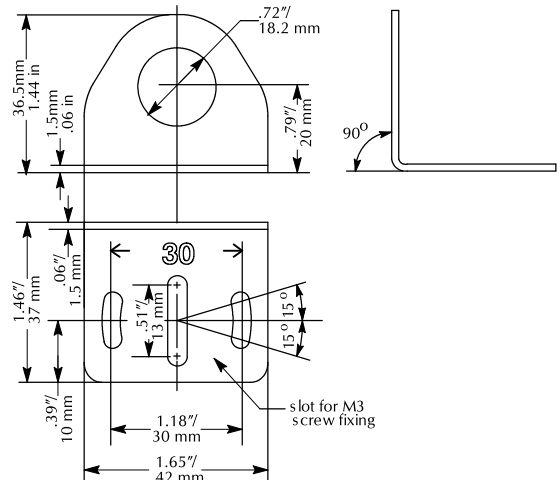
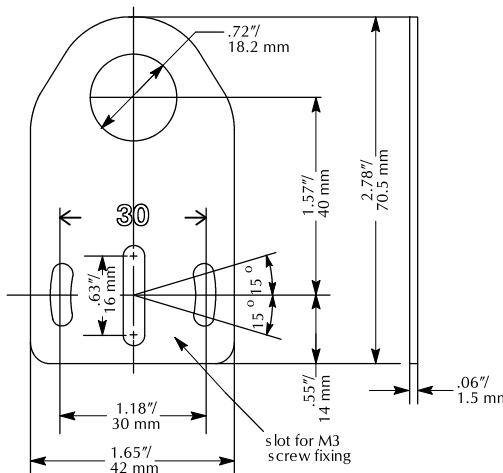
## ST18C right-angle bracket

Angular mounting bracket for M18 (18 mm) sensors. Has two mounting holes (use 4 mm screws) and allows the rotation of an optical axis for axial sensors. Hexagonal nuts not included.



Brackets		
Part Number	Price	Description
ST18A	<--->	Metal axial bracket for 18 mm sensors, 1/pk
ST18A7W	<--->	316L stainless steel axial bracket for 18 mm sensors, 1/pk

Brackets		
Part Number	Price	Description
ST18C	<--->	Metal right angle bracket for 18 mm sensors, 1/pk
ST18C7W	<--->	316L stainless steel right angle bracket for 18 mm sensors, 1/pk



# 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.



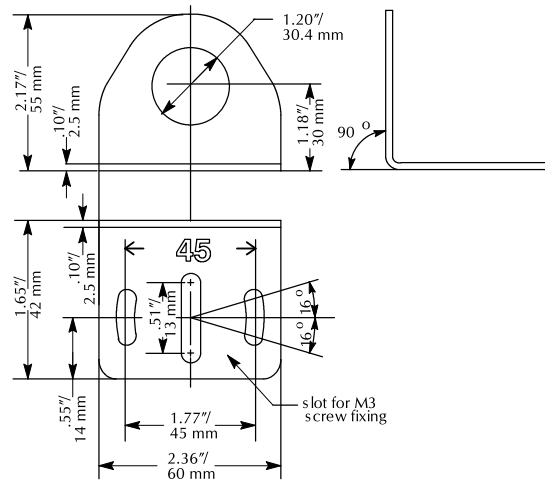
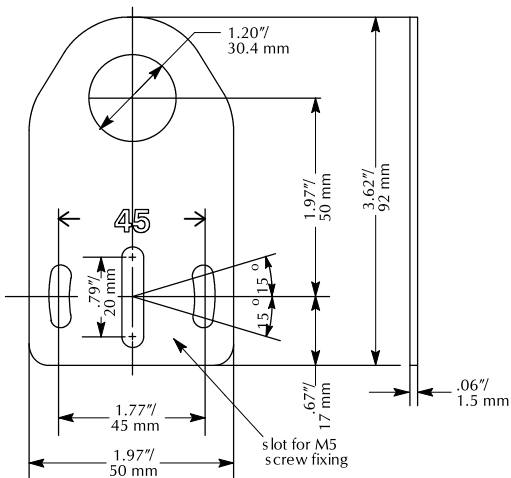
## ST30C right-angle bracket

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



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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.

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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

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