

# C18 Series Photoelectric Sensors

## M18 (18 mm) metal – DC



- 36 models available
- Diffuse, Polarized reflective, Through-beam, and Diffuse with background suppression models
- Long operating distances
- Scratch resistant and easy-to-clean glass lens
- Adjustable sensitivity (diffuse models only)
- Axial cable or 12 mm quick-disconnect models
- Complete overload protection
- IP67 rated



### C18 Series Photoelectric Sensor Selection Chart

Part Number	Price	Sensing Range	Output State	Optics	Logic	Connection	Wiring	Dimensions	Characteristic Curves
<b>Diffuse</b>									
<b>C18D-ON-1A</b>	\$41.00	Up to 600 mm (23.62 in)	1 N.O. and 1 N.C.	Axial	NPN	2 m (6.5') axial cable	Diagram 3	Figure 1	Chart 5
<b>C18D-OP-1A</b>	\$41.00		1 N.O. and 1 N.C..	Axial	PNP	2 m (6.5') axial cable	Diagram 4	Figure 1	Chart 5
<b>C18D-ON-1E</b>	\$41.00		1 N.O. and 1 N.C.	Axial	NPN	M12 (12 mm) connector	Diagram 3	Figure 2	Chart 5
<b>C18D-OP-1E</b>	\$41.00		1 N.O. and 1 N.C.	Axial	PNP	M12 (12 mm) connector	Diagram 4	Figure 2	Chart 5
<b>C18D-ON-2A</b>	\$36.25		1 N.O. and 1 N.C..	Right-angle	NPN	2 m (6.5') axial cable	Diagram 3	Figure 3	Chart 6
<b>C18D-OP-2A</b>	\$54.00		1 N.O. and 1 N.C.	Right-angle	PNP	2 m (6.5') axial cable	Diagram 4	Figure 3	Chart 6
<b>C18D-ON-2E</b>	\$54.00		1 N.O. and 1 N.C.	Right-angle	NPN	M12 (12 mm) connector	Diagram 3	Figure 4	Chart 6
<b>C18D-OP-2E</b>	\$54.00		1 N.O. and 1 N.C..	Right-angle	PNP	M12 (12 mm) connector	Diagram 4	Figure 4	Chart 6
<b>Diffuse with background suppression</b>									
<b>C18B-AN-1A</b>	\$67.00	10-120 mm (0.39 to 4.72 in)	N.O.	Axial	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1	Chart 1
<b>C18B-AP-1A</b>	\$67.00			Axial	PNP	2 m (6.5') axial cable	Diagram 2	Figure 1	Chart 1
<b>C18B-AN-1E</b>	\$67.00			Axial	NPN	M12 (12 mm) connector	Diagram 1	Figure 2	Chart 1
<b>C18B-AP-1E</b>	\$67.00			Axial	PNP	M12 (12 mm) connector	Diagram 2	Figure 2	Chart 1
<b>C18B-AN-2A</b>	\$71.75	10-120 mm (0.39 to 4.72 in)	N.O.	Right-angle	NPN	2 m (6.5') axial cable	Diagram 1	Figure 3	Chart 2
<b>C18B-AP-2A</b>	\$104.00			Right-angle	PNP	2 m (6.5') axial cable	Diagram 2	Figure 3	Chart 2
<b>C18B-AN-2E</b>	\$104.00			Right-angle	NPN	M12 (12 mm) connector	Diagram 1	Figure 4	Chart 2
<b>C18B-AP-2E</b>	\$104.00			Right-angle	PNP	M12 (12 mm) connector	Diagram 2	Figure 4	Chart 2
<b>Polarized reflective *Purchase reflectors separately.</b>									
<b>C18P-AN-1A</b>	\$43.50	Up to 2 m (6.6 ft)	N.O.	Axial	NPN	2 m (6.5') axial cable	Diagram 1	Figure 1	Chart 3
<b>C18P-AP-1A</b>	\$43.50			Axial	PNP	2 m (6.5') axial cable	Diagram 2	Figure 1	Chart 3
<b>C18P-AN-1E</b>	\$43.50			Axial	NPN	M12 (12 mm) connector	Diagram 1	Figure 2	Chart 3
<b>C18P-AP-1E</b>	\$43.50			Axial	PNP	M12 (12 mm) connector	Diagram 2	Figure 2	Chart 3
<b>C18P-AN-2A</b>	\$57.00	Up to 2 m (6.6 ft)	N.O.	Right-angle	NPN	2 m (6.5') axial cable	Diagram 1	Figure 3	Chart 4
<b>C18P-AP-2A</b>	\$57.00			Right-angle	PNP	2 m (6.5') axial cable	Diagram 2	Figure 3	Chart 4
<b>C18P-AN-2E</b>	\$57.00			Right-angle	NPN	M12 (12 mm) connector	Diagram 1	Figure 4	Chart 4
<b>C18P-AP-2E</b>	\$57.00			Right-angle	PNP	M12 (12 mm) connector	Diagram 2	Figure 4	Chart 4
<b>Through-beam **Purchase one receiver and one emitter for a complete set.</b>									
<b>C18R-ON-1A</b>	\$38.00	Up to 6 m (19.7 ft)	1 N.O. and 1 N.C.	Axial	NPN	2 m (6.5') axial cable	Diagram 3	Figure 1	Chart 7
<b>C18R-OP-1A</b>	\$38.00			Axial	PNP	2 m (6.5') axial cable	Diagram 4	Figure 1	Chart 7
<b>C18R-ON-1E</b>	\$38.00			Axial	NPN	M12 (12 mm) connector	Diagram 3	Figure 2	Chart 7
<b>C18R-OP-1E</b>	\$38.00			Axial	PNP	M12 (12 mm) connector	Diagram 4	Figure 2	Chart 7
<b>C18E-00-1A</b>	\$28.00	Receiver dependent	Receiver dependent	Axial	Receiver dependent	2 m (6.5') axial cable	Diagram 5	Figure 5	Chart 7
<b>C18E-00-1E</b>	\$28.00			Axial		M12 (12 mm) connector	Diagram 5	Figure 6	Chart 7
<b>C18R-ON-2A</b>	\$50.00	Up to 6 m (19.7 ft.)	1 N.O. and 1 N.C.	Right-angle	NPN	2 m (6.5') axial cable	Diagram 3	Figure 3	Chart 8
<b>C18R-OP-2A</b>	\$50.00			Right-angle	PNP	2 m (6.5') axial cable	Diagram 4	Figure 3	Chart 8
<b>C18R-ON-2E</b>	\$50.00			Right-angle	NPN	M12 (12 mm) connector	Diagram 3	Figure 4	Chart 8
<b>C18R-OP-2E</b>	\$41.00			Right-angle	PNP	M12 (12 mm) connector	Diagram 4	Figure 4	Chart 8
<b>C18E-00-2A</b>	\$38.00	Receiver dependent	Receiver dependent	Right-angle	Receiver dependent	2 m (6.5') axial cable	Diagram 5	Figure 7	Chart 8
<b>C18E-00-2E</b>	\$38.00			Right-angle		M12 (12 mm) connector	Diagram 5	Figure 8	Chart 8

# C18 Series Photoelectric Sensors

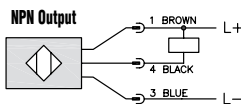
Specifications	Diffuse Models	Diffuse Models with Background Suppression	Reflective Models	Through-beam Models
<b>Type</b>	Diffuse	Diffuse with background suppression	Polarized reflection	Through-beam <sup>1</sup>
<b>Sensing Distance</b>	600 mm (23.62in) <sup>2</sup>	10 to 120 mm (0.39 to 4.72 in) <sup>3</sup>	2 m (6.6 ft)	6 m (19.7 ft)
<b>Emission</b>	LED red (660nm)	LED red (660nm)	LED red polarized (660 nm)	LED red (660nm)
<b>Light Spot Diameter</b>	See charts			
<b>Sensitivity</b>	Adjustable one-turn pot.			—
<b>Output Type</b>	NPN or PNP; 1 L.O. and 1 D.O.	NPN or PNP; L.O. only	NPN or PNP; D.O. only	NPN or PNP; 1 L.O. and 1 D.O.
<b>Operating Voltage</b>	10-36 VDC			
<b>No Load Supply Current</b>	20 mA	25 mA	15 mA	Receiver: 10 mA Emitter: 15 mA
<b>Operating (Load) Current</b>	≤200 mA			
<b>Off-state (Leakage) Current</b>	≤10μ A			
<b>Voltage Drop</b>	≤2.0 V			
<b>Switching Frequency</b>	1kHz	500Hz	1kHz	1kHz
<b>Ripple</b>	≤20%			
<b>Time Delay Before Availability (tv)</b>	60ms	20ms	20ms	20ms
<b>Short-Circuit Protection</b>	Yes (switch autoresets after overload is removed)			
<b>Operating Temperature Range</b>	-25° to +55°C (-13° to 131°F)			
<b>Protection Degree (DIN 40050)</b>	IEC IP67			
<b>LED Indicators - Switching Status</b>	Yellow (output state, output energized), green (excess light indication). Emitter has no LED			
<b>Housing Material</b>	Chrome-plated brass			
<b>Lens Material</b>	Glass			
<b>Shock/Vibration</b>	See terminology section			
<b>Tightening Torque</b>	50 Nm (36.88 lb-ft)			
<b>Weight</b>	65.22 g (2.3 oz).			
<b>Connectors</b>	2m (6.5') axial cable; M12 (12mm) connector			
<b>Agency Approvals</b>	UL file E328811			

Notes: <sup>1</sup>Through-beam sensors must be used in pairs consisting of one receiver and one emitter. <sup>2</sup>With 200x200mm white matte paper. <sup>3</sup>With 100x100mm white matte paper.

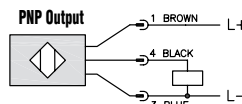
## Wiring diagrams

**Warning: These products are not safety sensors and are not suitable for use in personal safety applications.**

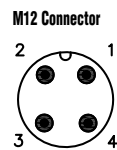
**Diagram 1**



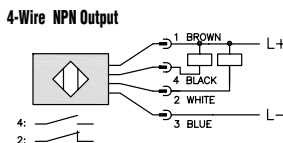
**Diagram 2**



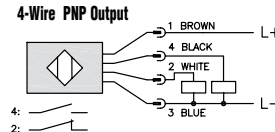
**Connector**



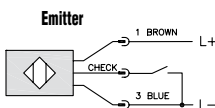
**Diagram 3**



**Diagram 4**



**Diagram 5**



Emitter test input (<4V: OFF / >8V or open: ON) 0.5mA

Switching Element Function		
	Thru-beam and Reflective Models	Diffuse Models
<b>Light on</b>	N.C.	N.O.
<b>Dark on</b>	N.O.	N.C.

# C18 Series Photoelectric Sensors

## Dimensions

(mm)

Figure 1

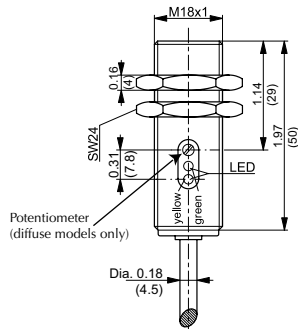


Figure 2

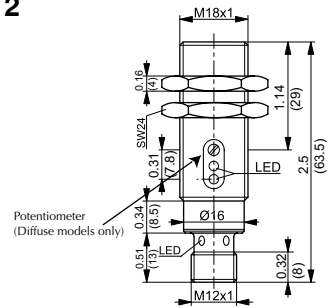


Figure 3

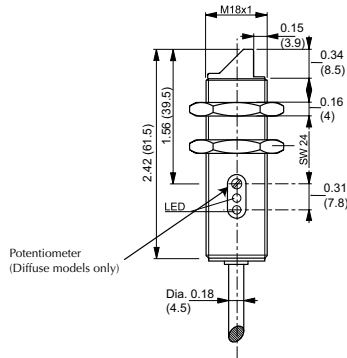


Figure 4

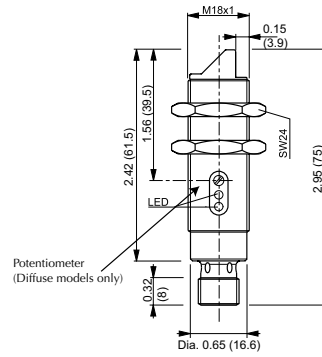


Figure 5

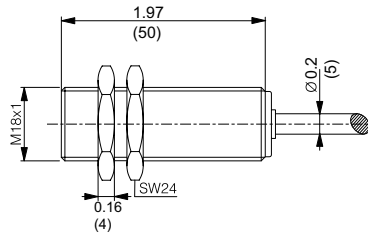


Figure 6

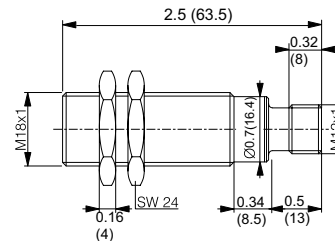


Figure 7

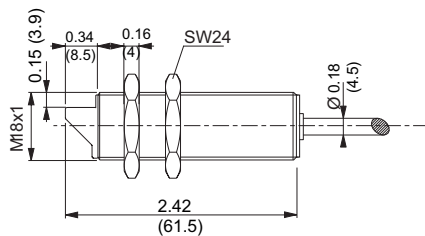
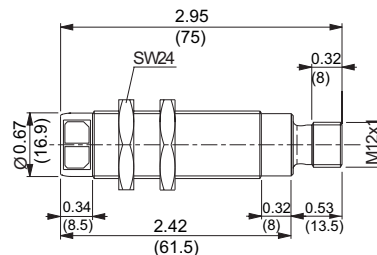


Figure 8

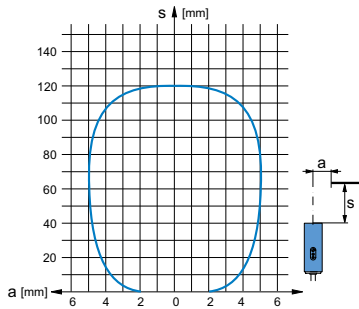


Note: Dimensions are in inches (millimeters).

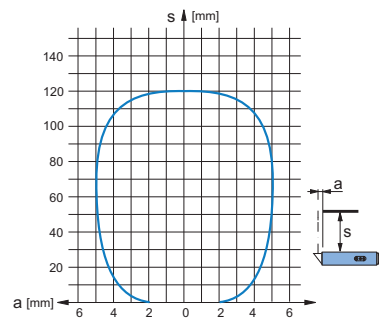
# C18 Series Photoelectric Sensors

## Characteristic Curves

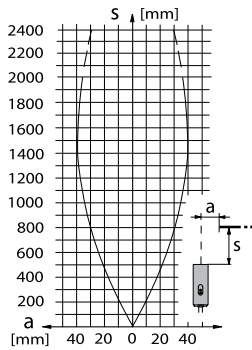
**Chart 1 (Diffuse with background suppression C18B-\*-1\*)**



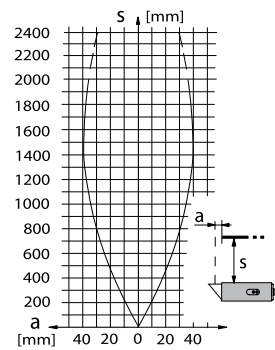
**Chart 2 (Diffuse with Background Suppression C18B-\*-2\*)**



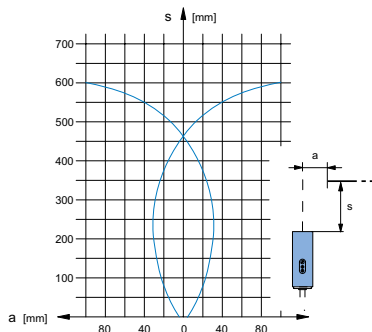
**Chart 3 (Polarized reflective C18P-\*-1\*)**



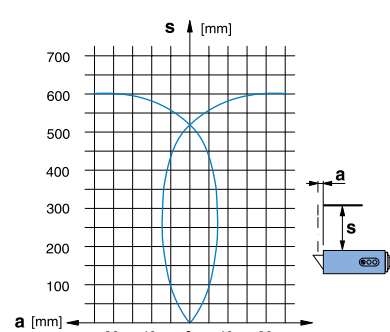
**Chart 4 (Polarized reflective C18P-\*-2\*)**



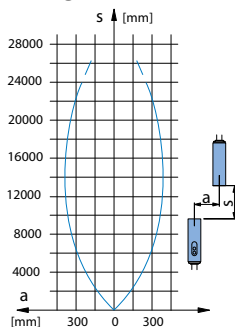
**Chart 5 (Diffuse c18D-\*-1\*)**



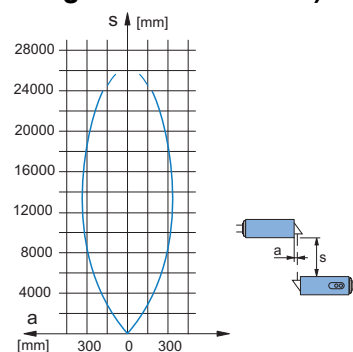
**Chart 6 (Diffuse c18D-\*-2\*)**



**Chart 7 (Through-beam C18R-\*-1\*)**



**Chart 8 (Through-beam C18R-\*-2\*)**



# Accessories for 18mm Sensors

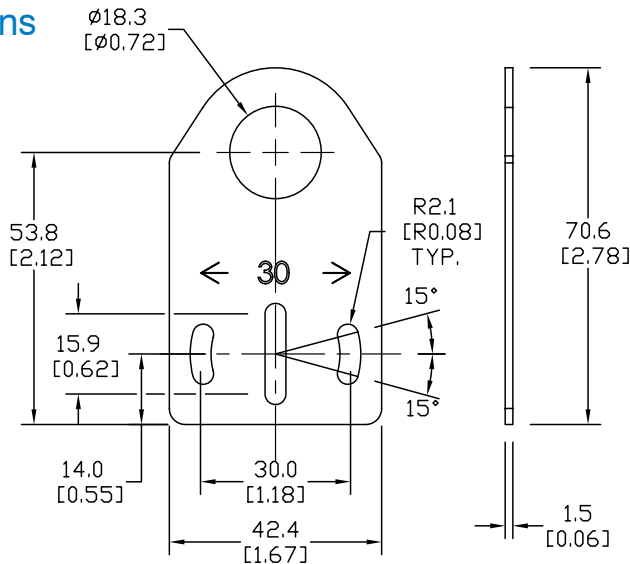
## Axial Mounting Bracket

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

Accessories for 18mm Sensors			
Part Number	Price	Description	Weight [lb]
ST18A	\$1.25	Mounting bracket, axial, zinc-plated steel. For use with 18mm sensors. 1/pk.	0.06
ST18A7W	\$6.00	Mounting bracket, axial, 316L stainless steel. For use with 18mm sensors. 1/pk.	0.06

### Dimensions

mm [inches]



ST18A

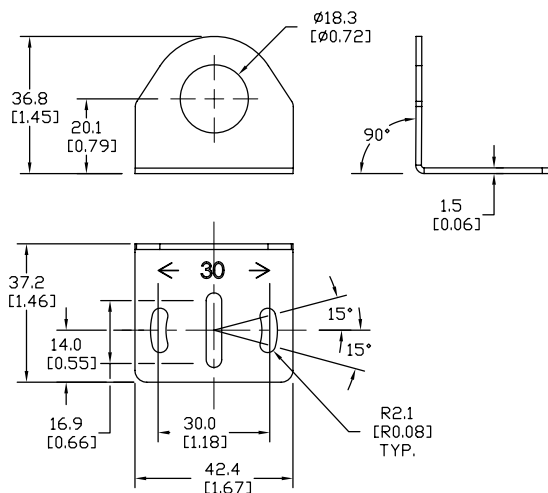
## Right-angle Mounting Bracket

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

Accessories for 18mm Sensors			
Part Number	Price	Description	Weight [lb]
ST18C	\$1.25	Mounting bracket, right angle, zinc-plated steel. For use with 18mm sensors. 1/pk.	0.06
ST18C7W	\$6.00	Mounting bracket, right angle, 316L stainless steel. For use with 18mm sensors. 1/pk.	0.06

### Dimensions

mm [inches]



ST18C

See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings

# Accessories for 18mm Sensors

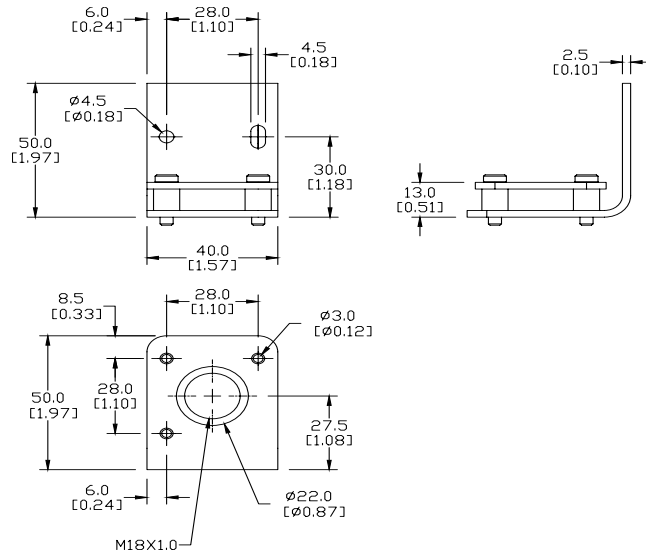
## Right-angle Fine Tune Mounting Bracket

Mounting bracket, right-angle, fine tune vertical and horizontal adjustment, nickel-plated steel. For use with 18mm sensors. Allows for fine tuning vertical and horizontal placement.

Accessories for 18mm Sensors			
Part Number	Price	Description	Weight [lb]
OPT2036	\$30.00	Mounting bracket, right-angle, fine tune vertical and horizontal adjustment, nickel-plated steel. For use with 18mm sensors.	0.02

### Dimensions

mm [inches]



OPT2036

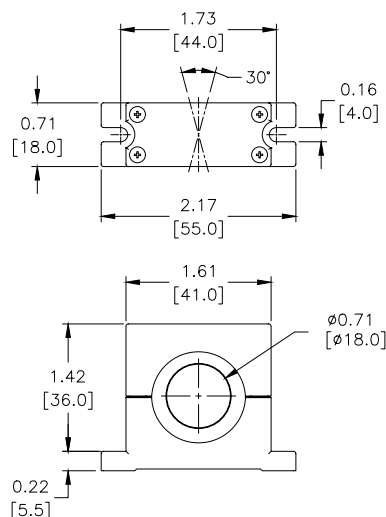
## Swivel Mounting Bracket

Mounting bracket, ball swivel, plastic. For use with 18mm sensors. Has a ball-joint and set screws to adjust sensor orientation. Allows angular orientation up to 15 degrees (from center) in all directions for photoelectric sensors (Will not work with C18 series).

Accessories for 18mm Sensors			
Part Number	Price	Description	Weight [lb]
ST02	\$8.25	Mounting bracket, ball swivel, plastic. For use with 18mm sensors.	0.06

### Dimensions

mm [inches]



ST02

See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings

# Accessories for 18mm Sensors

## Right-angle Mounting Brackets

Mounting bracket, right-angle, fixed insertion stop adjustment, plastic. For use with 18mm sensors. Available with or without fixed insertion stop.

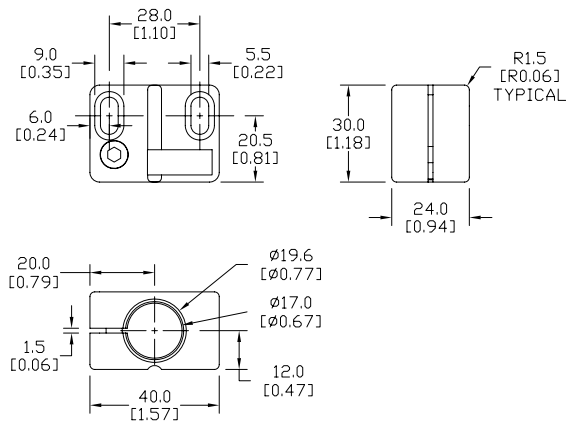
Accessories for 18mm Sensors				
Part Number	Price	Description	Weight [lb]	
<b>OPT2104</b>	\$8.00	Mounting bracket, right-angle, fixed insertion stop adjustment, plastic. For use with 18mm sensors.	0.06	
<b>OPT2105</b>	\$8.00	Mounting bracket, right-angle, plastic. For use with 18mm sensors.	0.06	



**OPT2104, OPT2105**

## Dimensions

mm [inches]



## Right-angle Swivel Mounting Systems

Mounting bracket, right-angle swivel, 360 degree vertical and horizontal adjustment, 12mm rod mount. For use with 18mm sensors. Available in all 304 stainless steel or with an aluminum head and a stainless steel mounting plate.

Accessories for 18mm Sensors					
Part Number	Price	Description	Mounting Head	Mounting Plate	Weight [lb]
<b>OPT2116</b>	\$9.00	Mounting bracket, right-angle swivel, 360 vertical and horizontal adjustment, aluminum, 12mm rod mount. For use with 18mm sensors.	Aluminum	304 Stainless Steel	0.15
<b>OPT2117</b>	\$16.00	Mounting bracket, right-angle swivel, 360 vertical and horizontal adjustment, 304 stainless steel, 12mm rod mount. For use with 18mm sensors.	304 Stainless Steel	304 Stainless Steel	0.28

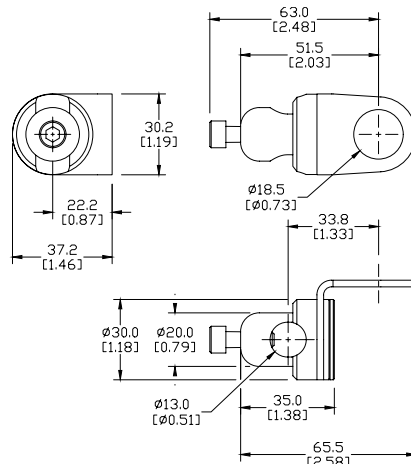
**Note: 304 Stainless steel mounting rods sold separately: OPT2109 (200mm length), OPT2110 (300mm length), and OPT2111 (500mm length).**



**OPT2116, OPT2117**

## Dimensions

mm [inches]



See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings

# Mounting Rods

## Mounting Rods

304 Stainless steel rods for mounting swivel brackets OPT2112 - OPT2127. Available in three lengths: 200mm, 300mm, and 500mm. 12mm diameter.

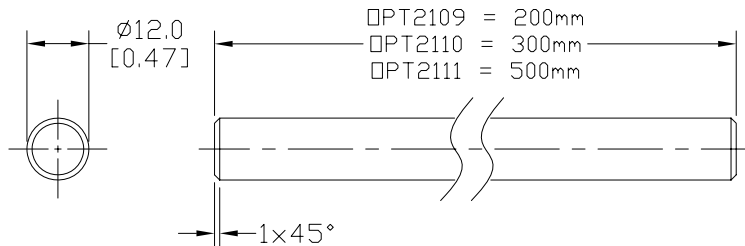
Mounting Rods for OPT2112-2127 Swivel Mounting Brackets			
Part Number	Price	Description	Weight [lb]
<b>OPT2109</b>	\$10.00	Mounting rod, 12mm diameter, 200mm length, 304 stainless steel.	0.41
<b>OPT2110</b>	\$12.00	Mounting rod, 12mm diameter, 300mm length, 304 stainless steel.	0.60
<b>OPT2111</b>	\$16.00	Mounting rod, 12mm diameter, 500mm length, 304 stainless steel.	0.98



**OPT2109, OPT2110, OPT2111**

## Dimensions

mm [inches]



## Right-angle Mounting Bracket

Mounting bracket, right-angle, nickel-plated brass. For use with 12mm mounting rods OPT2109, OPT2110 & OPT2111.

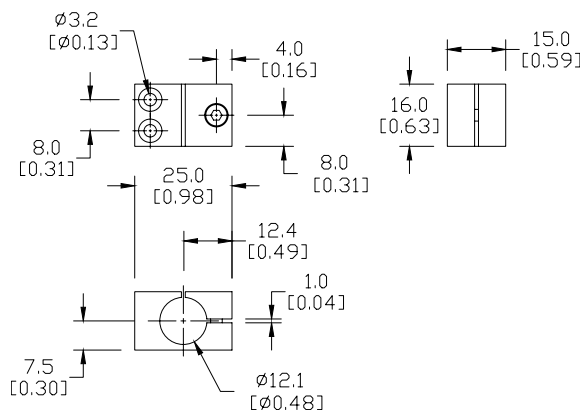
Accessories for 12mm Sensors			
Part Number	Price	Description	Weight [lb]
<b>OPT2108</b>	\$12.00	Mounting bracket, right-angle, nickel-plated brass. For use with 12mm mounting rods OPT2109, OPT2110 & OPT2111.	0.07



**OPT2108**

## Dimensions

mm [inches]



See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings



# Reflectors

## RL Series Reflectors for Polarized Reflective Photoelectric Sensors (All Models)

- Suitable for use with polarized light photoelectric sensors
- Shapes and sizes for most applications
- Miniature types for close mounting in multiple sensor installations
- Single hole, dual hole and self-adhesive mounting types available
- Single and 10-packs available

### Installation Notes

- Keep the reflector surface clean to ensure peak detection performance. This is especially true when the maximum sensing range is being used. Clean using a damp cloth.
- When selecting a reflector, it is important to consider the ambient conditions it will be exposed to. Dusty or high humidity conditions may reduce the sensing range as much as 90%.
- Reflectors should be positioned at a 90° angle to the optical axis with a tolerance of ±15°.



Specifications							
Model	Price	Quantity	Dimensions	Degree of Protection	Mounting	Materials	
RL102	\$35.00	10 per pack	25mm [0.98 in]	IEC IP67	Customer-supplied adhesive or other mounting method required	Reflective face: PMMA Polymethylmethacrylate (acrylic)  Base material: ABS (Acrylonitrile-butadiene-styren)	
RL102-1	\$3.75	1 per pack					
RL103	\$40.00	10 per pack	34.5 mm [1.36 in]				
RL103-1	\$4.25	1 per pack					
RL104	\$40.00	10 per pack	46mm [1.81 in]				
RL104-1	\$4.25	1 per pack					
RL105 *	\$35.00	10 per pack	90 x 40 mm [3.54 x 1.58 in]		Two 4.3 mm holes		
RL105-1 *	\$3.75	1 per pack					
RL105G *	\$35.00	10 per pack	95 x 38 mm [3.74 x 1.50 in]				
RL105G-1 *	\$3.75	1 per pack					
RL106G	\$40.00	10 per pack	182 x 42 mm [7.17 x 1.65 in]		Two 6mm holes		
RL106G-1	\$4.25	1 per pack					
RL110	\$18.00	10 per pack	84mm [3.31 in]		One 5mm hole		
RL110-1	\$2.00	1 per pack					
RL116	\$18.00	10 per pack	41 x 60 mm [3.54 x 2.36 in]		Two 3mm holes		
RL116-1	\$2.00	1 per pack					
RL100DA4	\$32.50	1 per pack	200 x 300 mm [7.87 x 11.81 in]		Self-adhesive		Paper (Acrylic tape with micro prism)
RL100DC4	\$10.00	1 per pack	50 x 300 mm [1.97 x 11.81 in]				
RL100DQ1	\$7.50	1 per pack	100 x 100 mm [3.94 x 3.94 in]				
RL111G	\$52.00	10 per pack	22.5 x 47 mm [0.89 x 21.85 in]		Two 3mm slots		Reflective face: PMMA Polymethylmethacrylate (acrylic)  Base material: ABS (Acrylonitrile-butadiene-styren)
RL111G-1	\$6.00	1 per pack					
RL112G	\$40.00	10 per pack	19 x 73 mm [0.75 x 2.87 in]				
RL112G-1	\$4.25	1 per pack					
RL113G	\$46.00	10 per pack	51.4 x 60.3 mm [2.02 x 2.37 in]	Two 4mm slots			
RL113G-1	\$5.00	1 per pack					

*Not recommended for applications involving moist air environments or water immersion.*

\* Note: RL105 and RL105-1 reflectors are being replaced by the RL105G and RL105G-1 models, and will no longer be available once our current stock is depleted.

The new reflectors function the same but the dimensions are slightly different. Compare the outside dimensions shown in this table and the dimensional drawings on the next page.

# Reflectors

## RL Series Reflectors for Polarized Reflective Laser Photoelectric Sensors (FALN series)

- Suitable for use with polarized light laser photoelectric sensors
- Sizes for most applications
- Miniature types for close mounting in multiple sensor installations
- Single and 5-packs available

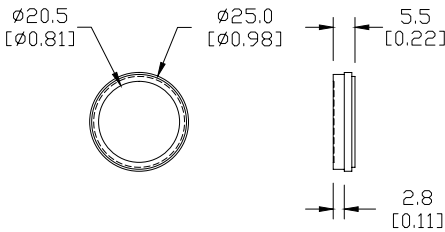
Specifications						
Model	RL201	RL201-1	RL203	RL203-1	RL204	RL204-1
Price	\$32.00	\$7.00	\$30.00	\$6.50	\$26.00	\$5.75
Quantity (per package)	5	1	5	1	5	1
Dimensions	60 x 82 mm 2.36 x 3.23 in		19 x 6mm 0.75 x 2.36 in		20mm x 32mm 0.80 in x 1.26 in	
Degree of Protection <sup>1</sup>	IEC IP67					
Mounting	Two 0.4 mm holes		Two 0.4 mm holes		Two 0.3 mm holes	
Materials	Acrylic/polycarbonate					

<sup>1</sup> Not recommended for applications involving moist air environments or water immersion.

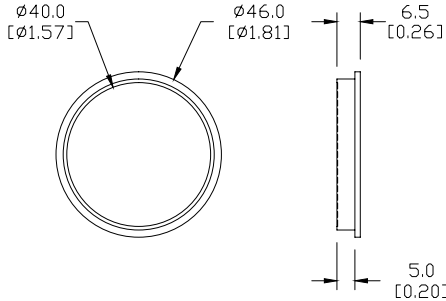
## Dimensions

mm [inches]

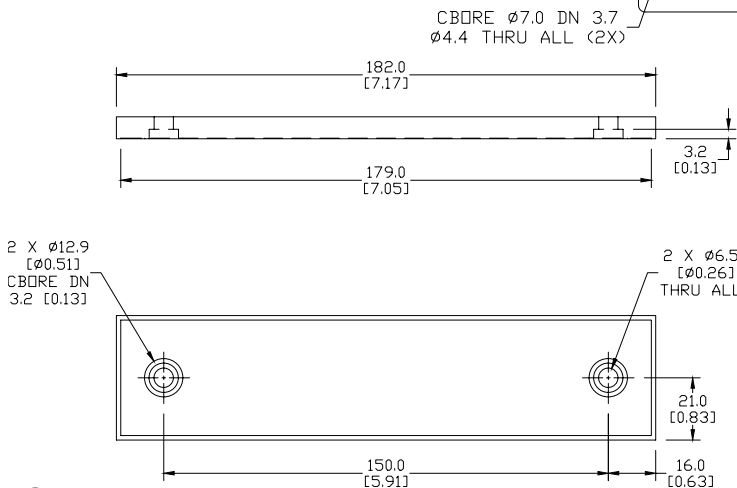
### RL102/RL102-1



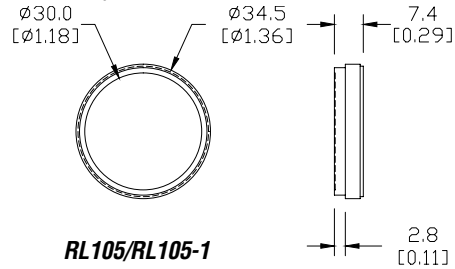
### RL104/RL104-1



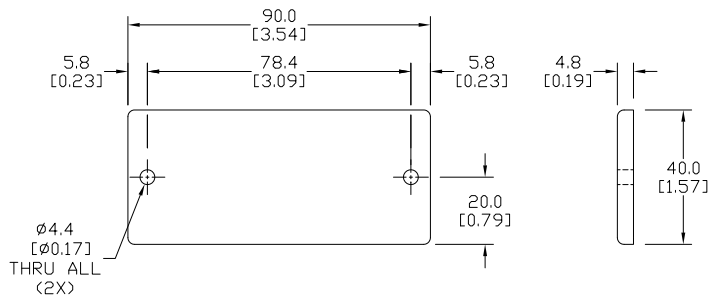
### RL106G/RL106G-1



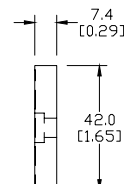
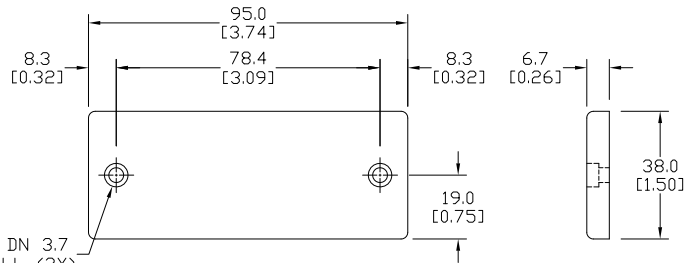
### RL103/RL103-1



### RL105/RL105-1



### RL105G/RL105G-1



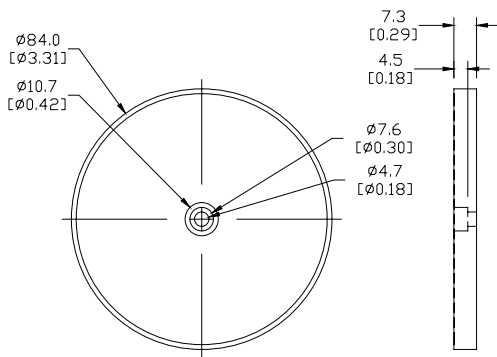
See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings

# Reflectors

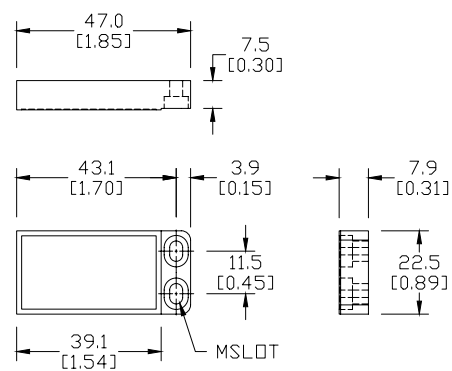
## Dimensions

mm [inches]

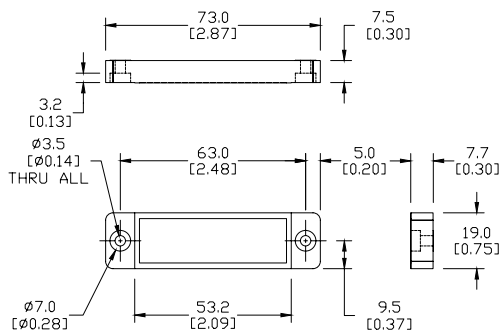
**RL110/RL110-1**



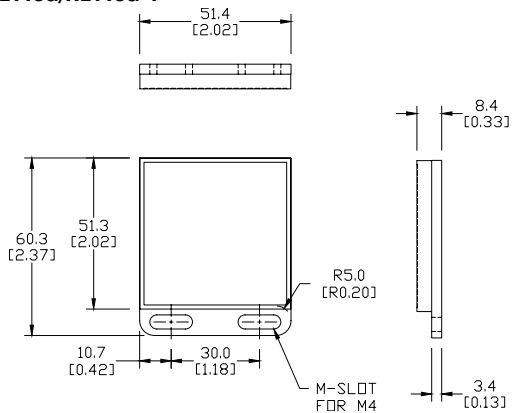
**RL111G/RL111G-1**



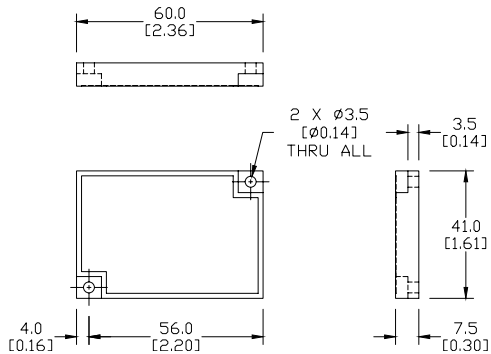
**RL112G/RL112G-1**



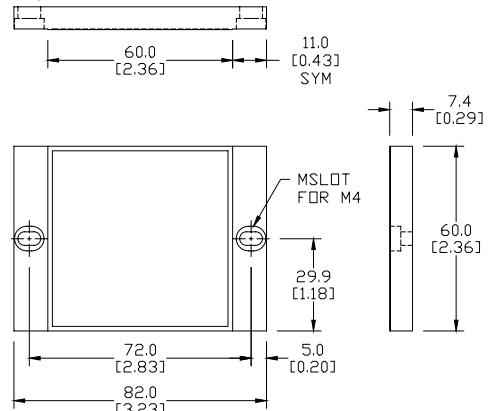
**RL113G/RL113G-1**



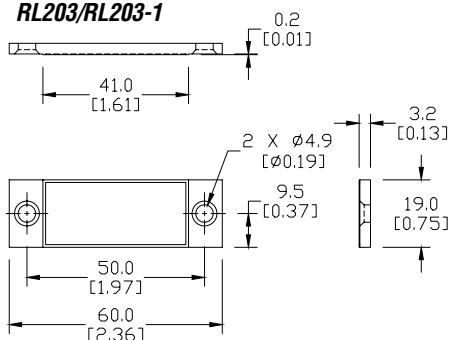
**RL116/RL116-1**



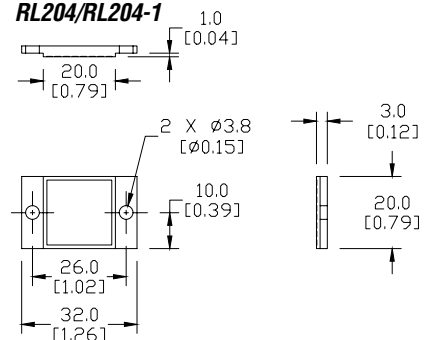
**RL201/RL201-1**



**RL203/RL203-1**



**RL204/RL204-1**



See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings