

# DM Series Photoelectric Sensors

## M12 (12 mm) metal with Teach function - DC



- 18 models available
- Metal housing
- Teach function available on diffuse and polarized reflective models
- Adjustable sensitivity on through-beam models
- Axial cable or M12 quick-disconnect models
- Multifunction LED status indicator
- Operates on 10-30 VDC
- IP67 rated

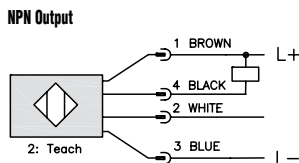


DM Series Photoelectric Sensors Selection Chart											
Part Number	Price	Sensing Range	Output State	Logic	Connection	Wiring	Dimensions	Characteristic Curves			
<b>Diffuse</b>											
<b>DM3-ON-1A</b>	\$40.00	Up to 100mm (3.9 in.)	NO + NC Selectable	NPN	2m (6.5) axial cable	Diagram 1	Figure 1	Chart 1			
<b>DM3-OP-1A</b>	\$40.00			PNP	2m (6.5) axial cable	Diagram 2	Figure 1	Chart 1			
<b>DM3-ON-1H</b>	\$40.00			NPN	M12 (12mm) connector	Diagram 1	Figure 2	Chart 1			
<b>DM3-OP-1H</b>	\$40.00			PNP	M12 (12mm) connector	Diagram 2	Figure 2	Chart 1			
<b>DM7-ON-1A</b>	\$40.00	Up to 300mm (11.8 in.)	NO + NC Selectable	NPN	2m (6.5) axial cable	Diagram 1	Figure 1	Chart 2			
<b>DM7-OP-1A</b>	\$40.00			PNP	2m (6.5) axial cable	Diagram 2	Figure 1	Chart 2			
<b>DM7-ON-1H</b>	\$40.00			NPN	M12 (12mm) connector	Diagram 1	Figure 2	Chart 2			
<b>DM7-OP-1H</b>	\$40.00			PNP	M12 (12mm) connector	Diagram 2	Figure 2	Chart 2			
<b>Polarized reflective*</b>											
<b>DMP-ON-1A</b>	\$47.00	Up to 2m (6.6 ft)	NO + NC Selectable	NPN	2m (6.5) axial cable	Diagram 1	Figure 1	Chart 3			
<b>DMP-OP-1A</b>	\$47.00			PNP	2m (6.5) axial cable	Diagram 2	Figure 1	Chart 3			
<b>DMP-ON-1H</b>	\$47.00			NPN	M12 (12mm) connector	Diagram 1	Figure 2	Chart 3			
<b>DMP-OP-1H</b>	\$47.00			PNP	M12 (12mm) connector	Diagram 2	Figure 2	Chart 3			
<b>Through-beam**</b>											
<b>DMR-ON-1A</b>	Receiver	\$34.00	Up to 4m (13.1 ft)	NO + NC Selectable	NPN	2m (6.5) axial cable	Diagram 1	Figure 1	Chart 4		
<b>DMR-OP-1A</b>	Receiver	\$34.00			PNP	2m (6.5) axial cable	Diagram 2	Figure 1	Chart 4		
<b>DMR-ON-1H</b>	Receiver	\$34.00			NPN	M12 (12mm) connector	Diagram 1	Figure 2	Chart 4		
<b>DMR-OP-1H</b>	Receiver	\$34.00			PNP	M12 (12mm) connector	Diagram 2	Figure 2	Chart 4		
<b>DME-00-1A</b>	Emitter	\$28.00			Receiver dependent	2m (6.5) axial cable		Diagram 3	Figure 1	Chart 4	
<b>DME-00-1H</b>	Emitter	\$28.00				M12 (12mm) connector		Diagram 3	Figure 2	Chart 4	

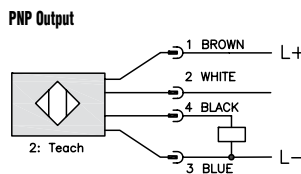
\* Purchase reflectors separately. \*\*Purchase one receiver and one emitter for a complete set.

## Wiring diagrams

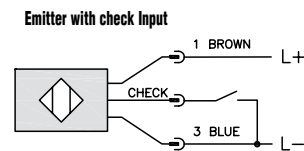
### Diagram 1



### Diagram 2



### Diagram 3

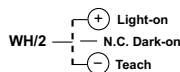


2-meter Axial Cable version: check is black  
M12 Connector: check is Pin 2 (white)

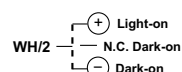
### Diffuse models



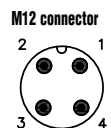
### Polarized reflective models



### Through-beam models



### Connector

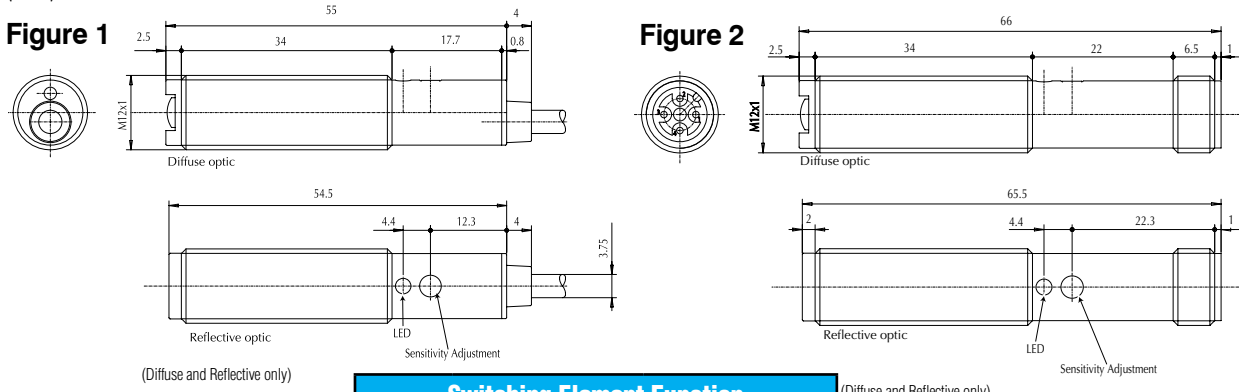


# DM Series Photoelectric Sensors

Specifications	Diffuse Models	Reflective Models	Through-Beam Models
<b>Type</b>	Diffuse reflection	Polarized reflection <sup>4</sup>	Through-beam <sup>5</sup>
<b>Sensing Distance</b>	DM3: 100mm <sup>1</sup> DM7: 300mm <sup>2</sup>	2m <sup>3</sup>	4m
<b>Light Spot Diameter</b>	DM3: 80 mm @ 100 mm DM7: 200 mm @ 300 mm	100 mm @ 2.5 m	350 mm @ 4 m
<b>Emission</b>	100mm: Infrared (880nm) 300mm: Red (660nm)	Infrared (880nm)	
<b>Sensitivity</b>	Teach function (see product data sheet for details)		Fixed
<b>Output Type</b>	NPN or PNP - Light on / Dark on selectable		
<b>Operating Voltage</b>	10-30VDC		
<b>No-load Supply Current</b>	≤20mA		
<b>Operating (Load) Current</b>	≤100mA		
<b>Off-state Leakage Current</b>	≤10μA		
<b>Voltage Drop</b>	2V max at 100mA		
<b>Switching Frequency</b>	400Hz	250Hz	
<b>Ripple</b>	≤10%		
<b>Time Delay Before Availability (tv)</b>	150ms		
<b>Short-Circuit Protection</b>	Yes, switch autoresets after load is removed		
<b>Operating Temperature</b>	-25 to +70°C (-13° to 158°F)		
<b>Protection Degree (DIN 40050)</b>	IEC IP67		
<b>LED Indicators - Switching Status</b>	Yellow		
<b>Housing Material</b>	Nickel-plated brass		
<b>Lens Material</b>	Poly methyl methacrylate (PMMA)		
<b>Shock/Vibration</b>	See terminology section		
<b>Tightening Torque</b>	10 Nm (7.37 lb-ft)		
<b>Weight</b>	Axial cable models: 54g (1.9 oz) M12 connector models: 18g (0.63 oz)		
<b>Connectors</b>	2m (6.5') axial cable; M12 (12mm) connector		
<b>Agency Approvals</b>	cULus F187310, CE		
<sup>1</sup> With 100x100mm white matte paper			
<sup>2</sup> With 200x200mm white matte paper			
<sup>3</sup> With standard Ø84mm RL110 reflector			
<sup>4</sup> Purchase reflectors separately.			
<sup>5</sup> An emitter (DME) and receiver (DMR) pair must be ordered for a complete sensor set.			

## Dimensions

(mm)

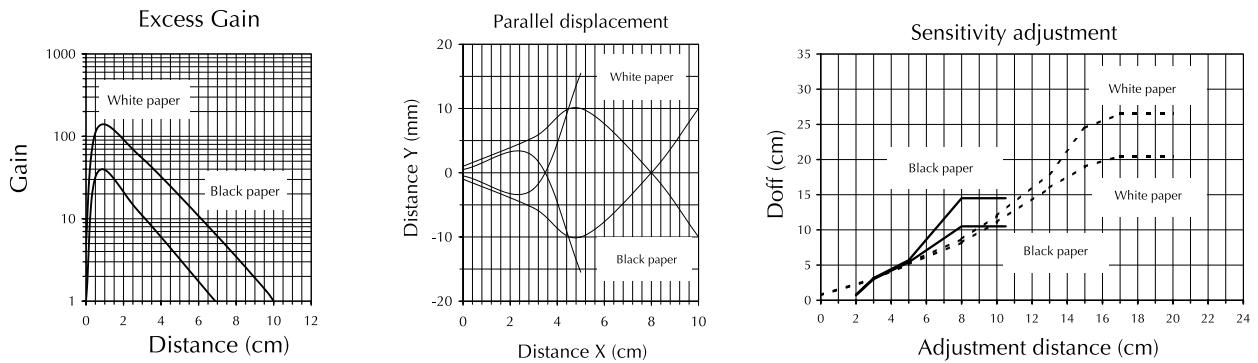


Switching Element Function		
	Thru-beam and Reflective Models	Diffuse Reflective Models
<b>Light on</b>	N.C.	N.O.
<b>Dark on</b>	N.O.	N.C.

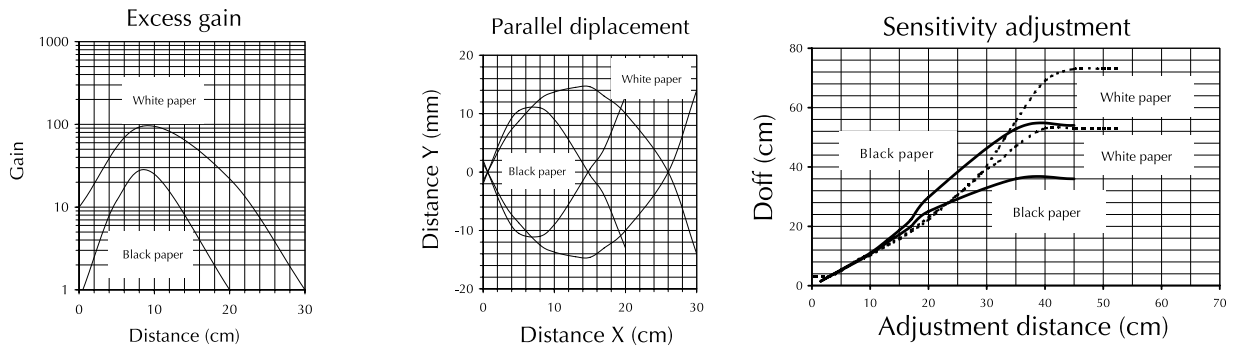
# DM Series Photoelectric Sensors

## Characteristic curves

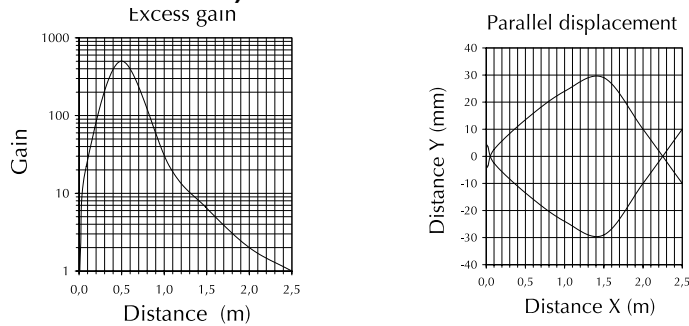
**Chart 1 (Diffuse DM3)**



**Chart 2 (Diffuse DM7)**

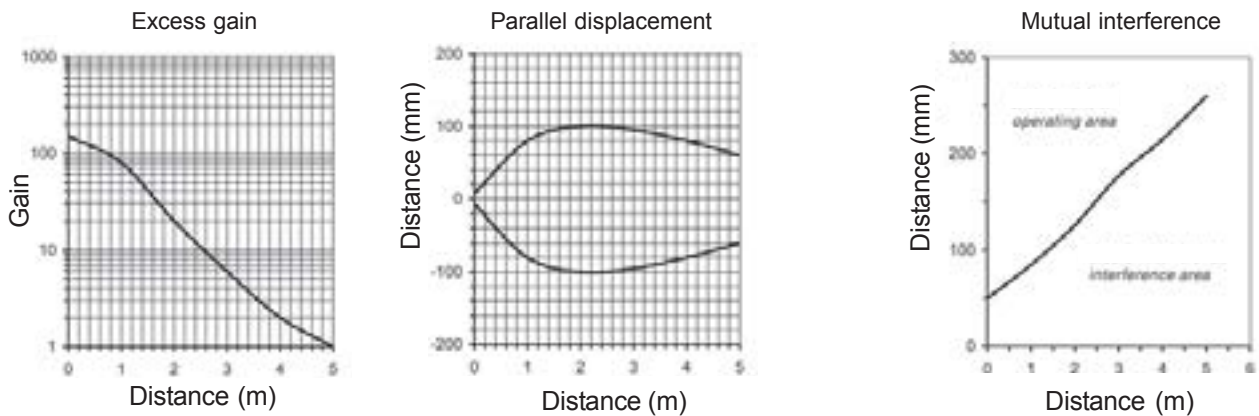


**Chart 3 (Polarized reflective)**



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

**Chart 4 (Through-beam)**



# Accessories for 12mm Sensors

## Axial Mounting Bracket

Mounting bracket, axial, zinc-plated steel. For use with 12mm sensors. Has two mounting holes (use 3mm screws) and allows the rotation of an optical axis for right-angle adapter sensors. Hexagonal nuts not included.

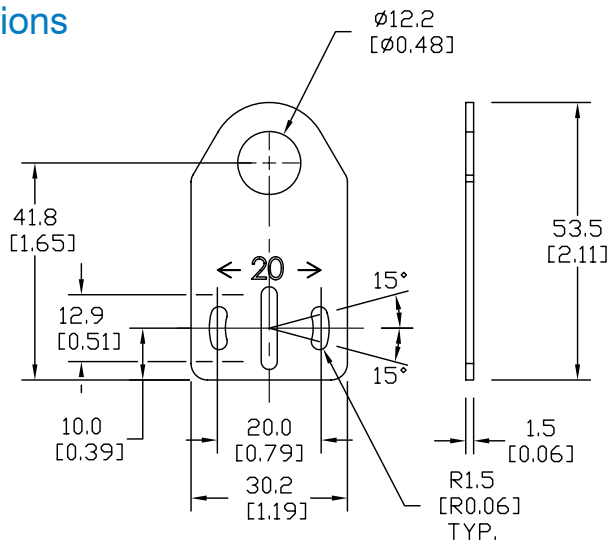
Accessories for 12mm Sensors			
Part Number	Price	Description	Weight (lb)
ST12A	\$2.00	Mounting bracket, axial, zinc-plated steel. For use with 12mm sensors. 1/pk.	0.03
ST12A7W	\$6.00	Mounting bracket, axial, 316L stainless steel. For use with 12mm sensors. 1/pk.	0.03



ST12A

### Dimensions

mm [inches]



## Right-angle Mounting Bracket

Mounting bracket, right-angle, zinc-plated steel or 316L stainless steel. For use with 12mm sensors. Has two mounting holes (use 3mm screws) and allows the rotation of an optical axis for axial sensors. Hexagonal screws not included.

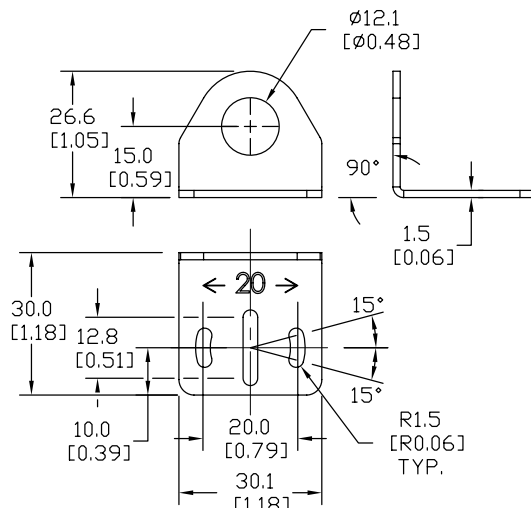
Accessories for 12mm Sensors			
Part Number	Price	Description	Weight (lb)
ST12C	\$2.00	Mounting bracket, right angle, zinc-plated steel. For use with 12mm sensors. 1/pk.	0.03
ST12C7W	\$6.00	Mounting bracket, right angle, 316L stainless steel. For use with 12mm sensors. 1/pk.	0.03



ST12C

### Dimensions

mm [inches]



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# Accessories for 12mm Sensors

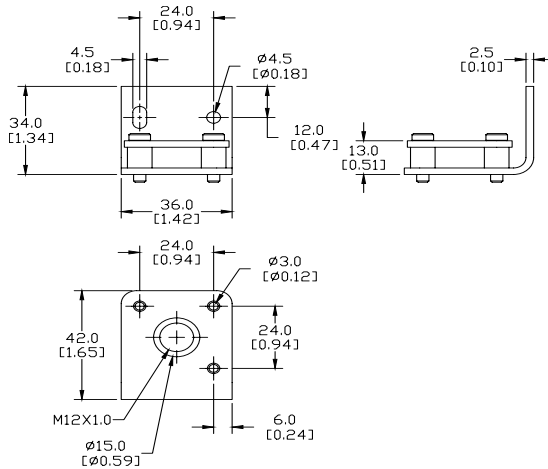
## Right-angle Fine Tune Mounting Bracket

Mounting bracket, right-angle, fine tune vertical and horizontal adjustment, nickel-plated steel. For use with 12mm sensors. Enables fine tuning vertical and horizontal placement.

Accessories for 12mm Sensors			
Part Number	Price	Description	Weight [lb]
<b>OPT2035</b>	\$30.00	Mounting bracket, right-angle, fine tune vertical and horizontal adjustment, nickel-plated steel. For use with 12mm sensors.	0.16

## Dimensions

mm [inches]



**OPT2035**

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# Accessories for 12mm Sensors

## Right-angle Mounting Brackets

Mounting bracket, right-angle, fixed insertion stop adjustment, plastic. For use with 12mm sensors. Available with or without fixed insertion stop.

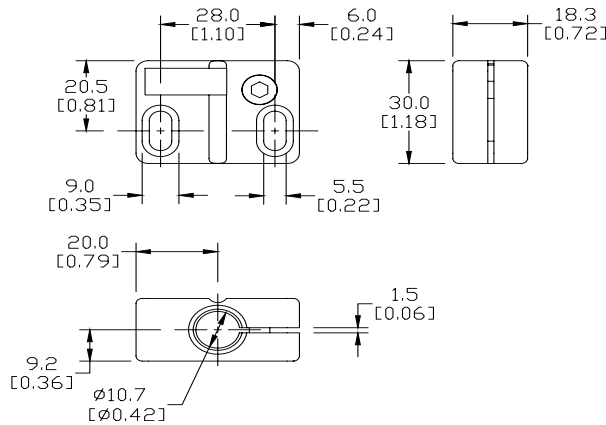
Accessories for 12mm Sensors					
Part Number	Price	Description	Mounting Head	Mounting Plate	Weight [lb]
OPT2102	\$6.00	Mounting bracket, right-angle, fixed insertion stop adjustment, plastic. For use with 12mm sensors.	Aluminum	Stainless Steel	0.14
OPT2103	\$6.00	Mounting bracket, right-angle, plastic. For use with 12mm sensors.	304 Stainless Steel	304 Stainless Steel	0.27



OPT2102, OPT2103

### 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 12mm sensors. Available in all stainless steel or with an aluminum head and stainless steel mounting plate.

Accessories for 12mm Sensors					
Part Number	Price	Description	Mounting Head	Mounting Plate	Weight [lb]
OPT2114	\$9.00	Mounting bracket, right-angle swivel, 360 vertical and horizontal adjustment, aluminum, 12mm rod mount. For use with 12mm sensors.	Aluminum	Stainless Steel	0.14
OPT2115	\$16.00	Mounting bracket, right-angle swivel, 360 vertical and horizontal adjustment, 304 stainless steel, 12mm rod mount. For use with 12mm sensors.	304 Stainless Steel	304 Stainless Steel	0.27

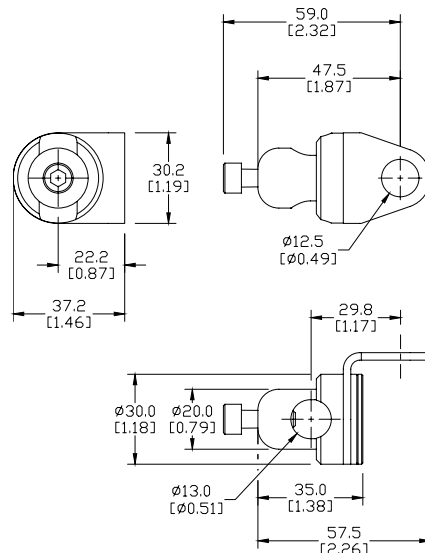
Note: 304 Stainless steel mounting rods sold separately: OPT2109 (200mm length), OPT2110 (300mm length), and OPT2111 (500mm length).



OPT2114, OPT2115

### Dimensions

mm [inches]



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# Mounting Rods

## Mounting Rods

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

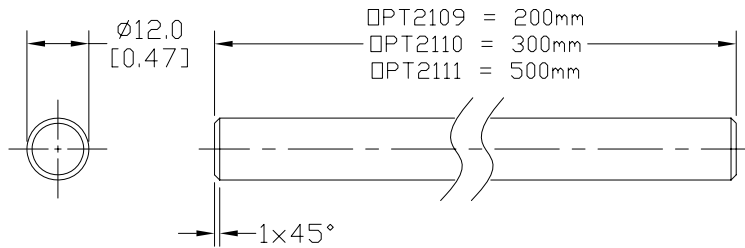
Mounting Rods for OPT2112-2127 Swivel Mounting Brackets			
Part Number	Price	Description	Weight [lb]
<b>OPT2109</b>	\$10.00	Mounting rod, 12mm diameter, 200mm length, 304 stainless steel.	0.41
<b>OPT2110</b>	\$12.00	Mounting rod, 12mm diameter, 300mm length, 304 stainless steel.	0.60
<b>OPT2111</b>	\$16.00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

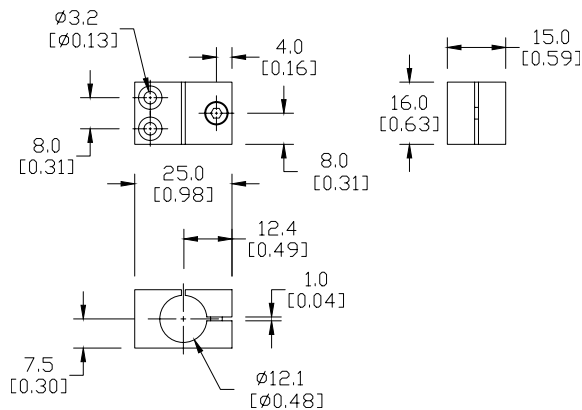
Accessories for 12mm Sensors			
Part Number	Price	Description	Weight [lb]
<b>OPT2108</b>	\$12.00	Mounting bracket, right-angle, nickel-plated brass. For use with 12mm mounting rods OPT2109, OPT2110 & OPT2111.	0.07



**OPT2108**

## Dimensions

mm [inches]



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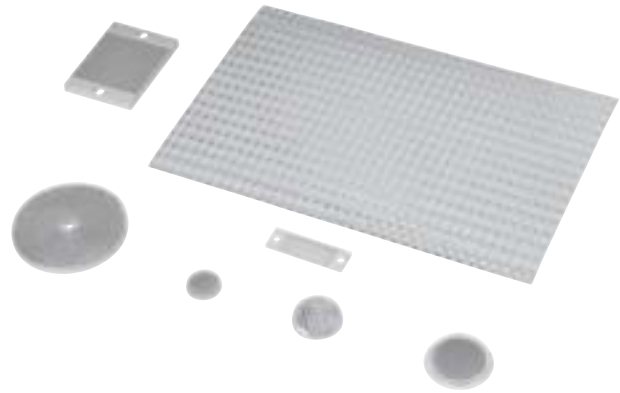
# Reflectors

## 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

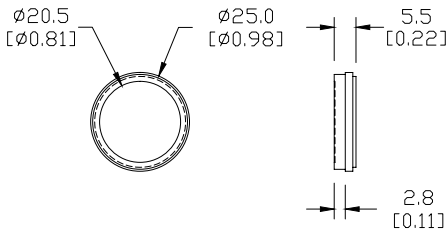
Specifications						
Model	RL201	RL201-1	RL203	RL203-1	RL204	RL204-1
Price	\$32.00	\$7.00	\$30.00	\$6.50	\$26.00	\$5.75
Quantity (per package)	5	1	5	1	5	1
Dimensions	60 x 82 mm 2.36 x 3.23 in		19 x 6mm 0.75 x 2.36 in		20mm x 32mm 0.80 in x 1.26 in	
Degree of Protection <sup>1</sup>	IEC IP67					
Mounting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

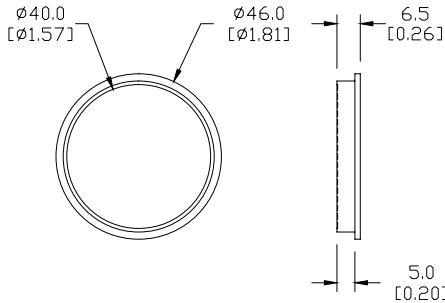
## Dimensions

mm [inches]

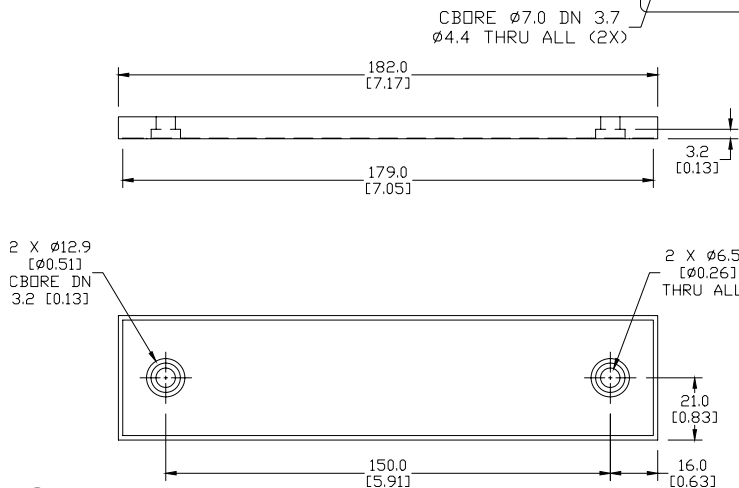
### RL102/RL102-1



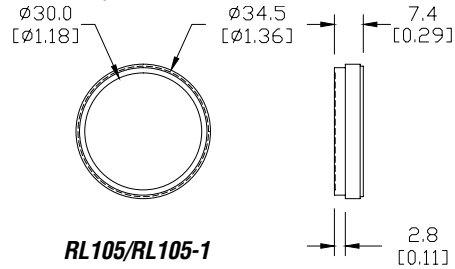
### RL104/RL104-1



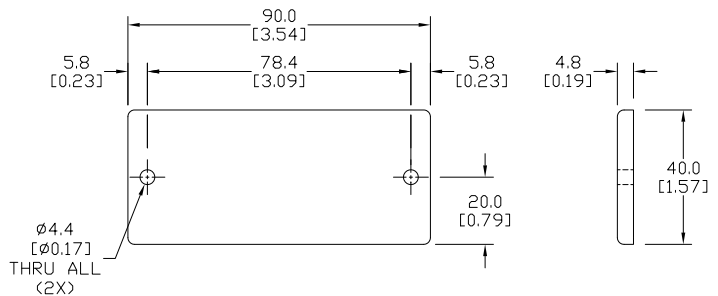
### RL106G/RL106G-1



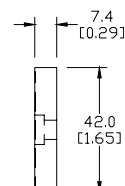
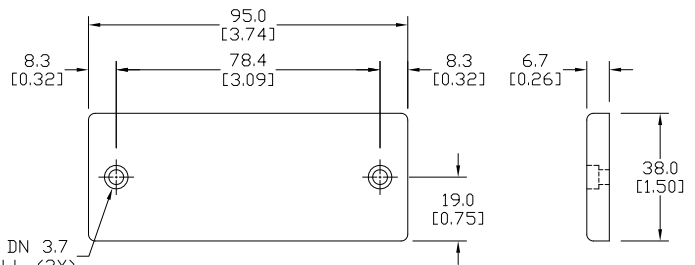
### RL103/RL103-1



### RL105/RL105-1



### RL105G/RL105G-1



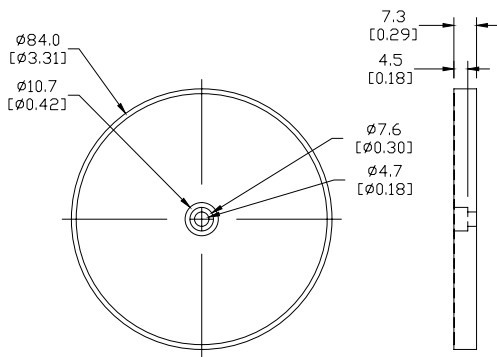
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# Reflectors

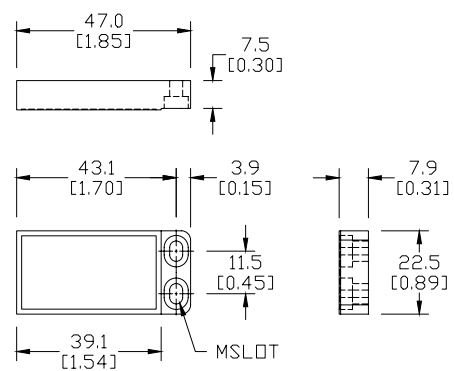
## Dimensions

mm [inches]

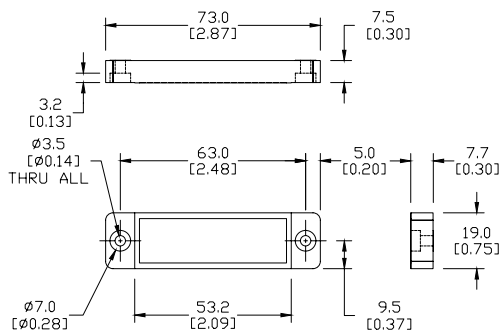
**RL110/RL110-1**



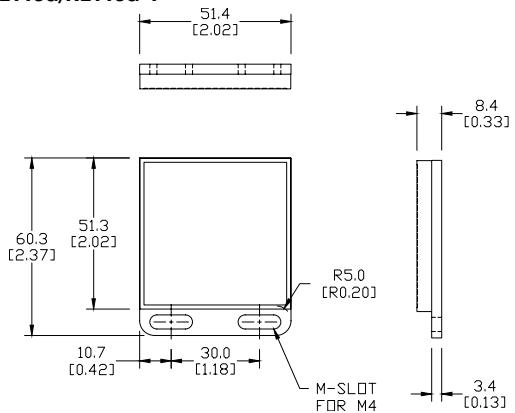
**RL111G/RL111G-1**



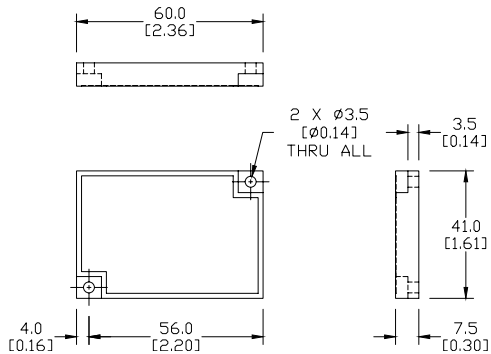
**RL112G/RL112G-1**



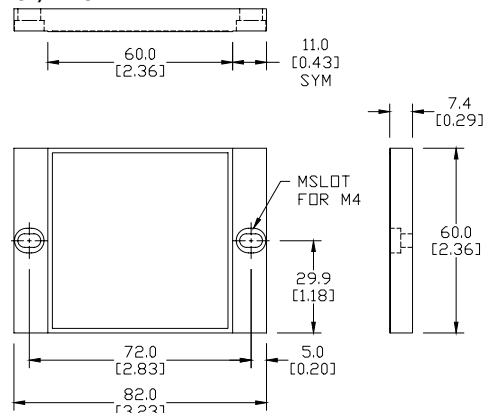
**RL113G/RL113G-1**



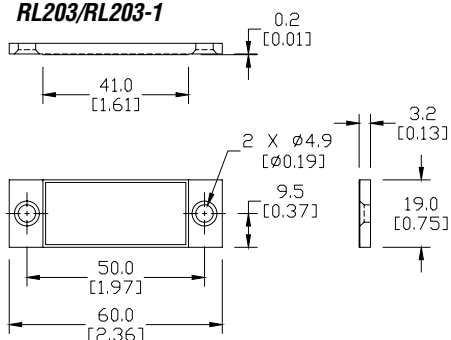
**RL116/RL116-1**



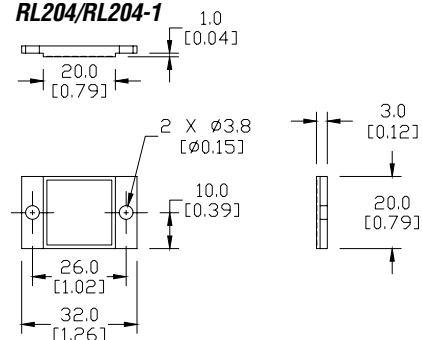
**RL201/RL201-1**



**RL203/RL203-1**



**RL204/RL204-1**



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