

# OPT Series Photoelectric Sensors

**OPT2135**

## Features

- Standard housing with long range and small spot diameter
- Simple potentiometer sensitivity adjustment
- Visible light spot allows easy targeting set-up
- LO/DO (Light-on/Dark-on) antivalent (complementary N.O./N.C.) outputs
- Clear glass detection models available
- Flexible mounting options available
- IO-Link compatibility



## OPT Series Photoelectric Sensors (Diffuse with Background Suppression) Selection Chart

Part Number	Price	Adjustable Sensing Range (mm [in])	Switching Frequency	Light Emission	Logic	Connection	Wiring	Drawing Link
<a href="#">OPT2147</a>	\$106.00	50-200 [1.97-7.87]	800 Hz	Visible red 633nm	PNP	4-pin M12 quick-disconnect	Diagram 1	<a href="#">PDF</a>
<a href="#">OPT2148</a>	\$106.00	50-200 [1.97-7.87]	800 Hz	Visible red 633nm	NPN	4-pin M12 quick-disconnect	Diagram 2	<a href="#">PDF</a>
<a href="#">OPT2149</a>	\$106.00	60-500 [2.36-19.69]	800 Hz	Visible red 633nm	PNP	4-pin M12 quick-disconnect	Diagram 1	<a href="#">PDF</a>
<a href="#">OPT2150</a>	\$106.00	60-500 [2.36-19.69]	800 Hz	Visible red 633nm	NPN	4-pin M12 quick-disconnect	Diagram 2	<a href="#">PDF</a>
<a href="#">OPT2153</a>	\$102.00	100-1200 [3.94-47.24]	500 Hz	Visible red 633nm	PNP	4-pin M12 quick-disconnect	Diagram 1	<a href="#">PDF</a>
<a href="#">OPT2154</a>	\$102.00	100-1200 [3.94-47.24]	500 Hz	Visible red 633nm	NPN	4-pin M12 quick-disconnect	Diagram 2	<a href="#">PDF</a>
<a href="#">OPT2157</a>	\$224.00	50-300 [1.97-11.81]	800 Hz	Class 1 Laser	PNP	4-pin M12 quick-disconnect	Diagram 1	<a href="#">PDF</a>
<a href="#">OPT2158</a>	\$224.00	50-300 [1.97-11.81]	800 Hz	Class 1 Laser	NPN	4-pin M12 quick-disconnect	Diagram 2	<a href="#">PDF</a>

Note: Brackets sold separately.

## OPT Series Photoelectric Sensors (Retro Reflex) Selection Chart

Part Number	Price	Adjustable Sensing Range (m [ft])	Switching Frequency	Light Emission	Logic	Connection	Wiring	Drawing Link
<a href="#">OPT2133</a>	\$82.00	0-7 [0-22.97]*	2000 Hz	Visible red 633nm	PNP	4-pin M12 quick-disconnect	Diagram 1	<a href="#">PDF</a>
<a href="#">OPT2134</a>	\$82.00	0-7 [0-22.97]*	2000 Hz	Visible red 633nm	NPN	4-pin M12 quick-disconnect	Diagram 2	<a href="#">PDF</a>
<a href="#">OPT2135</a>	\$92.00	0.02-11 [0.07-36.09]*	2000 Hz	Visible red 633nm	PNP	4-pin M12 quick-disconnect	Diagram 1	<a href="#">PDF</a>
<a href="#">OPT2136</a>	\$92.00	0.02-11 [0.07-36.09]*	2000 Hz	Visible red 633nm	NPN	4-pin M12 quick-disconnect	Diagram 2	<a href="#">PDF</a>
<a href="#">OPT2137</a>	\$224.00	0-9.5 [0-31.16]	2000 Hz	Class 1 Laser	PNP	4-pin M12 quick-disconnect	Diagram 1	<a href="#">PDF</a>
<a href="#">OPT2138</a>	\$224.00	0-9.5 [0-31.16]	2000 Hz	Class 1 Laser	NPN	4-pin M12 quick-disconnect	Diagram 2	<a href="#">PDF</a>

\* Based on a 100mm x 100mm [3.94 in x 3.94 in]

Note: Reflectors and brackets sold separately.

## OPT Series Photoelectric Sensors (Retro Reflex for Clear Glass Detection) Selection Chart

Part Number	Price	Sensing Range (m [ft])	Switching Frequency	Light Emission	Logic	Connection	Wiring	Drawing Link
<a href="#">OPT2139</a>	\$129.00	0-2.6 [0-8.53]*	2000 Hz	Visible red 633nm	PNP	4-pin M12 quick-disconnect	Diagram 1	<a href="#">PDF</a>
<a href="#">OPT2140</a>	\$129.00	0-2.6 [0-8.53]*	2000 Hz	Visible red 633nm	NPN	4-pin M12 quick-disconnect	Diagram 2	<a href="#">PDF</a>

\* Based on a 100mm x 100mm [3.94 in x 3.94 in]

Note: Reflectors and brackets sold separately.

## OPT Series Photoelectric Sensors (Through-Beam) Selection Chart

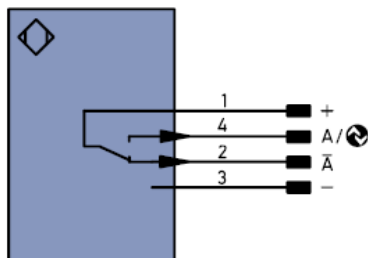
Part Number	Price	Sensing Range (m [ft])	Switching Frequency	Light Emission	Logic	Connection	Wiring	Drawing Link
<b>Emitter</b>								
<a href="#">OPT2132</a>	\$78.00	20 [65.62]	-	Visible red 633nm	-	4-pin M12 quick-disconnect	Diagram 3	<a href="#">PDF</a>
<b>Receivers</b>								
<a href="#">OPT2130</a>	\$71.00	20 [65.62]	1000 Hz	-	PNP	4-pin M12 quick-disconnect	Diagram 1	<a href="#">PDF</a>
<a href="#">OPT2131</a>	\$71.00	20 [65.62]	1000 Hz	-	NPN	4-pin M12 quick-disconnect	Diagram 2	<a href="#">PDF</a>

Note: Brackets sold separately.

# OPT Series Photoelectric Sensors

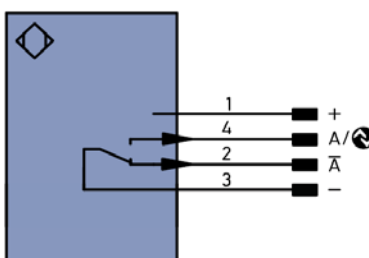
## Wiring Diagrams

**Diagram 1**  
**PNP**



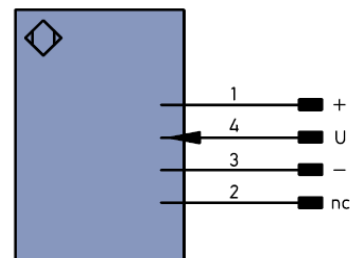
- + Supply Voltage +
- Supply Voltage 0V
- A Switching Output (N.O.)
- $\bar{A}$  Switching Output (N.C.)
- IO-Link

**Diagram 2**  
**NPN**



- + Supply Voltage +
- Supply Voltage 0V
- A Switching Output (N.O.)
- $\bar{A}$  Switching Output (N.C.)
- IO-Link

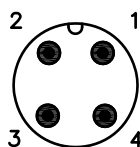
**Diagram 3**  
**Emitter**



- + Supply Voltage +
- Supply Voltage 0V
- U Test Input
- nc No Connection

## Connector

**M12 Connector**



# OPT Series Photoelectric Sensors

OPT Series Photoelectric Sensor Specifications				
Type	Diffuse with Background Suppression	Retro Reflex	Retro Reflex for Clear Glass	Through-Beam
Sensing Distance	Refer to Photoelectric Sensors Selection Guide (OPT Series)			
Light Spot Diameter	See tables below			
Sensitivity	Adjustable via potentiometer			
Output State	Antivalent*			
Operating Voltage	15-30VDC	10-30VDC		
Supply Power IO-Link	18-30VDC			
No Load Supply Current	< 20mA			< 20mA emitter; < 25mA receiver
Operating (Load) Current	100mA			
Off-state (Leakage) Current	< 50µA			
Voltage Drop	< 2V			
Ripple	N/A			
Time Delay Before Availability (tv)	N/A			
Short-Circuit Protection	Yes			
Operating Temperature	-40 to 60°C [-40 to 140°F]	-40 to 60°C (-40 to 140°F) ( <a href="#">OPT2137</a> and <a href="#">OPT2138</a> ) -25 to 60°C [-13 to 140°F]	-40 to 60°C [-40 to 140°F]	-40 to 60°C [-40 to 140°F]
Thermal Drift	< 5%	< 10%	< 3%	< 10%
Protection Degree (DIN 40050)	IP67 IP68			
LED Indicators	Blue - power Amber - output state “on”			
Housing Material	Plastic			
Lens Material	PMMA (Polymethyl methacrylate)			
Shock/Vibration	EC 69047-5-2/7.4			
Tightening Torque	0.5 N•m [0.37 lb•ft] for mounting			
Weight	0.035 kg [0.077 lb]	0.031 kg [0.068 lb]		0.03 kg [0.066 lb]
Connectors	4-pin M12 quick-disconnect, Rotates 270°			
IO Link	IO-Link v1.1			
Accessories	Mounting brackets available	Reflectors and mounting brackets available		Mounting brackets available
Agency Approvals**	UL E189727, CE			

\* LO/DO antivalent (complementary N.O./N.C.) outputs

\*\* To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page.

# OPT Series Photoelectric Sensors

## Detection Range / Sensing Distance

### OPT2147, OPT2148 (Diffuse With Background Suppression)

<b>Detection Range</b>	50mm [1.97 in]	100mm [3.94 in]	200mm [7.87 in]
<b>Light Spot Diameter</b>	7mm [0.28 in]	7mm [0.28 in]	5mm [0.20 in]

### OPT2149, OPT2150 (Diffuse With Background Suppression)

<b>Detection Range</b>	60mm [2.36 in]	250mm [9.84 in]	500mm [19.69 in]
<b>Light Spot Diameter</b>	11mm [0.43 in]	13mm [0.51 in]	15mm [0.59 in]

### OPT2153, OPT2154 (Diffuse With Background Suppression)

<b>Detection Range</b>	100mm [3.94 in]	600mm [23.62 in]	1200mm [47.24 in]
<b>Light Spot Diameter</b>	14mm [0.55 in]	17mm [0.67 in]	24mm [0.94 in]

### OPT2157, OPT2158 Laser (Diffuse With Background Suppression)

<b>Detection Range</b>	65mm [2.55 in]	150mm [5.90 in]	300mm [11.81 in]
<b>Light Spot Diameter</b>	3mm [0.11 in]	2.5 mm [0.09 in]	2mm [0.078 in]

### OPT2133, OPT2134 (Retro-Reflex)

<b>Distance, Sensor to Reflector</b>	1.5 m [4.92 ft]	3.5 m [11.48 ft]	7m [22.97 ft]
<b>Smallest Recognizable Part</b>	10mm [0.39 in]	6mm [0.24 in]	15mm [0.59 in]
<b>Light Spot Diameter</b>	60mm [2.36 in]	120mm [4.72 in]	250mm [9.84 in]

### OPT2135, OPT2136 (Laser Retro-Reflex)

<b>Distance, Sensor to Reflector</b>	2m [6.5 ft]	5m [16.40 ft]	9.5 m [31.16 ft]
<b>Smallest Recognizable Part</b>	0.75 mm [0.02 in]	5mm [0.19 in]	8mm [0.31 in]
<b>Light Spot Diameter</b>	20mm [0.79 in]	50mm [1.97 in]	70mm [2.75 in]

### OPT2137, OPT2138 (Retro-Reflex)

<b>Distance, Sensor to Reflector</b>	2m [6.5 ft]	5.5 m [18.04 ft]	11m [36.09 ft]
<b>Smallest Recognizable Part</b>	40mm [1.57 in]	20mm [0.79 in]	30mm [1.18 in]
<b>Light Spot Diameter</b>	120mm [4.72 in]	270mm [10.63 in]	500mm [19.69 in]

### OPT2139, OPT2140 (Retro-Reflex for Clear Glass Detection)

<b>Distance, Sensor to Reflector</b>	0.5 m [1.64 ft]	1.3 m [4.27 ft]	2.6 m [8.53 ft]
<b>Smallest Recognizable Part</b>	1.5 mm [0.06 in]	4mm [0.16 in]	15mm [0.59 in]
<b>Light Spot Diameter</b>	30mm [1.18 in]	45mm [1.77 in]	80mm [3.15 in]

### OPT2130, OPT2131 (Through-Beam)

<b>Distance, Transmitter to Receiver</b>	4m [13.12 ft]	10m [32.81 ft]	20m [65.62 ft]
<b>Smallest Recognizable Part</b>	6mm [0.24 in]	2mm [0.08 in]	2.5 mm [0.10 in]

# Accessories for OPT Series 50x50mm Photoelectric Sensors

## Right-angle Brackets

Mounting bracket, right-angle, nickel-plated steel or 304 stainless steel.  
For use with OPT series 50x50mm photoelectric sensors.

Accessories for OPT Series 50x50mm Photoelectric Sensors				
Part Number	Price	Description	Drawing Link	Weight [lb]
<a href="#"><u>OPT2031</u></a>	\$7.50	Wenglor mounting bracket, right-angle, nickel-plated brass. For use with OPT series 50x50mm photoelectric sensors.	<a href="#"><u>PDF</u></a>	0.24
<a href="#"><u>OPT2038</u></a>	\$12.00	Wenglor mounting bracket, right-angle, vertical and horizontal adjustment, 304 stainless steel. For use with OPT series 50x50mm photoelectric sensors.	<a href="#"><u>PDF</u></a>	0.19



[OPT2031](#)



[OPT2038](#)

# Accessories for OPT Series 50x50mm Photoelectric Sensors

## Right-angle Swivel Mounting Systems

Mounting bracket, right-angle swivel, 360 degree vertical and horizontal adjustment, 12mm rod mount. For use with OPT series 50x50mm photoelectric sensors. Available in all stainless steel or with an aluminum head with a stainless steel mounting plate.

Accessories for OPT Series 50x50mm Photoelectric Sensors						
Part Number	Price	Description	Mounting Head	Mounting Plate	Drawing Link	Weight [lb]
<a href="#"><u>OPT2122</u></a>	\$12.50	Wenglor mounting bracket, right-angle swivel, 360 degree vertical and horizontal adjustment, aluminum, 12mm rod mount. For use with OPT series 50x50mm photoelectric sensors.	Aluminum	304 Stainless Steel	<a href="#"><u>PDF</u></a>	0.19
<a href="#"><u>OPT2123</u></a>	\$22.50	Wenglor mounting bracket, right-angle swivel, 360 degree vertical and horizontal adjustment, 304 stainless steel, 12mm rod mount. For use with OPT series 50x50mm photoelectric sensors.	304 Stainless Steel	304 Stainless Steel	<a href="#"><u>PDF</u></a>	0.31

**NOTE:**

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



[OPT2122,](#)  
[OPT2123](#)

# Mounting Rods and Brackets

## 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	Drawing Link	Weight lb (g)
<a href="#">OPT2109</a>	\$14.00	Wenglor mounting rod, 12mm diameter, 200mm length, 304 stainless steel.	<a href="#">PDF</a>	0.41 [185.97]
<a href="#">OPT2110</a>	\$17.50	Wenglor mounting rod, 12mm diameter, 300mm length, 304 stainless steel.	<a href="#">PDF</a>	0.60 [272.16]
<a href="#">OPT2111</a>	\$22.50	Wenglor mounting rod, 12mm diameter, 500mm length, 304 stainless steel.	<a href="#">PDF</a>	0.98 [444.52]



## Right-angle Mounting Bracket

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

Right-angle Mounting Brackets for 12mm Sensors				
Part Number	Price	Description	Drawing Link	Weight lb [g]
<a href="#">OPT2108</a>	\$17.50	Wenglor mounting bracket, right-angle, nickel-plated brass. For use with 12mm mounting rods OPT2109, OPT2110 & OPT2111.	<a href="#">PDF</a>	0.07 [31.8]



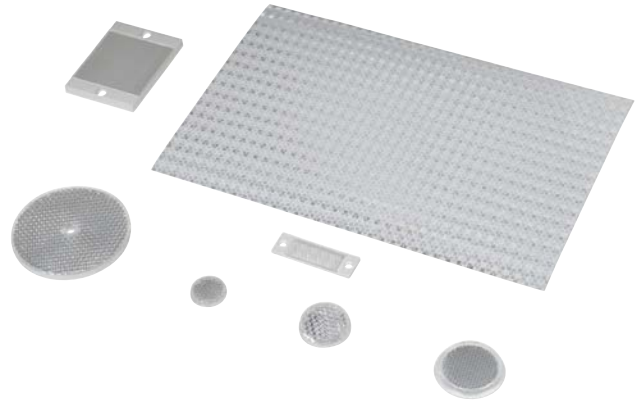
# Reflectors

## 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  $\pm 15^\circ$ .



Reflector Specifications							
Part number	Price	Drawing Link	Quantity	Dimensions mm [in]	Degree of Protection	Mounting	Materials
<a href="#">RL102</a>	\$42.00	<a href="#">PDF</a>	10	25	IEC IP67	Customer-supplied adhesive or other mounting method required	Reflective face: PMMA Polymethylmethacrylate (acrylic)  Base material: ABS (Acrylonitrile-butadiene-styren)
<a href="#">RL102-1</a>	\$4.75		1	[0.98]			
<a href="#">RL103</a>	\$47.00	<a href="#">PDF</a>	10	34.5			
<a href="#">RL103-1</a>	\$5.25		1	[1.36]			
<a href="#">RL104</a>	\$47.00	<a href="#">PDF</a>	10	46			
<a href="#">RL104-1</a>	\$5.25		1	[1.81]			
<a href="#">RL105G</a>	\$42.00	<a href="#">PDF</a>	10	95 x 38		Two 4.3 mm holes	
<a href="#">RL105G-1</a>	\$4.75		1	[3.74 x 1.50]			
<a href="#">RL106G</a>	\$47.00	<a href="#">PDF</a>	10	182 x 42		Two 6mm holes	
<a href="#">RL106G-1</a>	\$5.25		1	[7.17 x 1.65]			
<a href="#">RL110</a>	\$21.00	<a href="#">PDF</a>	10	84		One 5mm hole	
<a href="#">RL110-1</a>	\$2.25		1	[3.31]			
<a href="#">RL116</a>	\$21.00	<a href="#">PDF</a>	10	41 x 60		Two 3mm holes	
<a href="#">RL116-1</a>	\$2.25		1	[3.54 x 2.36]			
<a href="#">RL100DA4</a>	\$42.50	NA	1	200 x 300		Self-adhesive	Paper (Acrylic tape with micro prism)
<a href="#">RL100DC4</a>	\$13.00	NA	1	50 x 300			
<a href="#">RL100DQ1</a>	\$9.75	NA	1	100 x 100			
<a href="#">RL111G</a>	\$66.00	<a href="#">PDF</a>	10	22.5 x 47		Two 3mm slots	Reflective face: PMMA Polymethylmethacrylate (acrylic)  Base material: ABS (Acrylonitrile-butadiene-styren)
<a href="#">RL111G-1</a>	\$8.00		1	[0.89 x 1.85]			
<a href="#">RL112G</a>	\$48.50	<a href="#">PDF</a>	10	19 x 73			
<a href="#">RL112G-1</a>	\$5.25		1	[0.75 x 2.87]			
<a href="#">RL113G</a>	\$58.00	<a href="#">PDF</a>	10	51.4 x 60.3		Two 4mm slots	
<a href="#">RL113G-1</a>	\$6.50		1	[2.02 x 2.37]			

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



# 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						
Part Number	<a href="#"><i>RL201</i></a>	<a href="#"><i>RL201-1</i></a>	<a href="#"><i>RL203</i></a>	<a href="#"><i>RL203-1</i></a>	<a href="#"><i>RL204</i></a>	<a href="#"><i>RL204-1</i></a>
Price	\$42.00	\$9.00	\$39.00	\$8.50	\$33.00	\$7.50
Quantity	5	1	5	1	5	1
Drawing Link	<a href="#">PDF</a>		<a href="#">PDF</a>		<a href="#">PDF</a>	
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.

# Reflectors

## Reflectors for Photoelectric Laser Sensors

Reflectors for OPT Series Photoelectric Sensors				
Part Number	Price	Description	Drawing Link	Weight lb [g]
<a href="#">OPT2030</a>	\$15.00	Reflector, square, 100 x 100mm. For use with photoelectric laser sensors.	<a href="#">PDF</a>	0.20 [90.71]
<a href="#">OPT2167</a>	\$14.50	Wenglor reflector, rectangular, 61 x 51.5mm. For use with OPT2137 & OPT2138.	<a href="#">PDF</a>	0.03 [13.60]

Note: [OPT2015](#) requires purchase of [OPT2030](#) reflector. <50m sensing distance requires 1 reflector. 50–100 m sensing distance requires 4 reflectors.



[OPT2167](#)



[OPT2030](#)