



Cutler-Hammer

# Enhanced 50 Series Clear Object Photoelectric Sensors

**1452E-6547****1452E-6517**

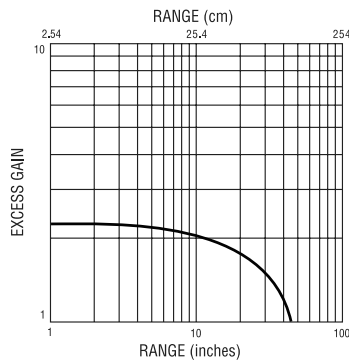
- 7 models available
- Fiberglass-reinforced plastic housing
- Field of view: 0.68°
- Cable wires or mini/micro connector termination
- NPN/PNP, Solid-State Relay, or SPDT EM Relay outputs
- IP67 rated

*Note: Cutler-Hammer parts available for sale to North America locations only.*

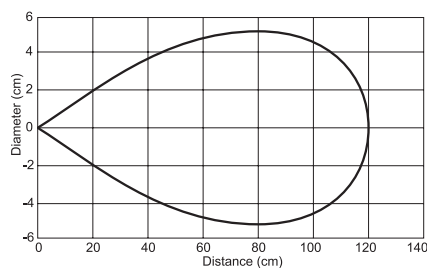
## Enhanced 50 Series Clear Object Photoelectric Sensors Selection Chart

Part Number	Price	Voltage Range	Sensing Range	Optimum Range	Sensing Beam	Output Type	Connection Type	Cable Part Number
<a href="#">1452E-6517</a>		10 - 40 VDC	45in [1.2 m]	1 to 24 in [25 to 610mm]	Visible Red	NPN/PNP 250mA	6-foot cable (300V)	Pre-wired 6ft [1.8 m]
<a href="#">1452E-6547</a>							4-pin Euro (Micro) DC connector	<a href="#">CSDS4A4CY2202</a> <a href="#">CSDS4A4CY2205</a>
<a href="#">1452E-6507</a>							4-pin Mini connector	<a href="#">CSMS4A4CY1602</a> <a href="#">CSMS4A4CY1606</a>
<a href="#">1452E-6513</a>		12 - 240 VDC 24 - 240 VAC	45in [1.2 m]	1 to 24 in [25 to 610mm]	Visible Red	Solid-state relay 300mA @ 240 VAC/VDC	6-foot cable (300V)	Pre-wired 6ft [1.8 m]
<a href="#">1452E-6543</a>							4-pin Micro AC connector	<a href="#">CSAS4F4CY2202</a> <a href="#">CSAS4F4CY2205</a>
<a href="#">1452E-6503</a>							4-pin Mini connector	<a href="#">CSMS4A4CY1602</a> <a href="#">CSMS4A4CY1606</a>
<a href="#">1452E-6504</a>						SPDT EM relay 3 A @ 120 VAC	5-pin Mini connector	<a href="#">CSMS5A5CY1602</a> <a href="#">CSMS5A5CY1606</a>

### Characteristic curve chart



### Spot dimension chart



*Note: Purchase reflectors separately.*

### Wiring Diagrams

(Pin numbers are for reference only. Rely on pin location when wiring.)

Operating Voltage	Models	Cable Models	Mini-Connector Models (Face View Male Shown)	Micro and Euro (Micro) Connector Models (Face View Male Shown)
10-40 VDC	Clear Object			
12 - 240 VDC or 24 - 240 VAC	Clear Object Solid-State Relay			
12 - 240 VDC or 24 - 240 VAC	Clear Object SPDT EM Relay			

① Connect load to appropriate output for either sinking or sourcing operation.



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# Enhanced 50 Series Photoelectric Sensors Selection Guide

## Overview

The Enhanced 50 family of high performance photoelectric sensors offers outstanding features, flexibility and durability at an incredible price. Choose from a wide selection of Through-beam, Polarized Reflex, Diffuse and even Clear Object models all designed in a rugged, industry standard, rectangular package. Each model comes with a variety of input options for maximum flexibility across many voltage ratings.

Cabling choices include built-in mini-connector, micro-connector, pigtail micro-connector or a 6 ft. integrated cable. Other convenient features included are Dark-on/Light-on selectability and Gain adjustment, available on all models. Use the Selection Guide below to find the sensor model that best suits your requirements.



### Enhanced 50 Photoelectric Sensors Specifications by Model Type

Specifications	Through-Beam	Diffuse	Polarized Reflex	Clear Object Detector
<b>Voltage Range</b>	10 - 40 VDC 12 - 240 VDC 24 - 240 VAC	10 - 40 VDC 12 - 240 VDC 24 - 240 VAC	10 - 40 VDC 12 - 240 VDC 24 - 240 VAC	10 - 40 VDC 12 - 240 VDC 24 - 240 VAC
<b>Sensing Range</b>	500ft [152m]	10ft [3m]	16ft [4.9 m]	45in [1.2 m]
<b>Optimum Power</b>	0.1 to 250ft [0.03 to 77m]	1 to 60in [25 to 1520mm]	0.5 to 8ft [0.2 to 2.5 m]	1 to 24in [25 to 610mm]
<b>Sensing Beam</b>	Infrared	Infrared	Visible Red	Visible Red
<b>Output Types</b>	NPN/PNP 250mA, Solid-state relay 300mA @ 240 VAC/VDC, SPDT EM relay 3A @ 120VAC	NPN/PNP 250mA, Solid-state relay 300mA @ 240 VAC/VDC, SPDT EM relay 3A @ 120VAC	NPN/PNP 250mA, Solid-state relay 300mA @ 240 VAC/VDC, SPDT EM relay 3A @ 120VAC	NPN/PNP 250mA, Solid-state relay 300mA @ 240 VAC/VDC, SPDT EM relay 3A @ 120VAC

### Enhanced 50 Photoelectric Sensors Specifications by Input Type

Enhanced 50 Photoelectric Sensors Specifications by Input Type			
Specifications	AC/DC EM Relay Models	AC/DC Solid-State Relay Models	DC Only Models
Input Voltage	12 – 240 VDC 24 – 240 VAC	12 – 240 VDC 24 – 240 VAC	10 – 40 VDC
Light/Dark Operation	Switch selectable		
Operating Temperature	-13 to 131°F [-25 to 55°C]		
Humidity	95% relative humidity, non-condensing		
Case Material	Fiberglass reinforced plastic		
Lens Material	Acrylic		
Vibration	IEC 60947-5-2 part 7.4.2		
Shock	IEC 60947-5-2 part 7.4.1		
Protection	Output short circuit and overcurrent protection, reverse polarity protection		
Enclosure Ratings	IP67		
Agency Approvals	IEC IP67, cCSAus, UL508 (CSA File 224447)		
Output Load	3A @ 120VAC 3A @ 28VAC 3A @ 240VAC	300mA @ 240 VAC/VDC	250mA
Response Time	15ms	2ms	
No Load Current Draw	<30 mA		
Leakage Current (max.)	—	1mA @ 240VAC	<10µA
Indicator LEDs	Through-Beam Source.....All Others: Red: Power.....Green: Output .....Yellow: Power .....Red: Alignment		



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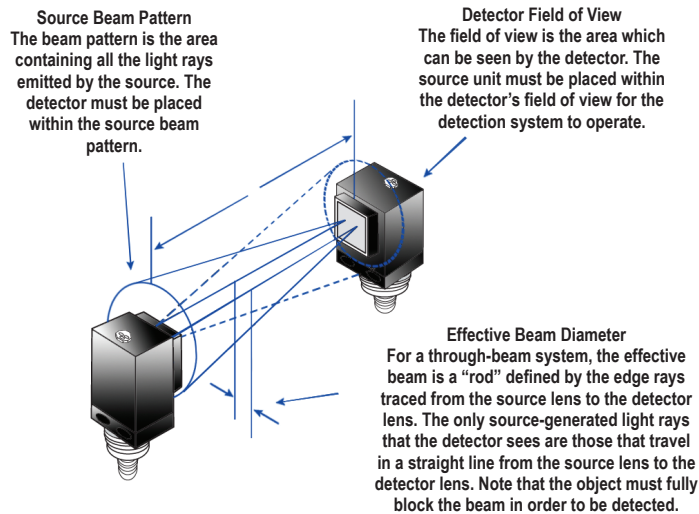
# Enhanced 50 Series Photoelectric Sensors

## Application Guide

The Enhanced 50 Series Photoelectric Sensors are a great fit for applications such as material handling, packaging, wrapping and sortation. This family of sensors, with its four basic models (Through-beam, Polarized Reflex, Diffuse and Clear Object), meets the needs for almost any sensing requirement, including harsh environments with excessive dust or high temperature. Follow the application guide below to choose the best sensor model for your application.

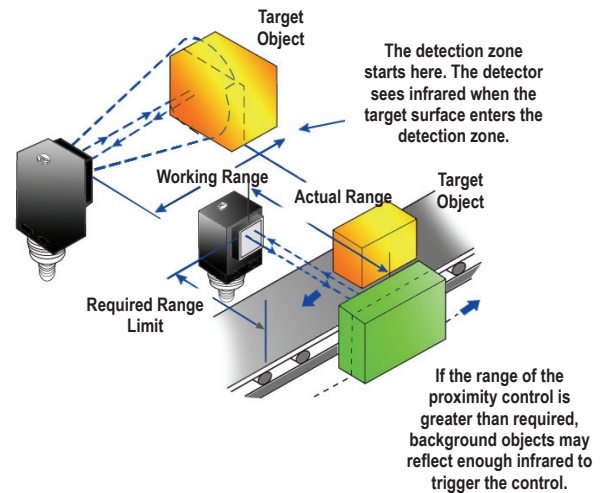
### Through-Beam

- Most accurate
- Longest sensing range
- Most reliable
- Must be installed in two points on system: emitter and receiver
- More costly



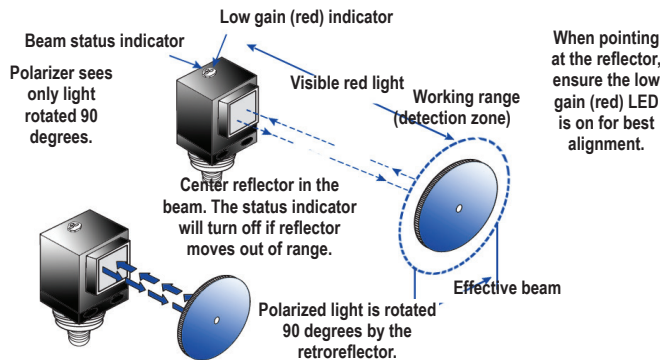
### Diffuse

- Lower cost
- Install at one point
- Less accurate than Through-Beam or Polarized Reflex
- More setup time involved



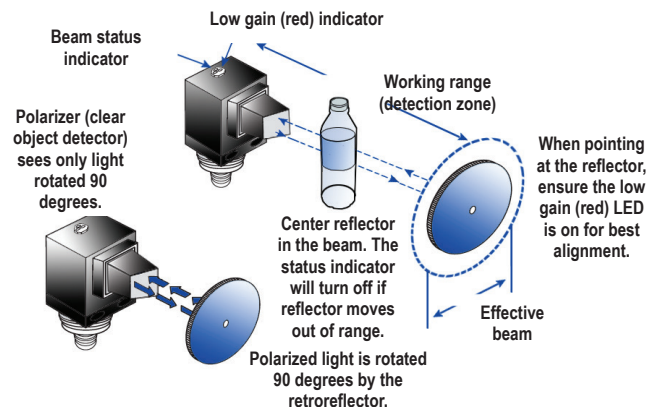
### Polarized Reflex

- Lower cost than Through-Beam
- Longer sensing range than Diffuse
- Very reliable
- Must be installed in two points on system: sensor and reflector



### Clear Object Detector

- Most reliable for sensing transparent objects
- Must be installed in two points on system: sensor and reflector.
- Short sensing distance: 45 inches max.










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# Enhanced 50 Series Photoelectric Sensors Connector Cables

Note: Cutler-Hammer parts available for sale to North America locations only.

Enhanced 50 Series Cables Selection Chart				
Part Number	Price	Description	Gauge	Pin-Out Diagram
<a href="#"><u>CSDS4A4CY2202</u></a>		DC Euro (Micro) connector cable for quick-disconnect photoelectric sensors, straight female, DC 4-pin/4-wire, PVC, 6 feet (2 meter) length	22	 1-Brown 2-White 3-Blue 4-Black
<a href="#"><u>CSDS4A4CY2205</u></a>		DC Euro (Micro) connector cable for quick-disconnect photoelectric sensors, straight female, DC 4-pin/4-wire, PVC, 16.4 feet (5 meter) length	22	
<a href="#"><u>CSAS4F4CY2202</u></a>		AC Micro connector cable for quick-disconnect photoelectric sensors, straight female, AC 4-pin/4-wire, PVC, 6 feet (2 meter) length, 1/2" - 20 UNF thread	22	 1-Red/Black 2-Red/White 3-Red 4-Green
<a href="#"><u>CSAS4F4CY2205</u></a>		AC Micro connector cable for quick-disconnect photoelectric sensors, straight female, AC 4-pin/4-wire, PVC, 16.4 feet (5 meter) length, 1/2" - 20 UNF thread	22	
<a href="#"><u>CSAS5A5CY2202</u></a>		AC Micro connector cable for quick-disconnect photoelectric sensors, straight female, AC 5-pin/5-wire, PVC, 6 feet (2 meter) length, 1/2" - 20 UNF thread	22	 1-Brown 2-Blue 3-Gray 4-Black 5-White
<a href="#"><u>CSAS5A5CY2205</u></a>		AC Micro connector cable for quick-disconnect photoelectric sensors, straight female, AC 5-pin/5-wire, PVC, 16.4 feet (5 meter) length, 1/2" - 20 UNF thread	22	
<a href="#"><u>CSMS4A4CY1602</u></a>		Mini connector cable for quick-disconnect photoelectric sensors, straight female, 4-pin/4-wire, PVC, 6 feet (2 meter) length, 7/8" - 16 UN thread	16	 1-Black 2-Blue 3-Brown 4-White
<a href="#"><u>CSMS4A4CY1606</u></a>		Mini connector cable for quick-disconnect photoelectric sensors, straight female, 4-pin/4-wire, PVC, 19.69 feet (6 meter) length, 7/8" - 16 UN thread	16	
<a href="#"><u>CSMS5A5CY1602</u></a>		Mini connector cable for quick-disconnect photoelectric sensors, straight female, 5-pin/5-wire, PVC, 6 feet (2 meter) length, 7/8" - 16 UN thread	16	 1-Black 2-Blue 3-Orange 4-Brown 5-White
<a href="#"><u>CSMS5A5CY1606</u></a>		Mini connector cable for quick-disconnect photoelectric sensors, straight female, 5-pin/5-wire, PVC, 19.69 feet (6 meter) length, 7/8" - 16 UN thread	16	

[CSDS4A4CY2202](#)[CSAS4F4CY2202](#)[CSAS5A5CY2202](#)

Connector Cables Specifications		
	Micro Style	Mini Style
<b>Jacket Material</b>	PVC	PVC
<b>Contact Material</b>	Gold-plated copper alloy	Gold-plated brass
<b>Coupling Nut Material</b>	Zinc die-cast epoxy-coat	Zinc die cast epoxy-coat
<b>O-ring</b>	Nitrile rubber	None
<b>Cable</b>	PVC insulation and jacket, stranded copper conductors	
<b>Cable Strain Relief</b>	35 pounds minimum	
<b>Voltage Rating</b>	320 V (24 VDC for LED plugs)	600 V
<b>Current Rating</b>	4A	4-pin: 10A 5-pin: 8 A
<b>Contact Resistance</b>	5mΩ max	5mΩ max
<b>Isolation Resistance</b>	1000MΩ min	100 MΩ min
<b>Protection</b>	IP67	NEMA 6P, IP68
<b>Temperature Range</b>	-25 to 90°C	-20 to 105°C
<b>Cable Diameter (3/C = 3 Conductor)</b>	22 AWG PVC: 4/C: 0.21 inch [5.3 mm] 5/C: 0.20 inch [5.1 mm]	16AWG PVC: 4/C: 0.42 inch [10.7 mm] 5/C: 0.50 inch [12.7 mm]
<b>Bend Radius</b>	Minimum recommended bend radius is 12X cable diameter	

[CSMS4A4CY1602](#)[CSMS5A5CY1602](#)



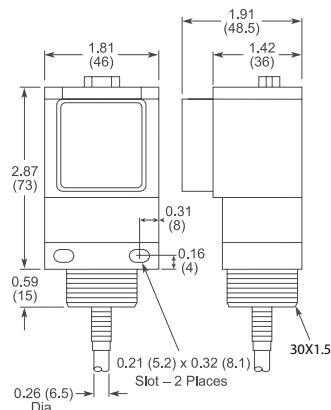
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# Enhanced 50 Series Photoelectric Sensors Dimensions

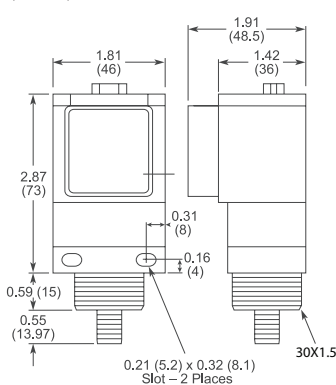
## Sensor Dimensions

inches (mm)

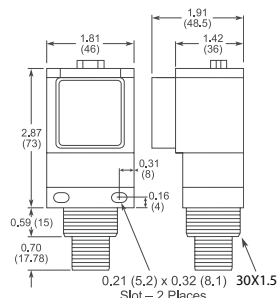
Cable and Pigtail Connector\* Version



AC/DC Micro or Euro (Micro) Connector Versions

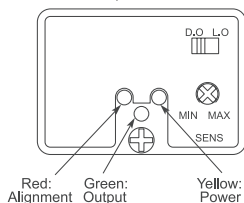


Mini Connector Versions

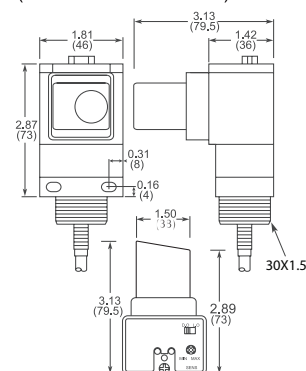


\* Pigtail length: 7.5" nominal

Top View



Clear Object Versions (Cable Version Shown)

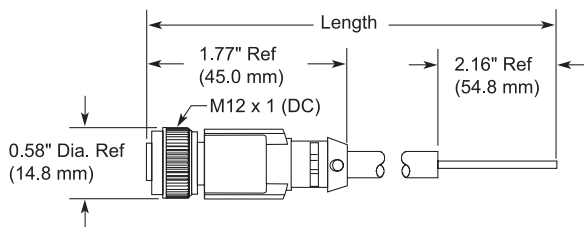


## Connector Cables Dimensions

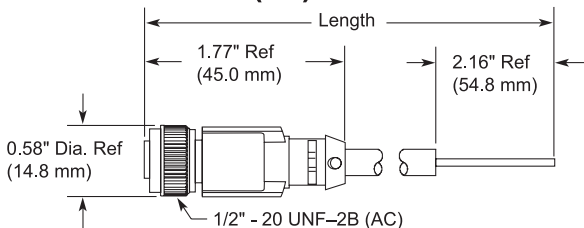
(in/mm)

### Micro Style Connector Cables

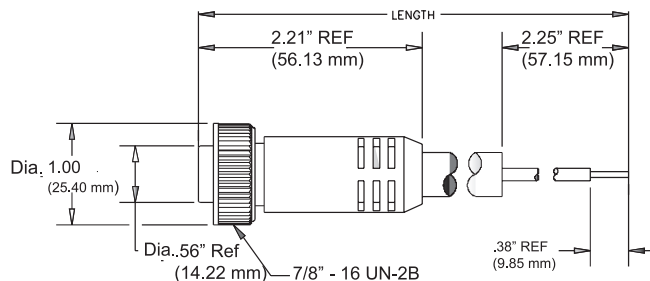
#### M12 x 1 (DC) connector cable



#### 1/2" - 20 UNF-2B (AC) connector cable



### Mini Style Connector Cables





# Accessories for 50 Series Photoelectric Sensors

## Mounting Brackets

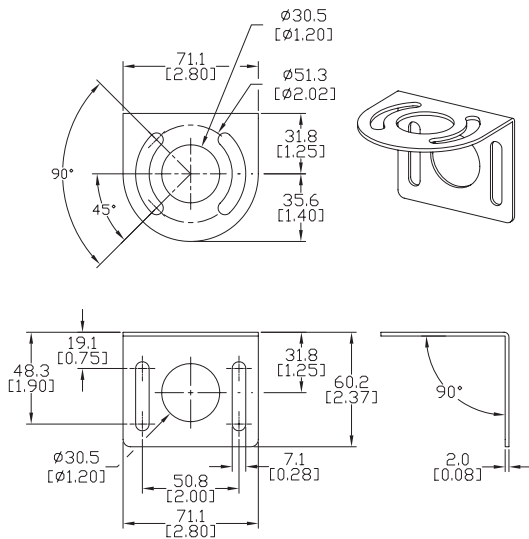
Short, tall or ball-swivel style of mounting brackets are available. All styles allow 360° rotation of the sensor.

*Note: Cutler-Hammer parts available for sale to North America locations only.*

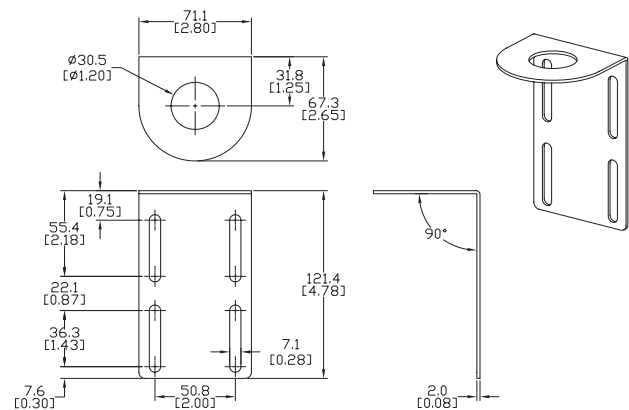
## Dimensions

mm [inches]

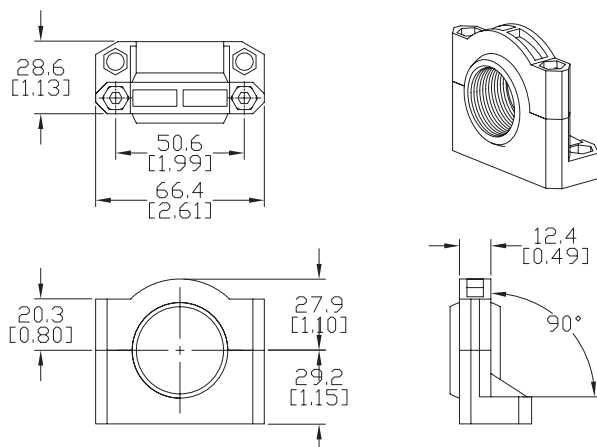
Accessories for Enhanced 50 Series Sensors			
Part Number	Price	Description	Weight [lb]
<a href="#"><u>6150E-6501</u></a>		Mounting bracket, right-angle, 1.5in vertical adjustment, nickel plated steel. For use with CH Enhanced 50 Series sensor.	0.20
<a href="#"><u>6150E-6502</u></a>		Mounting bracket, right-angle, 3.5in vertical adjustment, nickel plated steel. For use with CH Enhanced 50 Series sensor.	0.39
<a href="#"><u>6150E-6503</u></a>		Mounting bracket, right-angle ball swivel, 60 degree vertical and horizontal adjustment, plastic. For use with CH Enhanced 50 Series sensor. Ball swivel allows for ±30° angle.	0.11



[6150E-6501](#)



[6150E-6502](#)



[6150E-6503](#)

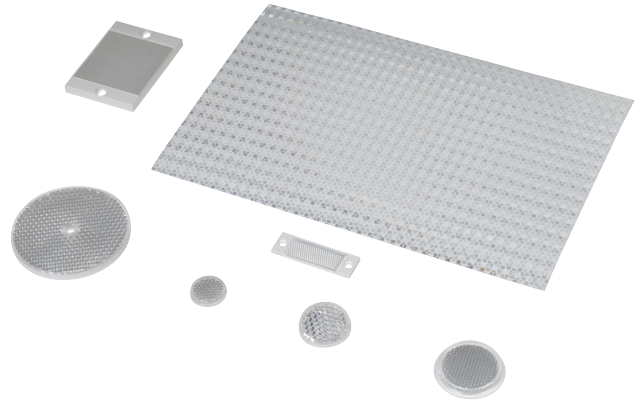
# Reflectors

## 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>		<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>			1	[0.98]			
<a href="#">RL103</a>		<a href="#">PDF</a>	10	34.5			
<a href="#">RL103-1</a>			1	[1.36]			
<a href="#">RL104</a>		<a href="#">PDF</a>	10	46			
<a href="#">RL104-1</a>			1	[1.81]			
<a href="#">RL105G</a>		<a href="#">PDF</a>	10	95 x 38		Two 4.3 mm holes	
<a href="#">RL105G-1</a>			1	[3.74 x 1.50]			
<a href="#">RL106G</a>		<a href="#">PDF</a>	10	182 x 42		Two 6mm holes	
<a href="#">RL106G-1</a>			1	[7.17 x 1.65]			
<a href="#">RL110</a>		<a href="#">PDF</a>	10	84		One 5mm hole	
<a href="#">RL110-1</a>			1	[3.31]			
<a href="#">RL116</a>		<a href="#">PDF</a>	10	41 x 60		Two 3mm holes	
<a href="#">RL116-1</a>			1	[3.54 x 2.36]			
<a href="#">RL100DA4</a>		NA	1	200 x 300 [7.87 x 11.81]		Self-adhesive	Paper (Acrylic tape with micro prism)
<a href="#">RL100DC4</a>		NA	1	50 x 300 [1.97 x 11.81]			
<a href="#">RL100DQ1</a>		NA	1	100 x 100 [3.94 x 3.94]			
<a href="#">RL111G</a>		<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>			1	[0.89 x 1.85]			
<a href="#">RL112G</a>		<a href="#">PDF</a>	10	19 x 73			
<a href="#">RL112G-1</a>			1	[0.75 x 2.87]			
<a href="#">RL113G</a>		<a href="#">PDF</a>	10	51.4 x 60.3		Two 4mm slots	
<a href="#">RL113G-1</a>			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						
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.