



Cutler-Hammer

Enhanced 50 Series Clear Object Photoelectric Sensors

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

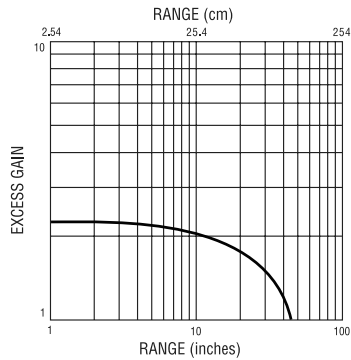
- Fiberglass-reinforced plastic housing
- Field of view: 0.68°
- Cable wires or mini/micro connector termination
- NPN/PNP, Solid-State Relay, or SPDT EM Relay outputs
- IP67 rated

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

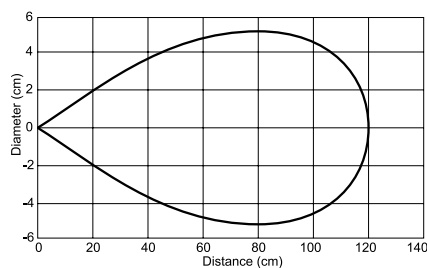
Enhanced 50 Series Clear Object Photoelectric Sensors Selection Chart

Part Number	Price	Voltage Range	Sensing Range	Optimum Range	Sensing Beam	Output Type	Connection Type	Cable Part Number
1452E-6517	\$:009jc:	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]
1452E-6547	\$:009je:						4-pin Euro (Micro) DC connector	CSDS4A4CY2202 CSDS4A4CY2205
1452E-6513	\$:009jb:	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]
1452E-6543	\$:009jd:						4-pin Micro AC connector	CSAS4F4CY2202 CSAS4F4CY2205
1452E-6504	\$009x?:					SPDT EM relay 3 A @ 120 VAC	5-pin Mini connector	CSMS5A5CY1602 CSMS5A5CY1606

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			
12 - 240 VDC or 24 - 240 VAC	Clear Object			

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
Voltage Range	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
Sensing Range	500ft [152m]	10ft [3m]	16ft [4.9 m]	45in [1.2 m]
Optimum Power	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]
Sensing Beam	Infrared	Infrared	Visible Red	Visible Red
Output Types	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: OutputYellow: PowerRed: Alignment		



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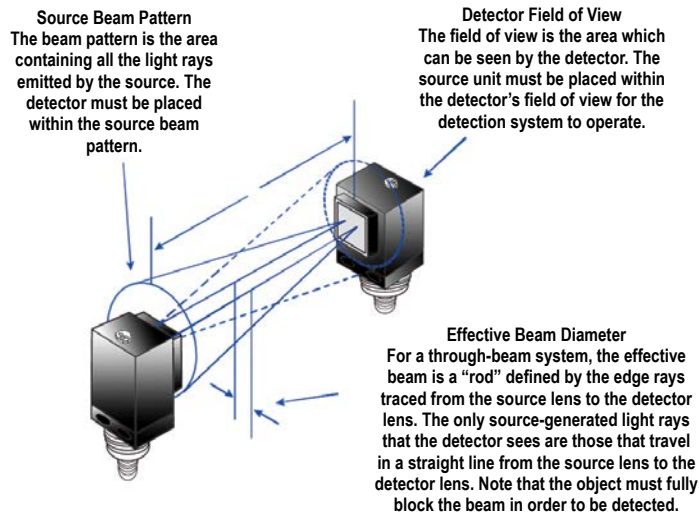
Enhanced 50 Series Photoelectric Sensors

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.

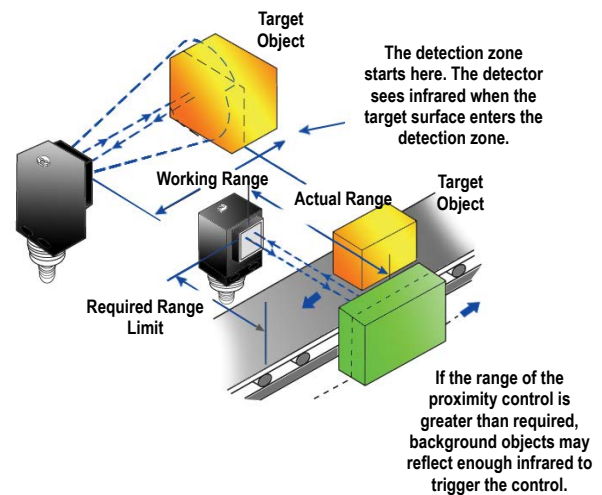
Through-Beam

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



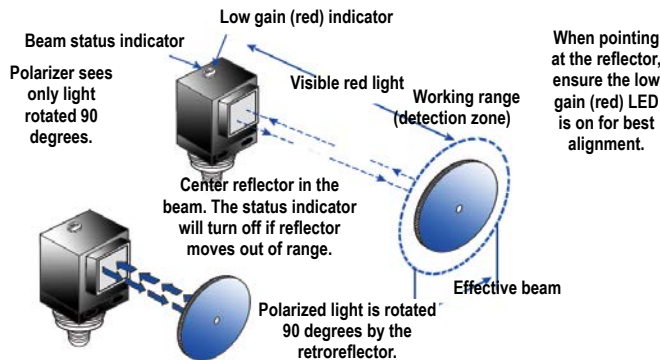
Diffuse

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



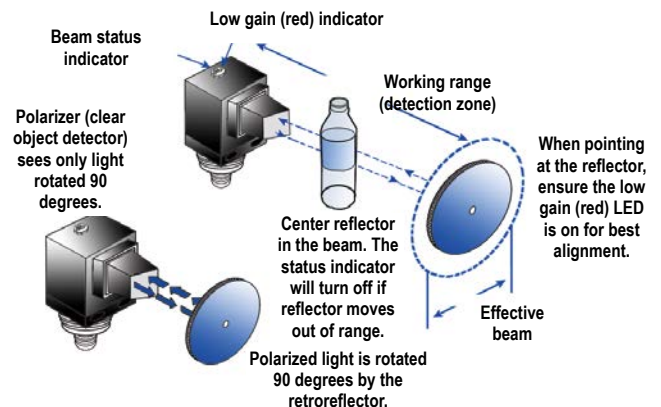
Polarized Reflex

- 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
<u>CSDS4A4CY2202</u>	\$;.05td:	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
<u>CSDS4A4CY2205</u>	\$;.05te:	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	1-Brown 2-White 3-Blue 4-Black
<u>CSAS4F4CY2202</u>	\$05qk:	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
<u>CSAS4F4CY2205</u>	\$-.05ql:	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	1-Red/Black 2-Red/White 3-Red 4-Green
<u>CSAS5A5CY2202</u>	\$05qn:	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
<u>CSAS5A5CY2205</u>	\$;.05tc:	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	1-Brown 2-Blue 3-Gray 4-Black 5-White
<u>CSMS4A4CY1602</u>	\$;.05tf:	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
<u>CSMS4A4CY1606</u>	\$;.05tg:	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	1-Black 2-Blue 3-Brown 4-White
<u>CSMS5A5CY1602</u>	\$;.05th:	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
<u>CSMS5A5CY1606</u>	\$;.05ti:	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	1-Black 2-Blue 3-Orange 4-Brown 5-White

[CSDS4A4CY2205](#)[CSAS4F4CY2205](#)[CSAS5A5CY2202](#)

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

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

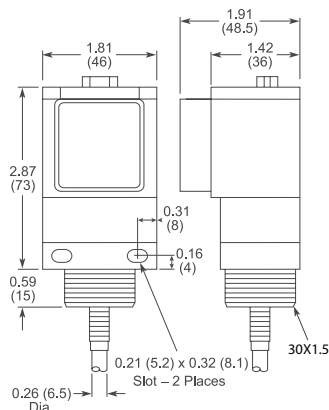
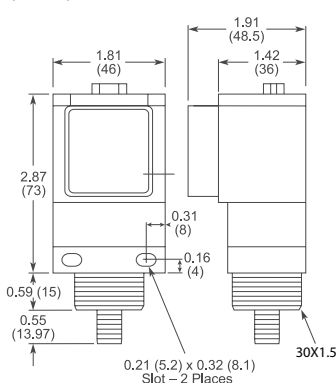


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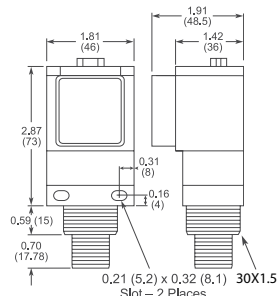
Enhanced 50 Series Photoelectric Sensors Dimensions

Sensor Dimensions

inches (mm)

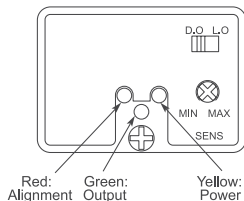
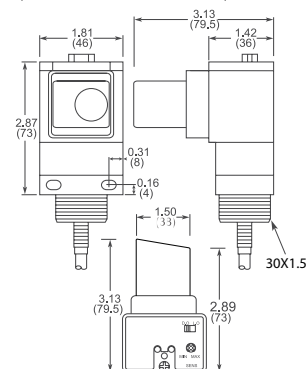
Cable and Pigtail Connector*
VersionAC/DC Micro or Euro
(Micro) Connector Versions

Mini Connector Versions



* Pigtail length: 7.5" nominal

Top View

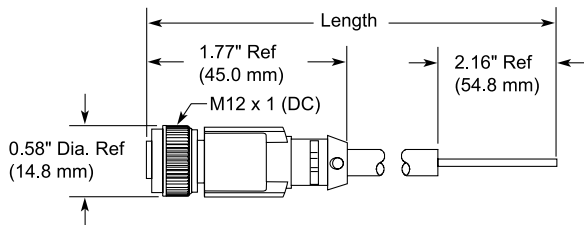
Clear Object Versions
(Cable Version Shown)

Connector Cables Dimensions

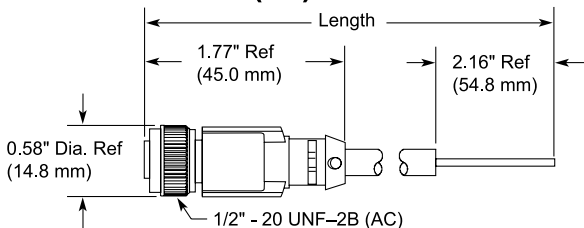
(in/mm)

Micro Style Connector Cables

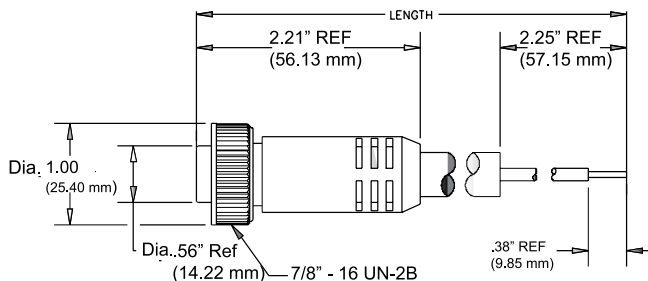
M12 x 1 (DC) connector cable



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



Mini Style Connector Cables



Accessories for 50 Series Photoelectric Sensors

Mounting Brackets

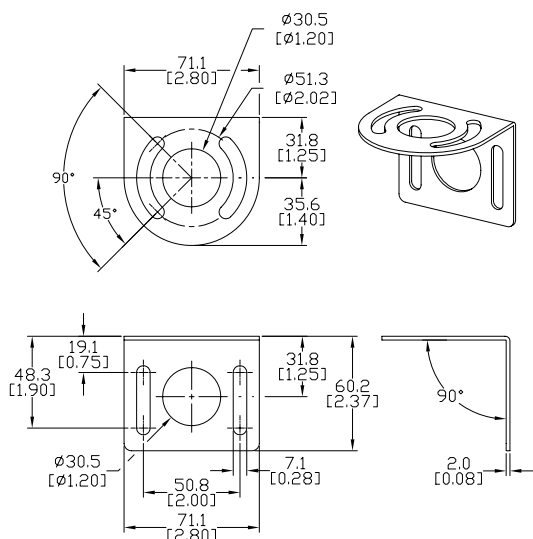
Short, tall or ball-swivel style of mounting brackets are available. All styles allow 360° rotation of the sensor.

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

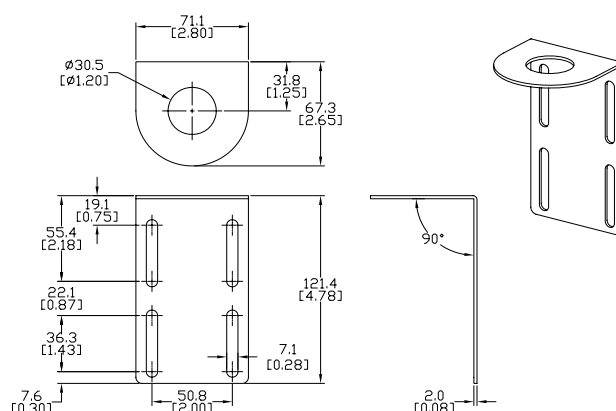
Dimensions

mm [inches]

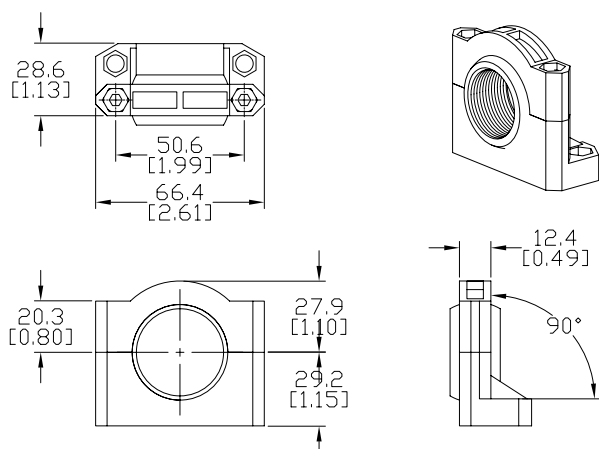
Accessories for Enhanced 50 Series Sensors			
Part Number	Price	Description	Weight [lb]
<u>6150E-6501</u>	\$05hu:	Mounting bracket, right-angle, 1.5in vertical adjustment, nickel plated steel. For use with CH Enhanced 50 Series sensor.	0.20
<u>6150E-6502</u>	\$05hv:	Mounting bracket, right-angle, 3.5in vertical adjustment, nickel plated steel. For use with CH Enhanced 50 Series sensor.	0.39
<u>6150E-6503</u>	\$05hx:	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](#)

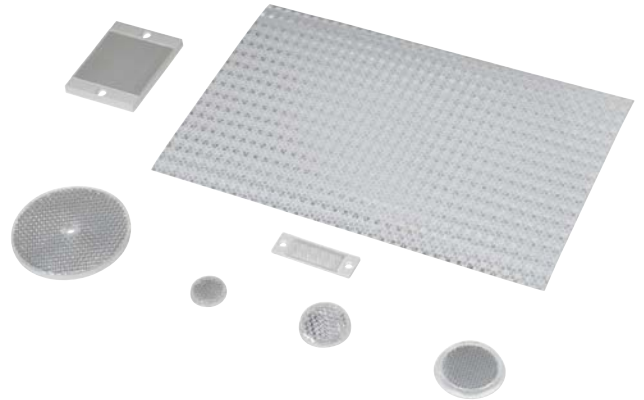
Reflectors

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
RL102	\$;09[h:	PDF	10	25	IEC IP67	Customer-supplied adhesive or other mounting method required	Reflective face: PMMA Polymethylmethacrylate (acrylic) Base material: ABS (Acrylonitrile-butadiene-styren)
RL102-1	\$?6y:		1	[0.98]			
RL103	\$;-09[i:	PDF	10	34.5			
RL103-1	\$?6z:		1	[1.36]			
RL104	\$;-09[j:	PDF	10	46			
RL104-1	\$;?6]:		1	[1.81]			
RL105G	\$-2e_j:	PDF	10	95 x 38		Two 4.3 mm holes	
RL105G-1	\$2e_k:		1	[3.74 x 1.50]			
RL106G	\$;-09[l:	PDF	10	182 x 42		Two 6mm holes	
RL106G-1	\$?6_:		1	[7.17 x 1.65]			
RL110	\$;09[n:	PDF	10	84		One 5mm hole	
RL110-1	\$?6#:		1	[3.31]			
RL116	\$05yv:	PDF	10	41 x 60		Two 3mm holes	
RL116-1	\$;?6!:		1	[3.54 x 2.36]			
RL100DA4	\$0?77:	NA	1	200 x 300	Self-adhesive	Paper (Acrylic tape with micro prism)	
RL100DC4	\$0?78:	NA	1	50 x 300			
RL100DQ1	\$?79:	NA	1	100 x 100			
RL111G	\$;0?6,:	PDF	10	22.5 x 47	Two 3mm slots	Reflective face: PMMA Polymethylmethacrylate (acrylic) Base material: ABS (Acrylonitrile-butadiene-styren)	
RL111G-1	\$?6?:		1	[0.89 x 1.85]			
RL112G	\$0?71:	PDF	10	19 x 73			
RL112G-1	\$?70:		1	[0.75 x 2.87]			
RL113G	\$0?73:	PDF	10	51.4 x 60.3	Two 4mm slots		
RL113G-1	\$?72:		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	RL201	RL201-1	RL203	RL203-1	RL204	RL204-1
Price	\$,09[o:	\$?74:	\$,09[p:	\$?75:	\$,09[q:	\$?76:
Quantity	5	1	5	1	5	1
Drawing Link	PDF		PDF		PDF	
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 ¹	IEC IP67					
Mounting	Two 0.4 mm holes		Two 0.4 mm holes		Two 0.3 mm holes	
Materials	Acrylic/polycarbonate					

¹ Not recommended for applications involving moist air environments or water immersion.