

FA Series LED Photoelectric Sensors



M18 (18 mm) plastic - DC

- 14 models available
- Diffuse, polarized reflective, and through-beam models with long sensing distances
- Plastic housing
- Axial cable or M12 quick-disconnect models
- NPN or PNP; Complementary N.O./N.C. outputs
- IP67 rated



FA Series Photoelectric Sensors Selection Chart									
Part Number	Price	Sensing Range	Output State	Logic	Connection	Wiring	Dimensions	Characteristic Curves	
Diffuse									
FAI8-BN-0A	\$45.00	1m (39.37in)	Complementary N.O./N.C.	NPN	2m (6.5) axial cable	Diagram 1	Figure 1	Chart 1	
FAI8-BP-0A	\$45.00			PNP	2m (6.5) axial cable	Diagram 2	Figure 1	Chart 1	
FAI8-BN-0E	\$44.00			NPN	M12 (12mm) connector	Diagram 1	Figure 2	Chart 1	
FAI8-BP-0E	\$44.00			PNP	M12 (12mm) connector	Diagram 2	Figure 2	Chart 1	
Polarized reflective*									
FARN-BN-0A	\$37.00	3m (118.11in)	Complementary N.O./N.C.	NPN	2m (6.5) axial cable	Diagram 1	Figure 1	Chart 2	
FARN-BP-0A	\$37.00			PNP	2m (6.5) axial cable	Diagram 2	Figure 1	Chart 2	
FARN-BN-0E	\$37.00			NPN	M12 (12mm) connector	Diagram 1	Figure 2	Chart 2	
FARN-BP-0E	\$37.00			PNP	M12 (12mm) connector	Diagram 2	Figure 2	Chart 2	
Through-beam**									
FAID-BN-0A	Receiver	\$38.00	Complementary N.O./N.C.	NPN	2m (6.5) axial cable	Diagram 1	Figure 1	Chart 3	
FAID-BP-0A	Receiver	\$38.00		PNP	2m (6.5) axial cable	Diagram 2	Figure 1	Chart 3	
FAID-BN-0E	Receiver	\$38.00		NPN	M12 (12mm) connector	Diagram 1	Figure 2	Chart 3	
FAID-BP-0E	Receiver	\$37.00		PNP	M12 (12mm) connector	Diagram 2	Figure 2	Chart 3	
FAIH-00-0A	Emitter	\$25.00		Receiver dependent		2m (6.5) axial cable	Diagram 3	Figure 1	Chart 3
FAIH-00-0E	Emitter	\$24.50				M12 (12mm) connector	Diagram 3	Figure 2	Chart 3

*Purchase reflectors separately.

**Purchase one receiver and one emitter for a complete set.

Wiring diagrams

Diagram 1

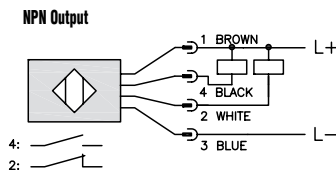


Diagram 2

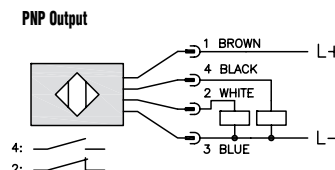
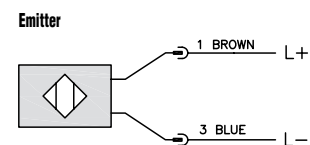


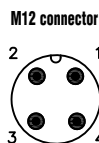
Diagram 3



Note: N.O. = Signal ON when emitter is NOT sensing receiver.

N.C. = Signal ON when emitter is sensing receiver.

Connector



Switching Element Function		
	Thru-Beam and Reflective Models	Diffuse Models
Light-on	N.C.	N.O.
Dark-on	N.O.	N.C.

FA Series LED Photoelectric Sensors

FA LED Series Specifications			
Mounting Type	Diffuse Models	Reflective Models	Through-Beam Models
	Diffuse reflection	Polarized reflection ³	Through-beam ⁴
Sensing Distance	1m ¹	3m ²	20m
Light Spot Diameter	180 mm @ 800 mm	200 mm @ 4 m	600 mm @ 20 m
Emission	Infrared (880 nm)	Red (660 nm)	Infrared (880 nm)
Sensitivity	Adjustable		
Output Type	NPN or PNP - Complementary NO/NC		
Operating Voltage	10-30 VDC		
No-load Supply Current	≤30mA		≤25mA
Operating (Load) Current	≤100mA		
Off-state (Leakage) Current	≤10µA		
Voltage Drop	2V max at 100mA		
Switching Frequency	250Hz		
Ripple	≤10%		
Time Delay Before Availability (tv)	200ms		
Short-Circuit Protection	Yes, switch autoresets after load is removed		
Operating Temperature	-25 to 70°C (-13° to 158°F); Drift: 10% Sr		
Protection Degree (DIN 40050)	IEC IP67		
LED Indicators/Switching Status	Yellow (output energized)		Receiver: Yellow (output energized) Emitter: Green (power ON)
Housing Material	Polybutylene Terephthalate (PBT)		
Lens Material	Polycarbonate (PC)	PMMA	Polycarbonate (PC)
Shock/Vibration	See terminology section		
Tightening Torque	1 Nm (0.737 lb-ft)		
Weight (cable/M12 connector)	100g (3.53 oz)		Emitter + Receiver 200g (7.05 oz)
Connection	2m (6.5') axial cable; M12 (12mm) connector. Two lock nuts included		
Agency Approvals	UL file E187310, CE		

¹ With 100x100mm white matte paper
² With standard diameter 84mm RL110 reflector.
³ Purchase reflectors separately.
⁴ An emitter (FAIH) and receiver (FAID) pair must be ordered for a complete sensor set.

Dimensions

mm

Figure 1

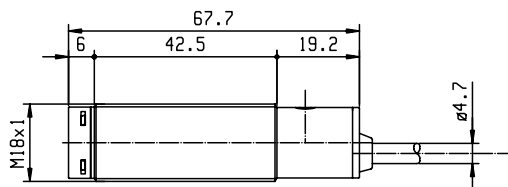
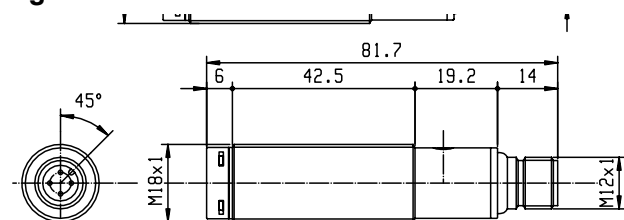


Figure 2



FA Series LED Photoelectric Sensors

Characteristic curves

Chart 1 (Diffuse)

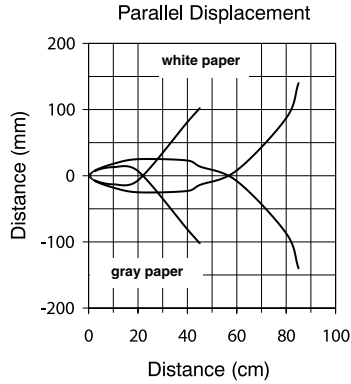
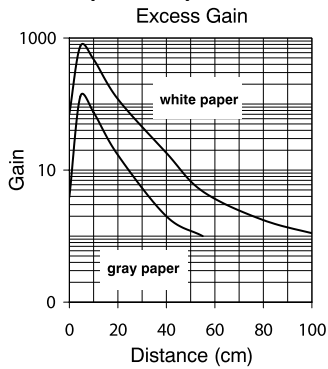


Chart 2 (Polarized Reflective)

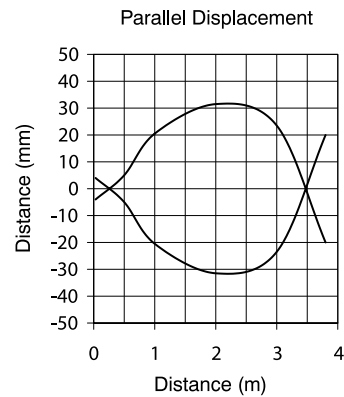
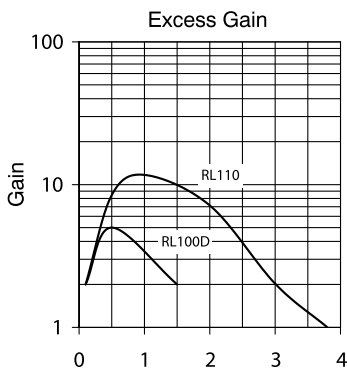
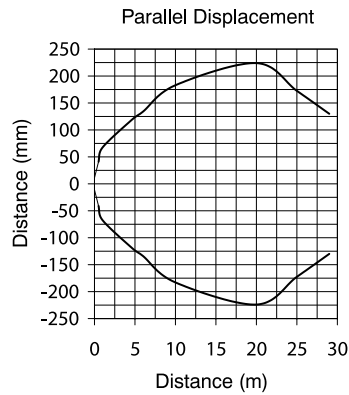
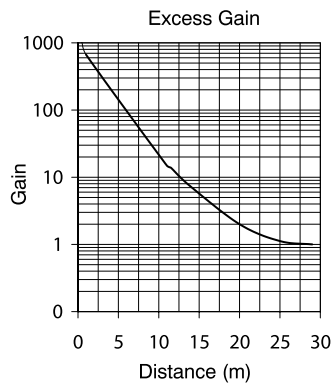


Chart 3 (Throughbeam)



Accessories for 18mm Sensors

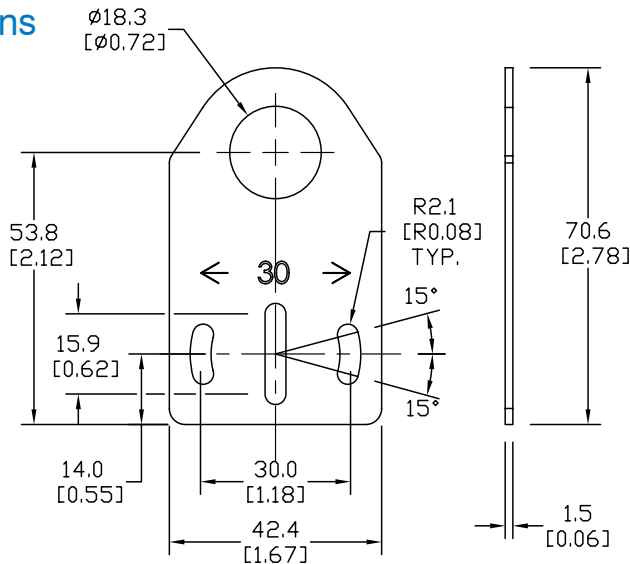
Axial Mounting Bracket

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	\$2.00	Mounting bracket, axial, zinc-plated steel. For use with 18mm sensors. 1/pk.	0.06
ST18A7W	\$2.00	Mounting bracket, axial, 316L stainless steel. For use with 18mm sensors. 1/pk.	0.06

Dimensions

mm [inches]



ST18A

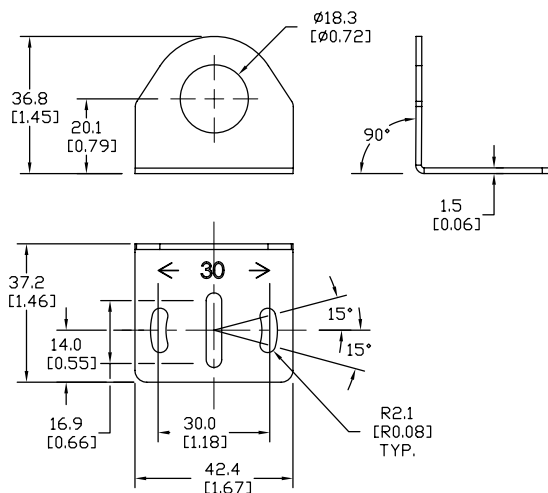
Right-angle Mounting Bracket

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	\$2.00	Mounting bracket, right angle, zinc-plated steel. For use with 18mm sensors. 1/pk.	0.06
ST18C7W	\$2.00	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 for complete engineering drawings

Accessories for 18mm Sensors

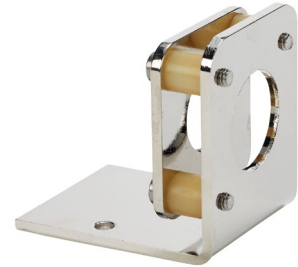
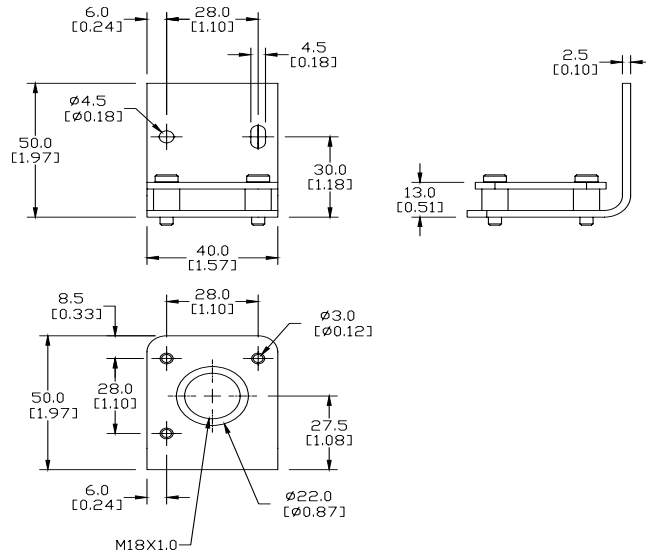
Right-angle Fine Tune Mounting Bracket

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

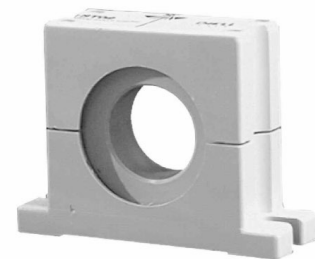
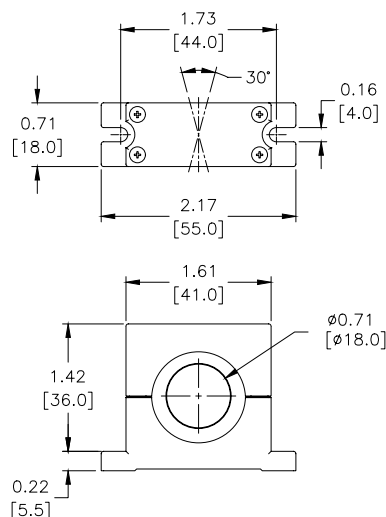
Swivel Mounting Bracket

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	\$2.00	Mounting bracket, ball swivel, plastic. For use with 18mm sensors.	0.06

Dimensions

mm [inches]



ST02

See our website: 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.

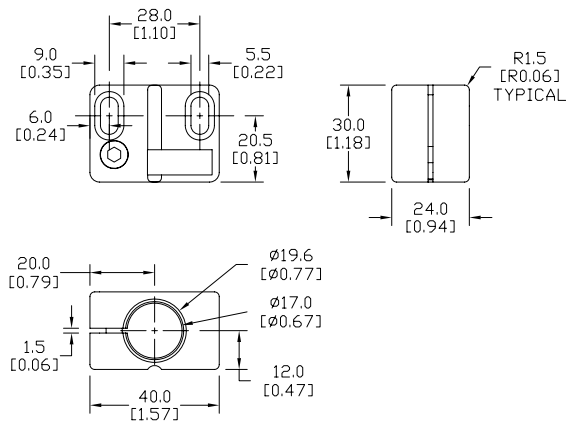
Accessories for 18mm Sensors				
Part Number	Price	Description	Weight [lb]	
OPT2104	\$8.25	Mounting bracket, right-angle, fixed insertion stop adjustment, plastic. For use with 18mm sensors.	0.06	
OPT2105	\$8.25	Mounting bracket, right-angle, plastic. For use with 18mm sensors.	0.06	



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]
OPT2116	\$9.25	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
OPT2117	\$16.50	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

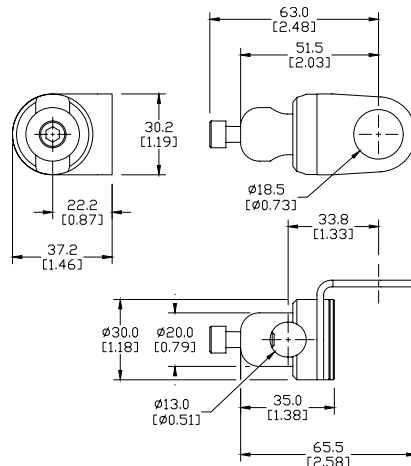


OPT2116, OPT2117

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

Dimensions

mm [inches]



See our website: 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.

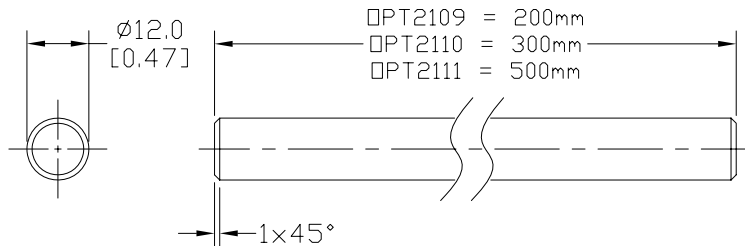
Mounting Rods for OPT2112-2127 Swivel Mounting Brackets			
Part Number	Price	Description	Weight [lb]
OPT2109	\$10.50	Mounting rod, 12mm diameter, 200mm length, 304 stainless steel.	0.41
OPT2110	\$12.50	Mounting rod, 12mm diameter, 300mm length, 304 stainless steel.	0.60
OPT2111	\$16.50	Mounting rod, 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.

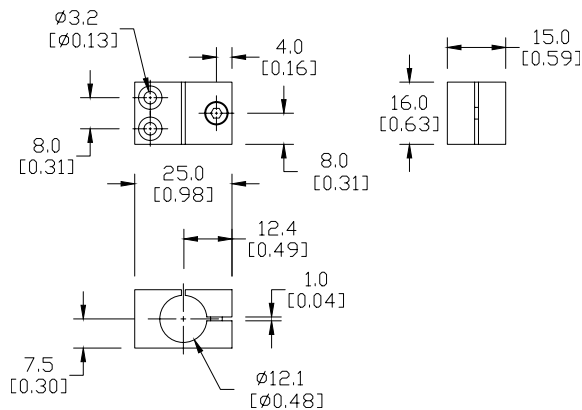
Accessories for 12mm Sensors			
Part Number	Price	Description	Weight [lb]
OPT2108	\$12.50	Mounting bracket, right-angle, nickel-plated brass. For use with 12mm mounting rods OPT2109, OPT2110 & OPT2111.	0.07



OPT2108

Dimensions

mm [inches]



See our website: www.AutomationDirect.com for complete engineering drawings

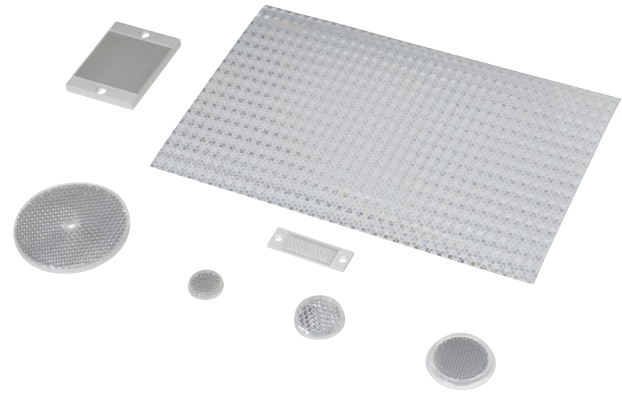
Reflectors

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	\$35.50	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	\$40.50	10 per pack	34.5 mm [1.36 in]				
RL103-1	\$4.25	1 per pack					
RL104	\$40.50	10 per pack	46mm [1.81 in]				
RL104-1	\$4.25	1 per pack					
RL105 *	retired	10 per pack	90 x 40 mm [3.54 x 1.58 in]		Two 4.3 mm holes		
RL105-1 *	retired	1 per pack					
RL105G *	\$35.50	10 per pack	95 x 38 mm [3.74 x 1.50 in]				
RL105G-1 *	\$3.75	1 per pack					
RL106G	\$40.50	10 per pack	182 x 42 mm [7.17 x 1.65 in]		Two 6mm holes		
RL106G-1	\$4.25	1 per pack					
RL110	\$18.50	10 per pack	84mm [3.31 in]		One 5mm hole		
RL110-1	\$2.00	1 per pack					
RL116	\$18.50	10 per pack	41 x 60 mm [3.54 x 2.36 in]		Two 3mm holes		
RL116-1	\$2.00	1 per pack					
RL100DA4	\$33.00	1 per pack	200 x 300 mm [7.87 x 11.81 in]		Self-adhesive		Paper (Acrylic tape with micro prism)
RL100DC4	\$10.50	1 per pack	50 x 300 mm [1.97 x 11.81 in]				
RL100DQ1	\$7.75	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	\$6.25	1 per pack					
RL112G	\$40.50	10 per pack	19 x 73 mm [0.75 x 2.87 in]				
RL112G-1	\$4.25	1 per pack					
RL113G	\$46.50	10 per pack	51.4 x 60.3 mm [2.02 x 2.37 in]	Two 4mm slots			
RL113G-1	\$5.25	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

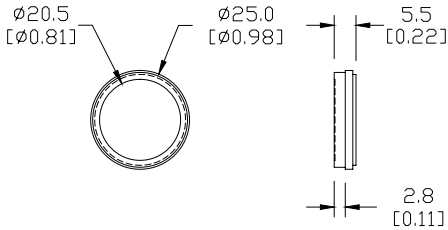
Specifications						
Model	RL201	RL201-1	RL203	RL203-1	RL204	RL204-1
Price	\$32.50	\$7.25	\$30.00	\$6.75	\$26.00	\$6.00
Quantity (per package)	5	1	5	1	5	1
Dimensions	60 x 82 mm 2.36 x 3.23 in		19 x 6mm 0.75 x 2.36 in		20mm x 32mm 0.80 in x 1.26 in	
Degree of Protection ¹	IEC IP67					
Mounting	Two 0.4 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.

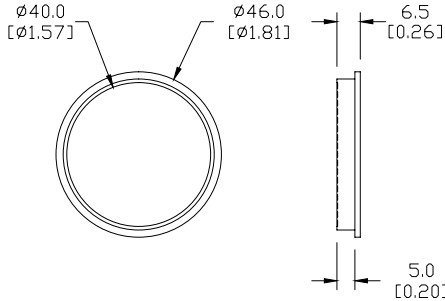
Dimensions

mm [inches]

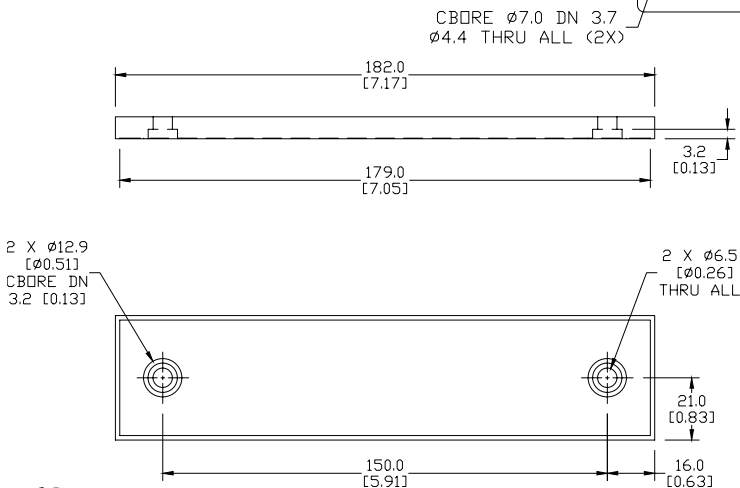
RL102/RL102-1



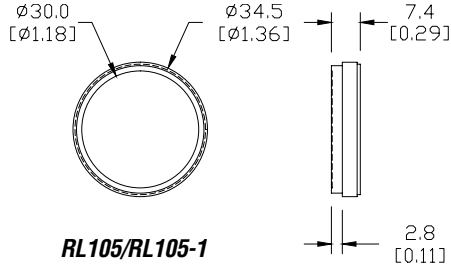
RL104/RL104-1



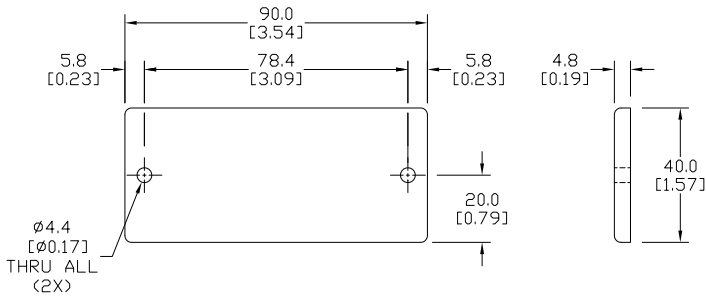
RL106G/RL106G-1



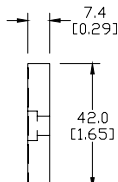
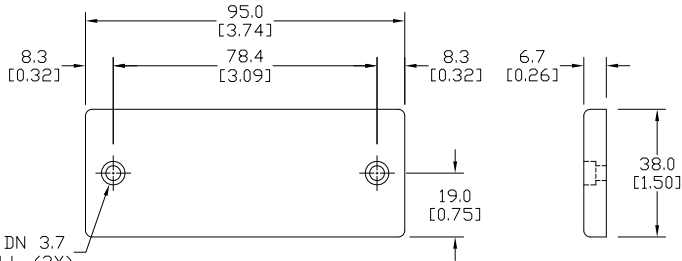
RL103/RL103-1



RL105/RL105-1



RL105G/RL105G-1



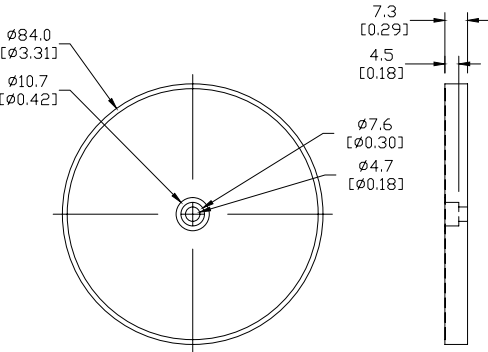
See our website: www.AutomationDirect.com for complete engineering drawings

Reflectors

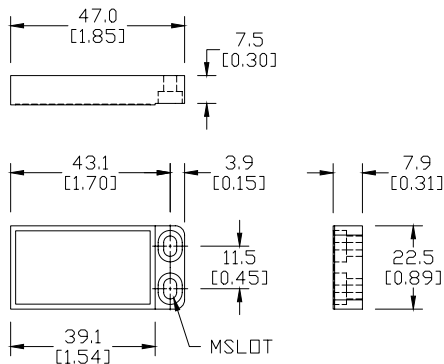
Dimensions

mm [inches]

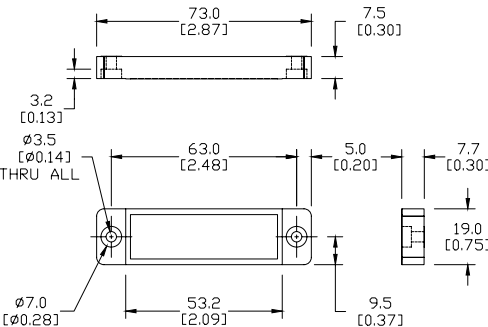
RL110/RL110-1



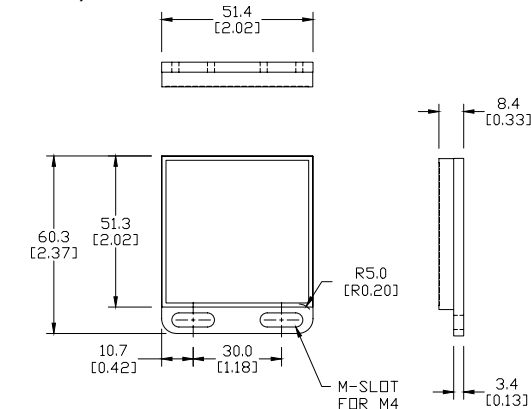
RL111G/RL111G-1



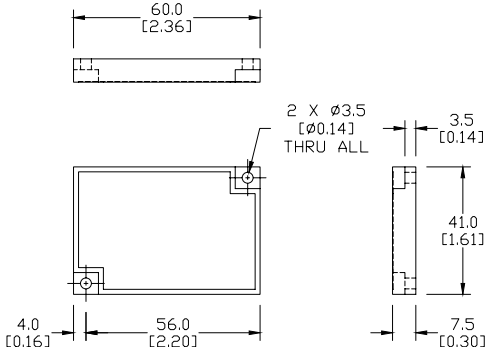
RL112G/RL112G-1



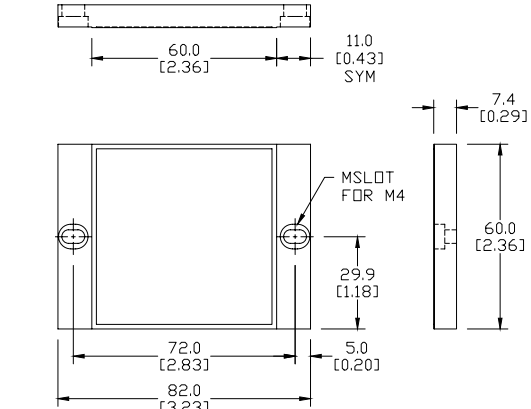
RL113G/RL113G-1



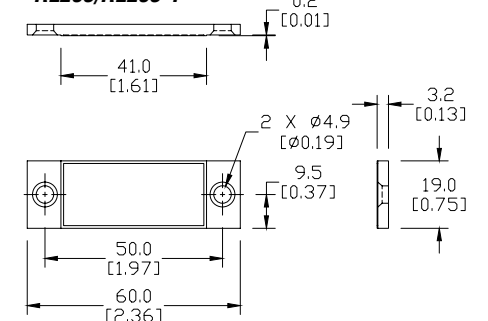
RL116/RL116-1



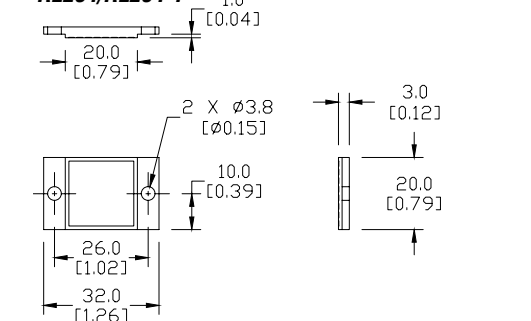
RL201/RL201-1



RL203/RL203-1



RL204/RL204-1



See our website: www.AutomationDirect.com for complete engineering drawings

Shutters and Adapters

Shutters for M18 (18mm) Through-beam Sensors (SSE / SSR)

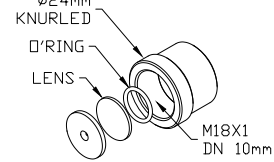
- Reduces the emitted beam, allowing the detection of small targets
- Shutter consists of an aluminum cap and aperture with an O-ring and glass lens, which can screw onto the optical head of either the emitter or receiver



STOS1-STOS8

Dimensions

mm [inches]



Sensing Distance (When Used with SSE / SSR Model Photoelectric Switches)						
Model	STOS1	STOS2	STOS3	STOS4	STOS6	STOS8
Price	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00
Ø x shutter (mm)	1	2	3	4	6	8
Distance (m)	N/A	N/A	N/A	1.5	3.5	6.5
Object (mm)	N/A	N/A	N/A	2	3	4

Table shows sensing distance and minimal detectable object.

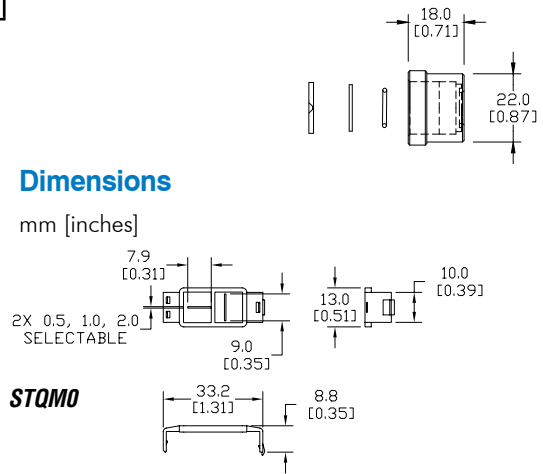
Shutter Accessory for QM Series Sensors			
Part Number	Price	Description	Wt
STQMO	\$14.00	Shutter, plastic. Package of 2. For use with through beam QM series photoelectric sensors. Vertical and horizontal diaphragms (0.5, 1, 2mm) included.	0.1

Shutter (STQMO) Sensing Distances			
Shutter Size	0.5 mm	1mm	2mm
Maximum Sensing Distance	1.5 m	2 m	4.5 m
Minimum Detectable Object Diameter	0.8 mm	1.5 mm	2.5 mm

Note: With shutters on emitter and receiver in same vertical or horizontal orientation.

Dimensions

mm [inches]



STQMO

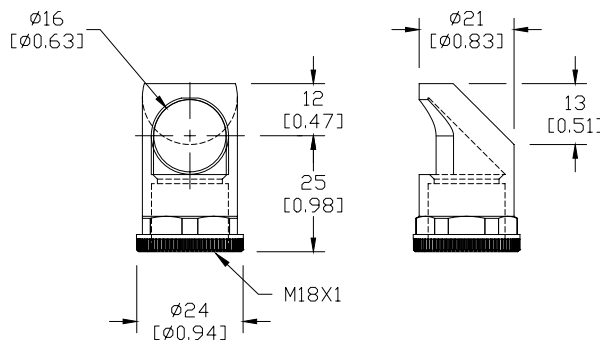
Right-angle M18 (18 mm) Beam Adapter

For use with M18 retroreflective and through-beam photoelectric switches (not for use with diffuse reflection sensors). Allows 90° light detection using an internal mirror set at 45° to the optical axis. Sensitivity loss is about 20-30%.

Beam Adapters			
Part Number	Price	Description	Weight (lb)
ST03	\$14.00	Right-angle beam adapter, for use with 18mm sensors (except diffuse reflection models), mirror allows 90 degree light detection.	0.06

Dimensions

mm [inches]



ST03

See our website: www.AutomationDirect.com for complete engineering drawings