

# OPT Series Transit Time Photoelectric Sensors

## Rectangular Plastic Distance Sensors



OPT2010, OPT2015, OPT2019

- Diffuse and Retro-reflective (Transit time) laser distance measurement sensors
- Analog and switching outputs available
- Measured value independent of material, color, and brightness
- Class 1 and 2 lasers available (safety label included with Class 2 lasers)
- M12 quick-disconnect and pigtail versions; order cable separately
- Mounting hardware included

OPT Series Photoelectric Sensors Selection Chart										
Part Number	Price	Working Range m [ft]	Laser Class	Function	Measurement Rate	Resolution	Output State	Connection	Wiring	Dims (mm)
<b>Diffuse (Transit Time)</b>										
OPT2010	\$249.00	0 - 3 [0 - 9.84]	1	Switching	1kHz	Hysteresis < 15mm	Complementary (NO/NC) PNP	5-pin M12 quick-disconnect	Diagram 1	50 x 50 x 50
OPT2011	\$295.00	0.05 - 3.05 [0.16 - 10.01]							Diagram 2	
OPT2012	\$319.00	0.2 - 6.2 [0.66 - 20.34]							Diagram 3	
OPT2013	\$559.00	0.1 - 10.1 [0.33 - 33.14]	2	Measuring/ Switching	1-100/s [10ms]	1-12 mm [0.04 - 0.47 in]	Analog 4-20 mA or 0-10 VDC Switching PNP/ NPN (NO/NC)	8-pin M12 quick-disconnect	Diagram 4	55 x 81 x 30
OPT2014	\$335.00							4-pin M12 quick-disconnect	Diagram 3	
OPT2016	\$249.00	0 - 1 [0 - 3.28]	1	Switching	1kHz	Hysteresis < 20mm	Complementary (NO/NC) PNP	4-pin M8 quick-disconnect	Diagram 5	22 x 32 x 12
OPT2017	\$249.00							4-pin M12 quick-disconnect, 200mm [7.87 in] cable		
OPT2018	\$249.00							4-pin M8 quick-disconnect, 200mm [7.87 in] cable		
OPT2019	\$249.00							Pigtail, 2m [6.5 ft] cable		
<b>Retro-Reflective (Transit Time)</b>										
OPT2015*	\$659.00	0.2 - 100.2 [0.66 - 328.74]	1	Measuring/ Switching	1-100/s [10ms]	4-20 mm [0.16 - 0.79 in]	Analog 4-20 mA or 0-10 VDC Switching PNP/ NPN (NO/NC)	8-pin M12 quick-disconnect	Diagram 4	55 x 81 x 30

\*Requires purchase of OPT2030 reflector (see Accessories). <50m sensing distance requires 1 reflector. 50-100m sensing distance requires 4 reflectors.

## Wiring Diagrams

**Diagram 1**

+ Supply Voltage "+"  
- Supply Voltage "0 V"  
A Switching output (NO)  
Ȧ Switching output (NC)  
La Emitted light can be switched off

**Diagram 2**

+ Supply Voltage "+"  
- Supply Voltage "0 V"  
O Analog output  
EA1/ EA2 Output/Input programmable

**Diagram 3**

+ Supply Voltage "+"  
- Supply Voltage "0 V"  
E/A3 Input/Output programmable  
A1 Switching Output (NO)

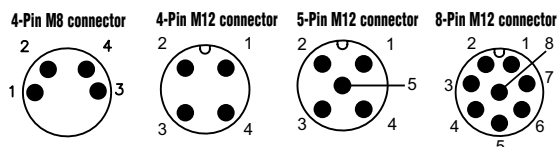
**Diagram 4**

+ Supply Voltage "+"  
- Supply Voltage "0 V"  
La Emitted light can be switched off  
O Analog output  
O- Ground for the Analog output  
E/A3 Input/Output programmable  
A1/A2 Switching Output (NO)

**Diagram 5**

+ Supply Voltage "+"  
- Supply Voltage "0 V"  
A Switching output (NO)  
Ȧ Switching output (NC)

## Connectors



Note: Class 2 power source required

Switching Element Function		
	Thru-Beam and Reflective Models	Diffuse Models
Light-on	NC	NO
Dark-on	NO	NC

# OPT Series Transit Time Photoelectric Sensors

OPT Series Transit Time Photoelectric Sensors Specifications											
Models	OPT2016	OPT2017	OPT2018	OPT2019	OPT2010	OPT2011	OPT2012	OPT2013	OPT2014	OPT2015	
Type	Diffuse (Transit time)									*Retro-Reflective	
Sensing distance – m [in]	1 [39.37]			3 [118.11]		3.05 [120.08]		6.2 [244.09]		10.1 [397.64]	100.2 [3944.90]
Light spot diameter (at maximum range)	< 15mm			9mm			< 12mm		< 20mm		80mm @ 40m < 200mm @ 100m
Laser class (EN 60825-1)	Class 1 Red Laser			Class 1 Red Laser			Class 2 Red Laser		Class 1 Red Laser		
Emission	680nm			660nm							
Sensitivity	Adjustable via Potentiometer				Adjustable via Teach						
Output type	PNP NO/NC				Programmable: Analog 4-20 mA/0-10 VDC, NO/NC PNP/NPN						
Current output max load	N/A				500Ω						
Operating voltage	10-30 VDC				18-30 VDC						
No load supply current	< 30mA			< 50mA		< 70mA		< 100mA			
Operating (load) current	100mA			200mA		100mA		200mA			
Voltage drop	< 2.5 V (switching outputs)										
Measurement rate	N/A				500/s		1-100/s				
Switching frequency	1000Hz				250Hz		50Hz				
Linearity	< 2.5%			NA			0.2 %		0.05%		
Short-circuit protection	Yes										
Operating temperature	-40°C to 50°C [-40°F to 122°F]			-40°C to 60°C [-40°F to 140°F]		-40°C to 50°C [-40°F to 122°F]		-25°C to 60°C [13°F to 140°F]			
Protection degree (DIN 40050)	IP67			IP68							
LED indicators - switching status	Yellow				Screen Display						
LED indicators - power	Green				Screen Display						
Housing material	Polycarbonate										
Lens material	Poly(methyl methacrylate) (PMMA)										
Shock/vibration	Tested according to EN 60068-2-6 / EN 60068-2-27										
Tightening torque	0.5 N·m (mounting screws)										
Weight (cable/connector)	8g [0.28 oz]	22g [0.78 oz]	16g [0.56 oz]	48g [1.69 oz]	37g [1.31 oz]	43g [1.52 oz]	81g [2.86 oz]	82g [2.89 oz]	80g [2.82 oz]	82g [2.89 oz]	
Connectors	4-pin M8	4-pin M12	4-pin M8	Pigtail	5-pin M12	4-pin M12		8-pin M12	4-pin M12	8-pin M12	
Agency approvals	CE, cULUS, E189727, RoHs										

\*Requires purchase of OPT2030 reflector (see Accessories). <50m sensing distance requires 1 reflector. 50-100m sensing distance requires 4 reflectors.

## IMPORTANT NOTE

The Laser Classification Systems for the standards IEC (EN) 60825-1 defines the following safety classes:

### Class 1

This class is eye-safe under all operating conditions.

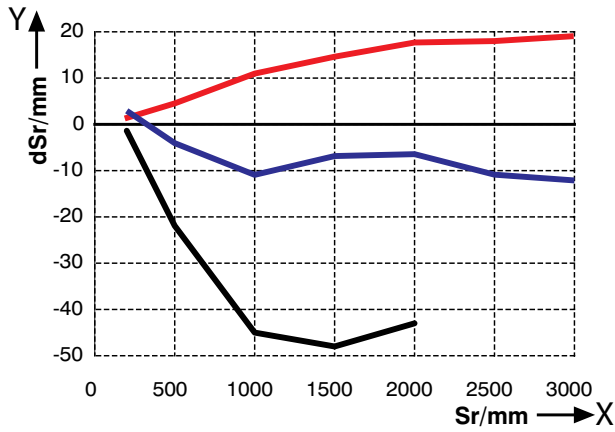
### Class 2

These are visible lasers. This class is safe for accidental viewing under all operating conditions. However, it may not be safe for a person who deliberately stares into the laser beam for longer than 0.25 seconds, by overcoming their natural aversion response to the very bright light.

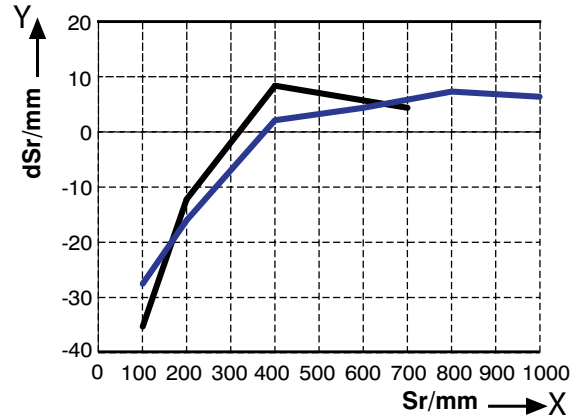
# OPT Series Transit Time Photoelectric Sensors

## Characteristic Curves

**OPT2010**



**OPT2016, OPT2017  
OPT2018, OPT2019**



Sr = Switching Distance

dSr = Switching Distance Change

black 6 % remission

blue 18 % remission

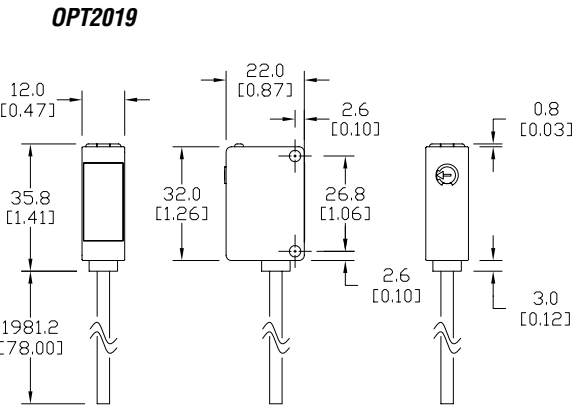
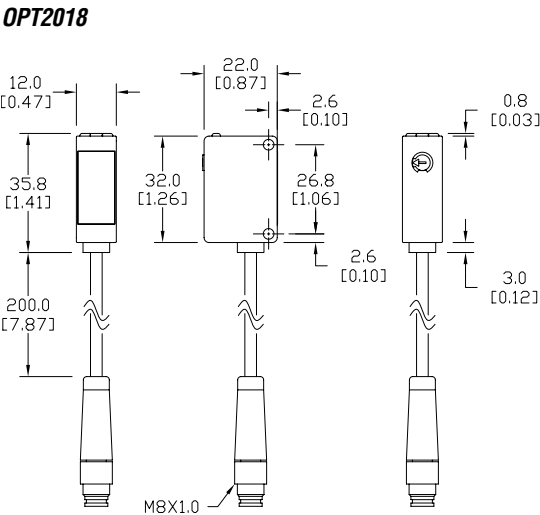
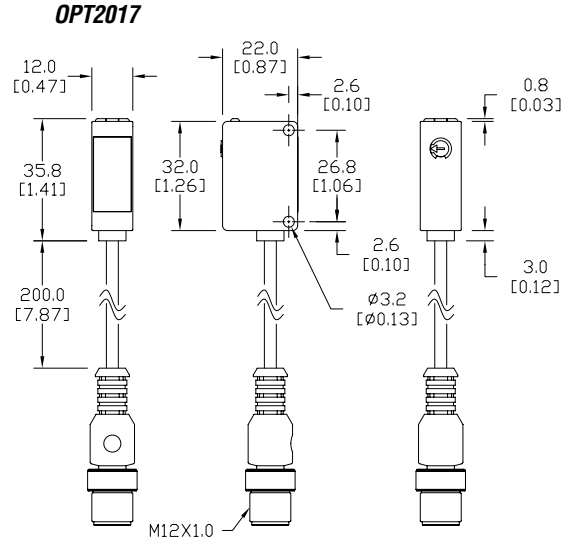
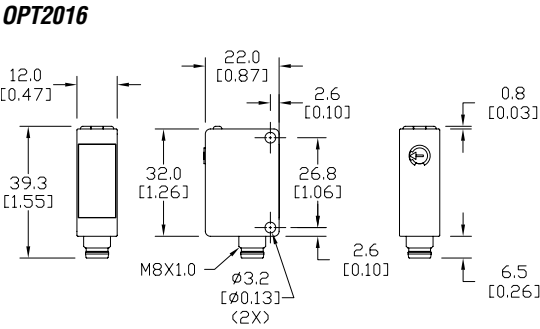
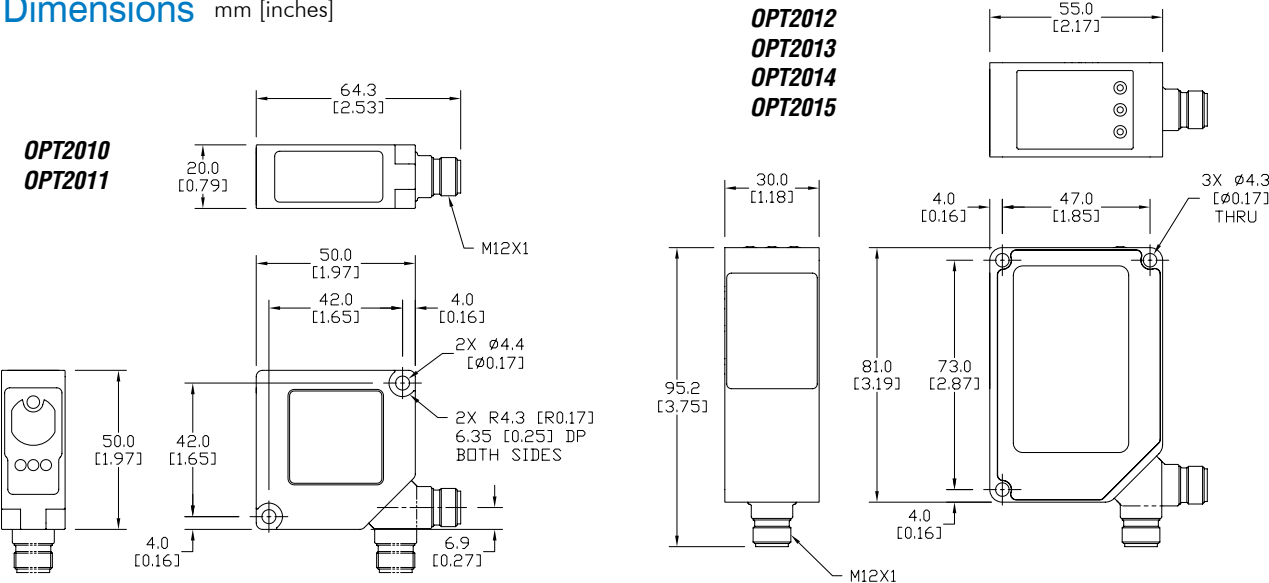
Brushed aluminum

<b>X</b>	Distance to target [mm]
<b>Y</b>	Minimum distance between object and background [mm]

*Typical curves based on Kodak white (90% remission)*

# OPT Series Transit Time Photoelectric Sensors

## Dimensions mm [inches]



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# Accessories for OPT2016-OPT2019 Photoelectric Sensors

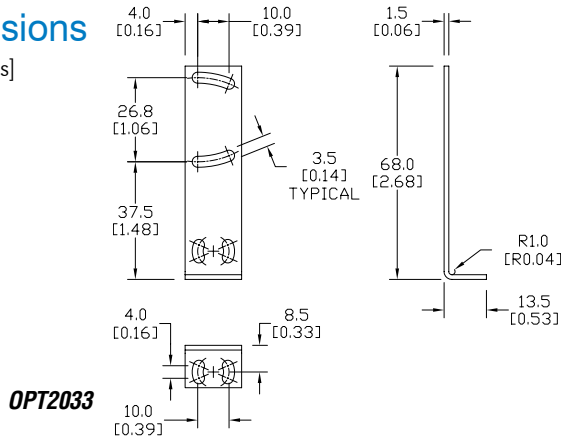
## Right-Angle Mounting Brackets

Mounting bracket, right angle, steel and nickel plated. For use with OPT2016-OPT2019 photoelectric sensors.

Mounting Brackets for OPT Series Photoelectric Sensors				
Part Number	Price	Description	Qty.	Weight
<b>OPT2033</b>	\$5.50	Right-angle mounting bracket, vertical adjustment, steel and nickel plated. For use with OPT2016 - OPT2019 photoelectric sensors.	1	16g [0.564 oz]

### Dimensions

mm [inches]



**OPT2033**

## Right-angle Swivel Mounting Systems

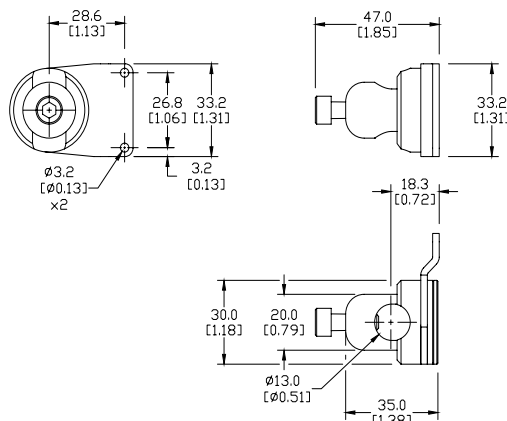
Mounting bracket, right-angle swivel, 360 degree vertical and horizontal adjustment, aluminum, 12mm rod mount. For use with OPT2016-OPT2019 photoelectric sensors. Available in all stainless steel or with an aluminum head with a stainless steel mounting plate.

Accessories for 26.8mm Sensors					
Part Number	Price	Description	Mounting Head	Mounting Plate	Weight [lb]
<b>OPT2120</b>	\$9.00	Mounting bracket, right-angle swivel, 360 vertical and horizontal adjustment, aluminum, 12mm rod mount. For use with OPT2016-OPT2019 photoelectric sensors.	Aluminum	304 Stainless Steel	0.14
<b>OPT2121</b>	\$16.00	Mounting bracket, right-angle swivel, 360 vertical and horizontal adjustment, 304 stainless steel, 12mm rod mount. For use with OPT2016-OPT2019 photoelectric 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).

### Dimensions

mm [inches]



**OPT2120, OPT2121**

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# Accessories for OPT2012 - OPT2015 Photoelectric Sensors

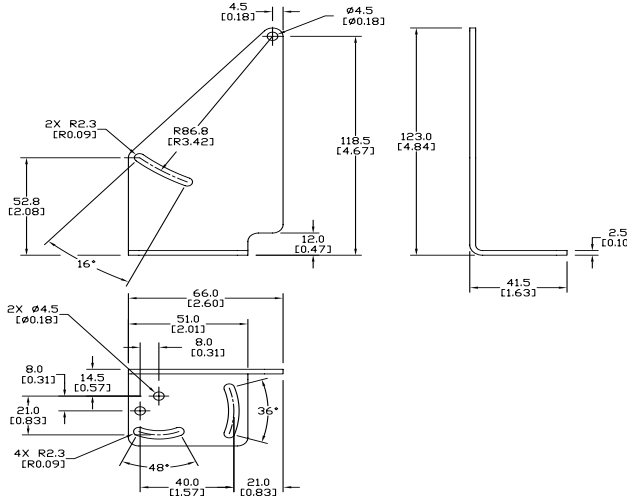
## Right-angle Mounting Bracket

Mounting bracket, right-angle, nickel-plated brass. For use with OPT2012 - OPT2015 photoelectric sensors.

Accessories for OPT2012-OPT2015 Photoelectric Sensors			
Part Number	Price	Description	Weight [lb]
OPT2032	\$5.50	Mounting bracket, right-angle, nickel-plated brass. For use with OPT2012 - OPT2015 photoelectric sensors.	0.36

### Dimensions

mm [inches]



OPT2032

## Right-angle Swivel Mounting Systems

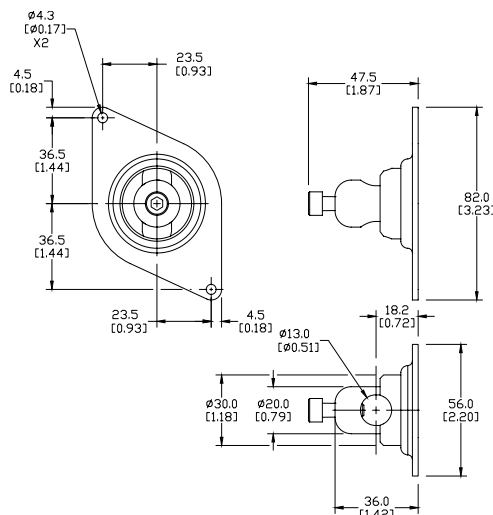
Mounting bracket, right-angle swivel, 360 degree vertical and horizontal adjustment, 12mm rod mount. For use with OPT2012 - OPT2015 photoelectric sensors. Available in all stainless steel or with an aluminum head with a stainless steel mounting plate.

Accessories for OPT2012-OPT2015 Photoelectric Sensors					
Part Number	Price	Description	Mounting Head	Mounting Plate	Weight [lb]
OPT2126	\$9.00	Mounting bracket, right-angle swivel, 360 vertical and horizontal adjustment, aluminum, 12mm rod mount. For use with OPT2012 - OPT2015 photoelectric sensors.	Aluminum	304 Stainless Steel	0.23
OPT2127	\$16.00	Mounting bracket, right-angle swivel, 360 vertical and horizontal adjustment, 304 stainless steel, 12mm rod mount. For use with OPT2012 - OPT2015 photoelectric sensors.	304 Stainless Steel	304 Stainless Steel	0.36

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

### Dimensions

mm [inches]



OPT2126, OPT2127

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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.

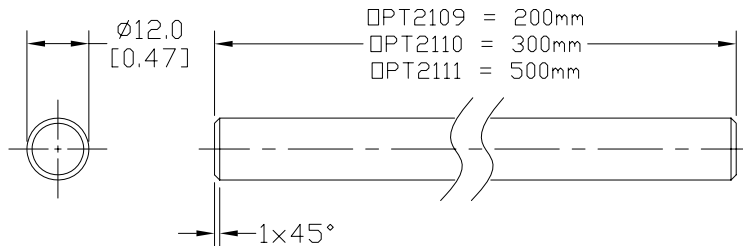
Mounting Rods for OPT2112-2127 Swivel Mounting Brackets			
Part Number	Price	Description	Weight [lb]
<b>OPT2109</b>	\$10.00	Mounting rod, 12mm diameter, 200mm length, 304 stainless steel.	0.41
<b>OPT2110</b>	\$12.00	Mounting rod, 12mm diameter, 300mm length, 304 stainless steel.	0.60
<b>OPT2111</b>	\$16.00	Mounting rod, 12mm diameter, 500mm length, 304 stainless steel.	0.98



**OPT2109, OPT2110, OPT2111**

## Dimensions

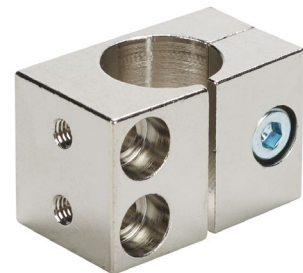
mm [inches]



## Right-angle Mounting Bracket

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

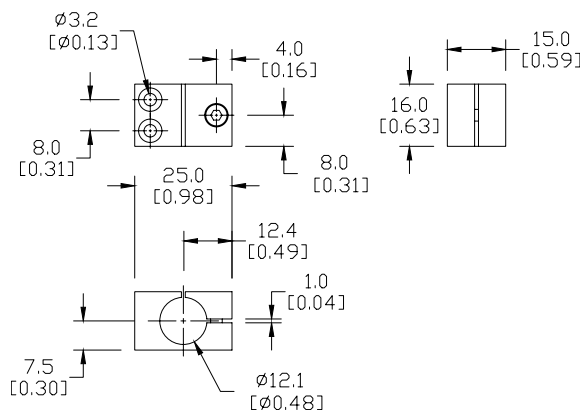
Accessories for 12mm Sensors			
Part Number	Price	Description	Weight [lb]
<b>OPT2108</b>	\$12.00	Mounting bracket, right-angle, nickel-plated brass. For use with 12mm mounting rods OPT2109, OPT2110 & OPT2111.	0.07



**OPT2108**

## Dimensions

mm [inches]



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# Reflectors

## Reflector for Photoelectric Laser Sensor

Accessories for OPT Series Photoelectric Sensors			
Part Number	Price	Description	Weight [lb]
<b>OPT2030</b>	\$11.00	Reflector, for photoelectric laser sensors, square, 100 x 100 mm. Plastic.	0.20

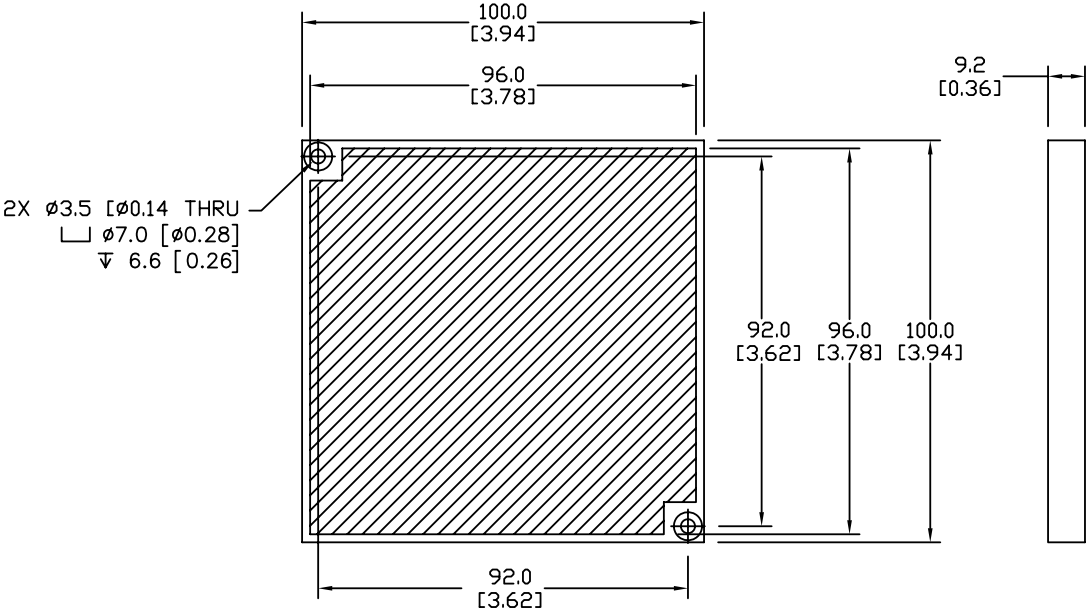
*Note: OPT2015 requires purchase of OPT2030 reflector. <50m sensing distance requires 1 reflector. 50-100 m sensing distance requires 4 reflectors.*



**OPT2030**

### Dimensions

mm [inches]



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