

FM Series Photoelectric Sensors



Harsh Duty Rectangular

- 27 harsh duty, washdown models available
- Rectangular photoelectric sensor (photo eye)
- 316L stainless steel housing
- Diffuse, diffuse with background suppression, polarized retroreflective and through-beam models
- 3-wire NPN or PNP
- Through-beam models consist of emitter and receiver pair (sold separately)
- 2m output cable, M8, or M12 quick-disconnect
Purchase cable separately
- Reflectors and mounting brackets available
- IP69K for food and beverage applications



FM Series Photoelectric Sensors (Diffuse) Selection Chart

Part Number	Price	Sensing Range	Light Emission	Logic	Connection	Wiring	Dimensions	Characteristic Curves
FMR6-0P-0A	\$;0?,k:	5 – 500 mm [0.197 – 19.68 in]	Visible Red 633 nm	PNP	2m [6.5 ft] cable (pigtail)	Diagram 1	Figure 1	3
FMR6-0P-0E	\$;:0?,l:			PNP	0.3 m cable with M12 quick-disconnect connector	Diagram 3	Figure 1	
FMR6-0P-0F	\$;0?,n:			PNP	4-pin M8 quick-disconnect	Diagram 3	Figure 2	
FMR6-0N-0A	\$;0?,o:			NPN	2m [6.5 ft] cable	Diagram 2	Figure 1	
FMR6-0N-0E	\$;0?,p:			NPN	0.3 m cable with M12 quick-disconnect connector	Diagram 4	Figure 1	
FMR6-0N-0F	\$;0?,q:			NPN	4-pin M8 quick-disconnect	Diagram 4	Figure 2	

Note: Brackets sold separately.

FM Series Photoelectric Sensors (Diffuse with Background Suppression) Selection Chart

Part Number	Price	Sensing Range	Light Emission	Logic	Connection	Wiring	Dimensions	Characteristic Curves
FMRS-0P-0A	\$;0?,e:	2 – 200 mm [0.079 – 7.87 in]	Visible Red 633 nm	PNP	2m [6.5 ft] cable	Diagram 1	Figure 1	4
FMRS-0P-0E	\$;:0?,f:			PNP	0.3 m cable with M12 quick-disconnect connector	Diagram 3	Figure 1	
FMRS-0P-0F	\$;0?,g:			PNP	4-pin M8 quick-disconnect	Diagram 3	Figure 2	
FMRS-0N-0A	\$;0?,h:			NPN	2m [6.5 ft] cable	Diagram 2	Figure 1	
FMRS-0N-0E	\$;-0?,i:			NPN	0.3 m cable with M12 quick-disconnect connector	Diagram 4	Figure 1	
FMRS-0N-0F	\$;-0?,j:			NPN	4-pin M8 quick-disconnect	Diagram 4	Figure 2	

Note: Brackets sold separately.

FM Series Photoelectric Sensors (Polarized Retroreflective) Selection Chart

Part Number	Price	Sensing Range	Light Emission	Logic	Connection	Wiring	Dimensions	Characteristic Curves
FMRP-0P-0A	\$;0?,s:	0.05 – 5 m [0.16 – 16.40 ft]	Visible Red 633 nm	PNP	2m [6.5 ft] cable	Diagram 1	Figure 1	2
FMRP-0P-0E	\$;:0?,t:			PNP	0.3 m cable with M12 quick-disconnect connector	Diagram 3	Figure 1	
FMRP-0P-0F	\$;0?,u:			PNP	4-pin M8 quick-disconnect	Diagram 3	Figure 2	
FMRP-0N-0A	\$;0?,v:			NPN	2m [6.5 ft] cable	Diagram 2	Figure 1	
FMRP-0N-0E	\$;0?,x:			NPN	0.3 m cable with M12 quick-disconnect connector	Diagram 4	Figure 1	
FMRP-0N-0F	\$;0?,y:			NPN	4-pin M8 quick-disconnect	Diagram 4	Figure 2	

Note: Reflectors and brackets sold separately.

FM Series Photoelectric Sensors

FM Series Photoelectric Sensors (Through-beam) Selection Chart

Part Number	Price	Sensing Range	Light Emission	Logic	Connection	Wiring	Dimensions	Characteristic Curves
Emitters								
<u>FMRE-00-0A</u>	\$;0?,z:	Up to 10m [32.81 ft]	Visible Red 633 nm	–	2m [6.5 ft] cable	Diagram 5	Figure 1	–
<u>FMRE-00-0E</u>	\$;0?,:]			–	0.3 m cable with M12 quick-disconnect connector	Diagram 6	Figure 1	–
<u>FMRE-00-0F</u>	\$;0?,[:			–	4-pin M8 quick-disconnect	Diagram 6	Figure 2	–
Receivers								
<u>FMRR-0P-0A</u>	\$;0?,_:	Up to 10m [32.81 ft]	–	PNP	2m [6.5 ft] cable	Diagram 1	Figure 1	1
<u>FMRR-0P-0E</u>	\$;0?,:#:			PNP	0.3 m cable with M12 quick-disconnect connector	Diagram 3	Figure 1	
<u>FMRR-0P-0F</u>	\$;0?,:!:			PNP	4-pin M8 quick-disconnect	Diagram 3	Figure 2	
<u>FMRR-0N-0A</u>	\$;0?,:?:			NPN	2m [6.5 ft] cable	Diagram 2	Figure 1	
<u>FMRR-0N-0E</u>	\$;0?,,,:			NPN	0.3 m cable with M12 quick-disconnect connector	Diagram 4	Figure 1	
<u>FMRR-0N-0F</u>	\$;0,00:			NPN	4-pin M8 quick-disconnect	Diagram 4	Figure 2	

Note: Brackets sold separately.

Wiring Diagrams

Diagram 1

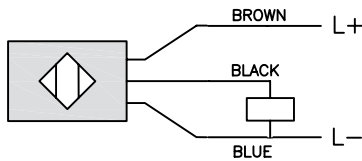


Diagram 2

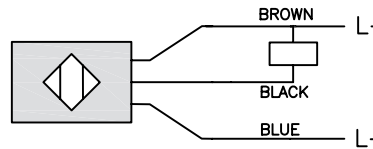


Diagram 3

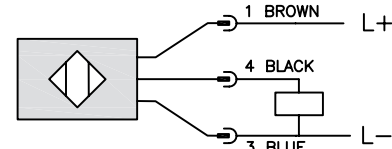


Diagram 4

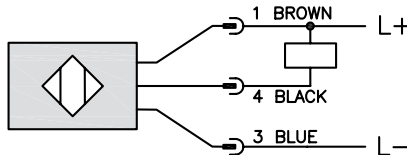


Diagram 5

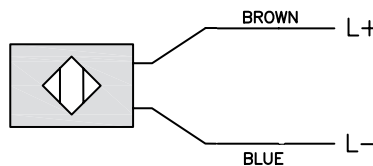
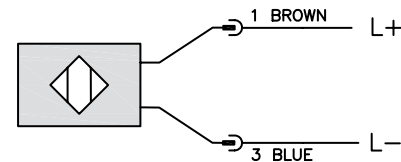
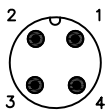


Diagram 6



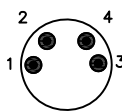
Connector

M12 Connector*



Connector

M8 Connector*



* Displaying sensor end.

Cable Assembly Wiring Colors:

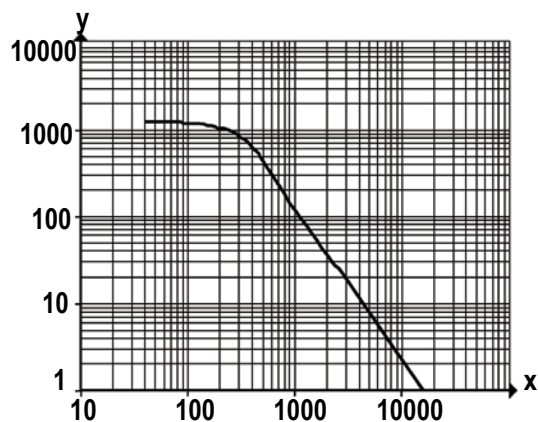
- Pin 1 - Brown
- Pin 2 - White
- Pin 3 - Blue
- Pin 4 - Black

Note: wiring colors are based on AutomationDirect 4-pole cable assemblies.

FM Series Photoelectric Sensors

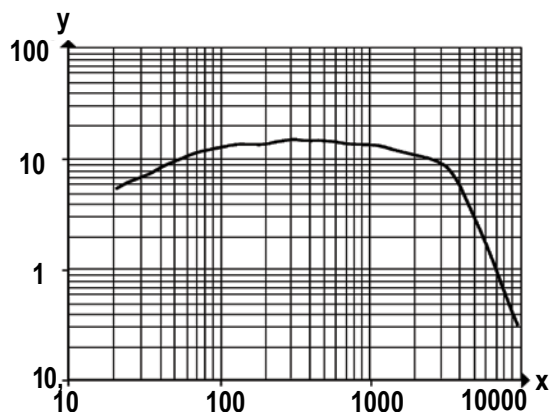
Characteristic Curves

Curve 1 (Through-beam)



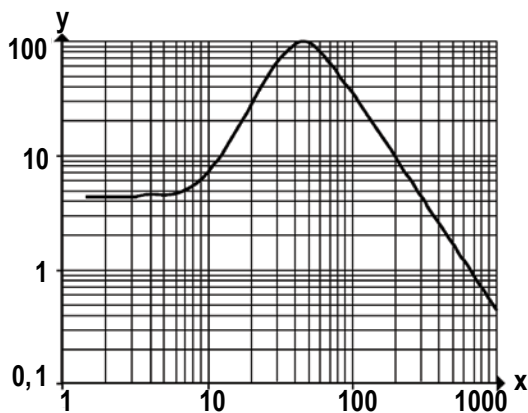
Excess gain graphs
x: distance [mm]
y: excess gain factor

Curve 2 (Polarized Retroreflective)



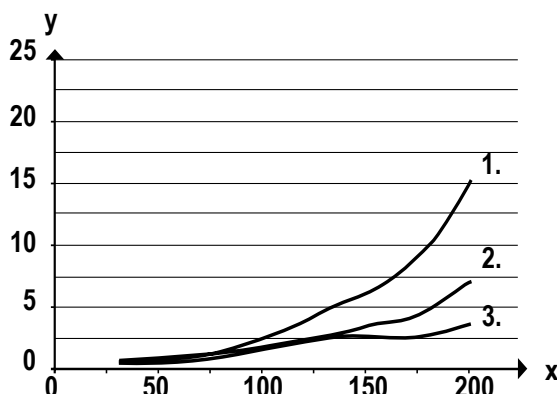
Excess gain graphs
x: distance [mm]
y: excess gain factor

Curve 3 (Diffuse)



Excess gain graphs
x: distance [mm]
y: excess gain factor

Curve 4 (Diffuse with Background Suppression)



c: background
x: distance sensor/object
y: min. distance object/background

Values in [mm]

- 1 = object black (6% remission), background white (90% remission)
- 2 = object gray (18% remission), background white (90% remission)
- 3 = object white (90% remission), background white (90% remission)

FM Series Photoelectric Sensors

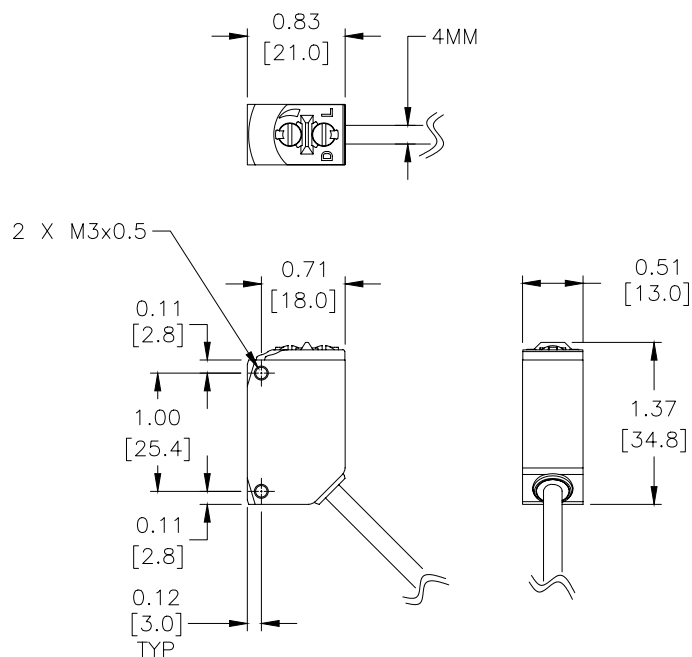
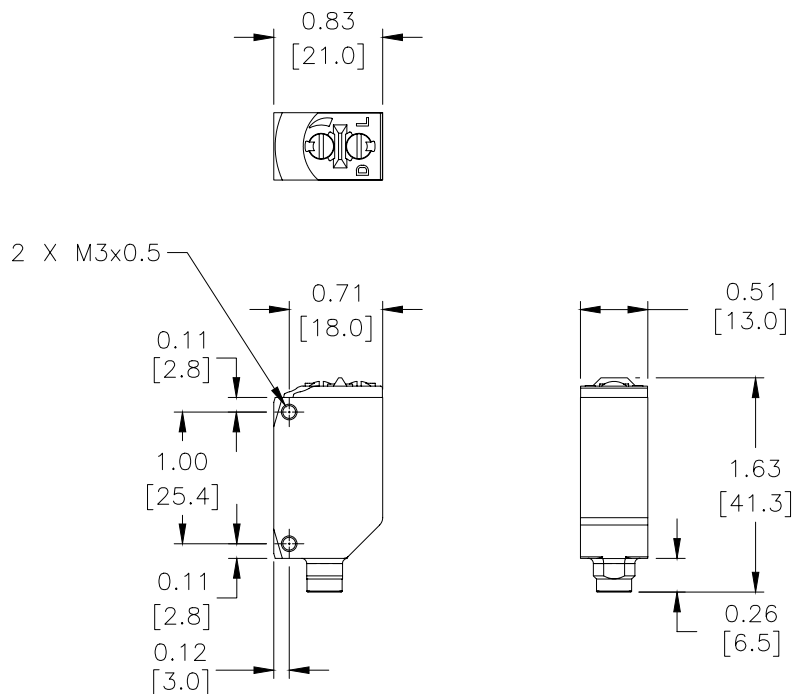
FM Series Photoelectric Sensors Specifications				
Type	Diffuse	Background Suppression	Polarized Retroreflective	Through-beam
Sensing Distance	Refer to Photoelectric Sensors Selection Guide (FM Series DC)			
Light Spot Diameter	Refer to Characteristic Curves			
Emission	Refer to FM Series Photoelectric Sensors Selection Charts			
Sensitivity	Adjustable			
Output State	Light-on or Dark-on			
Operating Voltage	10 – 30 VDC			
No Load Supply Current	16mA	22mA	12mA	7mA
Operating (Load) Current	≤ 100mA			
Off-state (Leakage) Current	–			
Voltage Drop	< 2.5 V			
Switching Frequency	1 kHz			
Ripple	–			
Time Delay Before Availability (tv)	Minimal			
Short-Circuit Protection	Yes (non-latching)			
Operating Temperature	-25 to 80°C [-13 to 176°F]			
Thermal Drift	–			
Protection Degree (DIN 40050)	IP65 IP67 IP68 IP69K			
LED Indicators - Light On/Dark On	Green (Power); Yellow (Output Status)			
LED Indicators - Excess Gain	–			
Housing Material	316L Stainless Steel			
Lens Material	Polymethyl methacrylate (PMMA)			
Shock/Vibration	See Photoelectric Sensor section			
Tightening Torque	–			
Weight	M8 quick-disconnect: 0.037 kg [1.31 oz] 0.3 m cable with M12 quick-disconnect connector: 0.053 kg [1.87 oz] 2-meter Cable: 0.084 kg [2.96 oz]	M8 quick-disconnect: 0.036 kg [1.27oz] 0.3 m cable with M12 quick-disconnect connector: 0.053 kg [1.87 oz] 2-meter Cable: 0.083 kg [2.93 oz]	M8 quick-disconnect: 0.037 kg [1.31 oz] 0.3 m cable with M12 quick-disconnect connector: 0.053 kg [1.87 oz] 2-meter Cable: 0.083 kg [2.93 oz]	M8 quick-disconnect: 0.036 kg [1.27oz] 0.3 m cable with M12 quick-disconnect connector: 0.053 kg [1.87 oz] 2-meter Cable: 0.084 kg [2.96 oz]
Connectors	Refer to FM Series Photoelectric Sensors Selection Charts			
Accessories	Reflectors and mounting brackets available			
Agency Approvals*	UL # E328811			

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

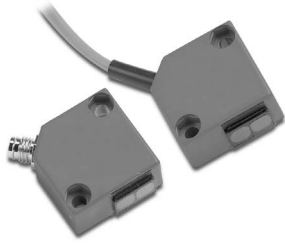
FM Series Photoelectric Sensors

Dimensions

inches [mm]

Figure 1**Figure 2**

CX Series Photoelectric Sensors



Mini-rectangular Plastic - DC

- 18 models available
- Long operating distances
- Adjustable sensitivity
- Scratch-resistant and easy to clean glass lens
- Axial cable or M8 quick-disconnect models
- Complete overload protection
- Mounting brackets are not needed
- IP65 rated



CX Series Mini-Rectangular Photoelectric Sensors Selection Chart

Part Number		Price	Sensing Range	Output State	Logic	Connection	Wiring	Dimensions	Characteristic Curves
Diffuse									
CX3-AN-1A		\$09?v:	Up to 600mm [23.62 in]	N.O.	NPN	2m [6.5 ft] axial cable	Diagram 1	Figure 1	Chart 1
CX3-AP-1A		\$09?y:			PNP	2m [6.5 ft] axial cable	Diagram 2	Figure 1	Chart 1
CX3-AN-1F		\$09?x:			NPN	M8 [8mm] connector	Diagram 1	Figure 2	Chart 1
CX3-AP-1F		\$09?z:			PNP	M8 [8mm] connector	Diagram 2	Figure 2	Chart 1
Diffuse with background suppression									
CX5-AN-1A		\$0a48:	15-150mm [0.59 to 5.91 in]	N.O.	NPN	2m [6.5 ft] axial cable	Diagram 1	Figure 1	Chart 2
CX5-AP-1A		\$0a4a:			PNP	2m [6.5 ft] axial cable	Diagram 2	Figure 1	Chart 2
CX5-AN-1F		\$0a49:			NPN	M8 [8mm] connector	Diagram 1	Figure 2	Chart 2
CX5-AP-1F		\$0a4b:			PNP	M8 [8mm] connector	Diagram 2	Figure 2	Chart 2
Polarized reflective*									
CXP-AN-1A		\$,09,8:	Up to 2m [6.6 ft]	N.O.	NPN	2m [6.5 ft] axial cable	Diagram 1	Figure 1	Chart 3
CXP-AP-1A		\$,09,a:			PNP	2m [6.5 ft] axial cable	Diagram 2	Figure 1	Chart 3
CXP-AN-1F		\$,09,9:			NPN	M8 [8mm] connector	Diagram 1	Figure 2	Chart 3
CXP-AP-1F		\$,09,b:			PNP	M8 [8mm] connector	Diagram 2	Figure 2	Chart 3
Through-beam**									
CXR-AP-1A	Receiver	\$,09,u:	Up to 6m [19.7 ft]	N.O.	PNP	2m [6.5 ft] axial cable	Diagram 2	Figure 1	Chart 4
CXR-AP-1F	Receiver	\$,09,v:			PNP	M8 [8mm] connector	Diagram 2	Figure 2	Chart 4
CXE-0N-1A	Emitter	\$,09,p:		Receiver dependent	Receiver dependent	2m [6.5 ft] axial cable	Diagram 3	Figure 1	Chart 4
CXE-0N-1F	Emitter	\$,09,q:				M8 [8mm] connector	Diagram 3	Figure 2	Chart 4

*Purchase reflectors separately.

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

Wiring Diagrams

Diagram 1
NPN Output

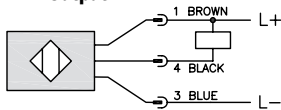


Diagram 2
PNP Output

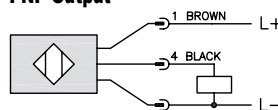
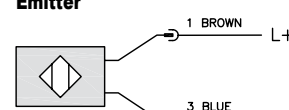


Diagram 3
Emitter

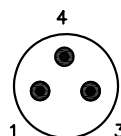


Emitter test input (<4V: OFF / >8V or open: ON) 0.5mA

Switching Element Function

	Through-beam and Reflective Models	Diffuse Reflective Models
Light-on	N.C.	N.O.
Dark-on	N.O.	N.C.

Connector
M8 connector



Warning: These products are not safety sensors and are not suitable for use in personal safety applications.

CX Series Photoelectric Sensors

CX Series Photoelectric Sensors Specifications				
Specifications	Diffuse Models	Diffuse Models with Background Suppression	Reflective Models	Through-beam Models ¹
Type	Diffuse reflection	Diffuse reflection with background suppression	Polarized reflection	Through-beam
Sensing Distance	600mm ²	15 to 150mm ³	2m	6m
Light Spot Diameter	See charts			
Emission	IR-LED [880nm]	LED red [660nm]	LED red polarized [660nm]	IR-LED [880nm]
Sensitivity	Adjustable 12-turn pot.			
Output Type	NPN or PNP; N.O. only			
Operating Voltage	10-36 VDC			
No Load Supply Current	15mA	25mA	15mA	15mA (R) / 10mA (E)
Operating (Load) Current	≤ 200mA			
Off-state (Leakage) Current	≤ 10μA			
Voltage Drop	≤ 2.0V			
Switching Frequency	1kHz	500Hz	1kHz	1kHz
Ripple	≤ 20%			
Time Delay Before Availability (tv)	100ms			
Short-Circuit Protection	Yes (switch auto-resets after overload is removed)			
Operating Temperature	-25 to 55°C [-13 to 131°F]			
Protection Degree (DIN 40050)	IEC IP65			
LED Indicators - Switching Status	Yellow (output state, output energized), green (excess light indication)			
Housing Material	PBTP (Crastin)			
Lens Material	Glass			
Shock/Vibration	See terminology section			
Tightening Torque	N/A			
Weight (cable/connector)	84g [2.96 oz] / 49g [1.73 oz]			232g [8.40oz] / 98g [3.46oz]
Connectors	2m [6.5 ft] axial cable; M8 [8mm] connector			
Agency Approvals	cULus E32881			

¹ Through-beam sensors must be used in pairs consisting of one receiver and one emitter ² With 200x200mm white matte paper

³ With 100x100mm white matte paper

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

Dimensions

(mm)

Figure 1

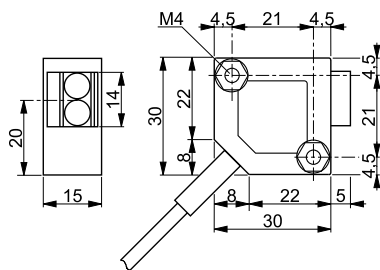
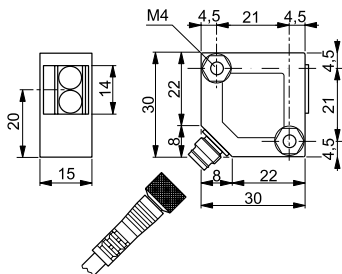


Figure 2



Characteristic curves

Chart 1 (Diffuse)

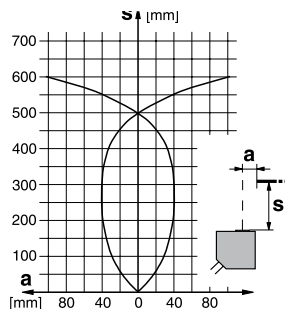


Chart 2 (Diffuse with background suppression)

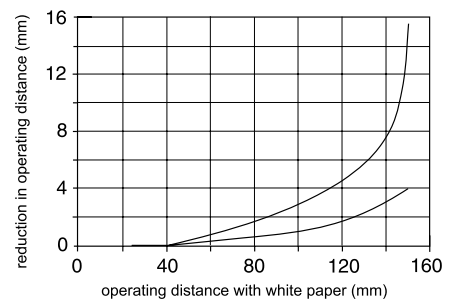


Chart 3 (Polarized reflective)

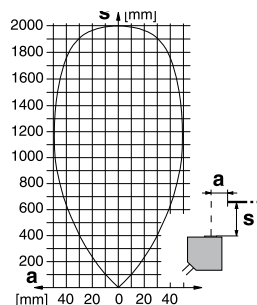
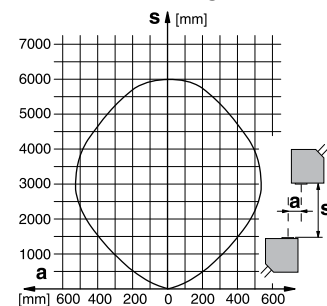


Chart 4 (Through-beam)



OPT Short Range (CMOS) Series Photoelectric Sensors



OPT2001

50 x 50mm Rectangular Plastic - DC

- Diffuse (Reflex) laser distance measurement sensors with CMOS technology
- 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)
- High resolution down to 8 μ m - (analog scalable down to 5mm range)
- High speed response times down to 660 μ s
- M12 quick-disconnect; purchase cable separately
- Mounting hardware included

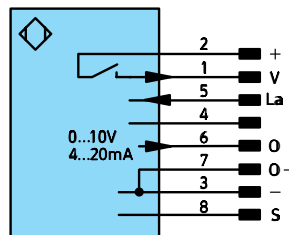


OPT Series Photoelectric Sensors Selection Chart

Part Number	Price	Sensing Range	Laser Class	Measurement Rate	Resolution	Output State	Logic	Connection	Wiring Diagram	Drawing Link	Characteristic Curves
Diffuse (Reflex)											
OPT2001	\$,;007![:	30-80mm	2	1500/s [660 μs]	< 8μm	Analog 4-20mA or 0-10V	—	8-pin M12 quick-disconnect	Diagram 1	PDF	See Characteristic Curve
OPT2002	\$,;007!_:	[1.18-3.15 in]	1	1000/s [1000 μs]			—			PDF	
OPT2003	\$,;007!#:	40-160mm	2	1500/s [660 μs]	< 20μm		—			PDF	
OPT2004	\$,;007!::	[1.57-6.30 in]	1	1000/s [1000 μs]			—			PDF	
OPT2005	\$,;007!?:	50-350mm	2	800/s [1250 μs]	< 50μm		—			PDF	
OPT2006	\$,;007!,::	[1.97-13.80 in]	1	500/s [2000 μs]			—			PDF	
OPT2007	\$,;007!z:	0 - 660 mm [0 - 25.98 in] working range 60-660 mm [2.36 - 25.98 in] adjustable range	1	100 Hz switching	Hysteresis <1 % of range	Selectable [N.O.,N.C.]	5-wire, configurable as PNP, NPN, or Push-Pull	5-pin M12 quick-disconnect	Diagram 2	PDF	—

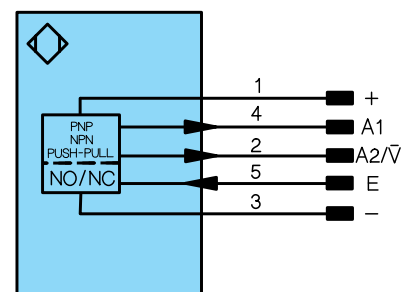
Wiring Diagrams

Diagram 1



- + Supply Voltage "+"
- V Contamination/Error output (NO)
- O Analog output
- O- Ground for the analog output
- Supply Voltage "0 V"
- S Shielding
- La Emitted Light disengageable

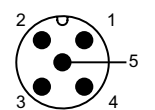
Diagram 2



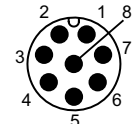
- + Supply Voltage "+"
- Supply Voltage "0 V"
- A1/A2 Switching output (NO)
- V Contamination Warning/
Error Output (NC)
- E Input (Teach Input, Emitted light can
be switched off)

Connectors

5-Pin M12 connector



8-Pin M12 connector



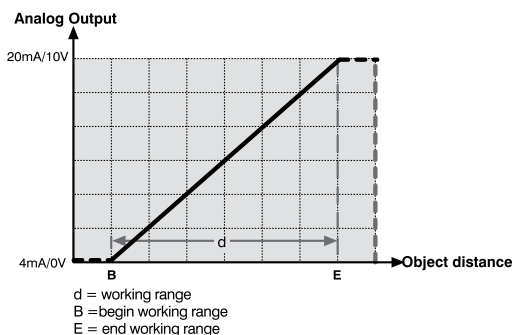
Note: Class 2 power source required

OPT Short Range (CMOS) Series

Photoelectric Sensors

Specifications	OPT2001	OPT2002	OPT2003	OPT2004	OPT2005	OPT2006	OPT2007
Type	Diffuse Reflex						
Sensing Distance	30-80 mm [1.18-3.15 in]	30-80 mm [1.18-3.15 in]	40-160 mm [1.57- 6.30 in]	40-160 mm [1.57- 6.30 in]	50-350 mm [1.97-13.78 in]	50-350 mm [1.97-13.78 in]	60-660 mm [2.36-25.98 in]
Light Spot Diameter (at maximum range)	1 x 2 mm [0.04 x 0.08 in]	0.7 x 1.4 mm [0.03 x 0.06 in]	1 x 2.5 mm [0.04 x 0.10 in]	0.9 x 1.8 mm [0.04 x 0.07 in]	1.5 x 4 mm [0.06 x 0.16 in]	1.4 x 3.1 mm [0.06 x 0.12 in]	2.0 x 5.5 mm [0.08 x 0.22 in]
Emission	Class 2 Red laser 660Nm	Class 1 Red laser 660Nm	Class 2 Red laser 660Nm	Class 1 Red laser 660Nm	Class 2 Red laser 660Nm	Class 1 Red laser 660Nm	Class 1 Red laser 655Nm
Sensitivity	Adjustable via Teach						
Output Type	0-10 VDC or 4-20mA: PNP error output						Complementary N.O./N.C. [Light-on, Dark-on] PNP or NPN
Current Output Max Load	500Ω						NA
Voltage Output Min Load	10 KΩ						NA
Operating Voltage	18-30 VDC						10-30 VDC
No Load Supply Current	< 80mA @ 24VDC						<50mA @ 2VDC
Operating (Load) Current	max 200mA						
Off-state (Leakage) Current	negligible						
Voltage Drop	< 2.5V						<1.5V
Measurement Rate/ Resolution	1500/s [660μs] @ 12μm 600/s [1660μs] @ 8μm	1000/s [1000μs] @ 12μm 500/s [2000μs] @ 8μm	1500/s [660μs] @ 30μm 600/s [1660μs] @ 20μm	1000/s [1000μs] @ 30μm 500/s [2000μs] @ 20μm	800/s [1250μs] @ 80μm 400/s [2500μs] @ 50μm	500/s [2000μs] @ 80μm 250/s [4000μs] @ 50μm	NA
Switching Frequency	1.5 kHz	1.0 kHz	1.5 kHz	1.0 kHz	800Hz	500Hz	100Hz
Linearity	0.1%				0.15%		NA
Time Delay Before Availability (tv)	NA						
Short-Circuit Protection	Yes						
Operating Temperature	-25 to 50°C [-13 to 122°F]						-25 to 60°C [-13 to 140°F]
Protection Degree (DIN 40050)	IEC IP67						IEC IP68
LED Indicators - Switching Status	Yellow						
LED Indicators - Power	Green						
Housing Material	Polycarbonate						
Lens Material	Polymethyl methacrylate (PMMA)						
Shock/Vibration	See terminology section.						
Tightening Torque	0.5 N·m (mounting screws)						
Weight (lbs) (cable/connector)	0.2						
Connectors	M12 quick-disconnect						
Agency Approvals	CE, cULUS, E189727, RoHs						

Characteristic Curves



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

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 and M8 quick-disconnect and pigtail versions; purchase 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	Dimensions [mm]	Drawing Link
Diffuse (Transit Time)											
OPT2010	\$,007!:	0 - 3 [0 - 9.84]	1	Switching	1kHz	Hysteresis < 15mm	Complementary (N.O./N.C.) PNP	5-pin M12 quick-disconnect	Diagram 1	50 x 50 x 20	PDF
OPT2011	\$007?0:	0.05 - 3.05 [0.16 - 10.01]		Measuring / Switching	500/s [2ms]	1mm [0.04 in]	Analog 4-20 mA or 0-10 VDC	4-pin M12 quick-disconnect	Diagram 2		PDF
OPT2012	\$007?1:	0.2 - 6.2 [0.66 - 20.34]			1-100/s [10ms]	1-12 mm [0.04 - 0.47 in]		Switching PNP/NPN (N.O./N.C.)	8-pin M12 quick-disconnect	Diagram 3	55 x 81 x 30
OPT2013	\$007?2:	0.1 - 10.1 [0.33 - 33.14]	2				4-pin M12 quick-disconnect		Diagram 4	PDF	
OPT2014	\$007?3:						4-pin M12 quick-disconnect		Diagram 3	PDF	
OPT2016	\$01nv_:	0 - 1 [0 - 3.28]	1		1kHz	Hysteresis < 20mm	Complementary (N.O./N.C.) PNP	4-pin M8 quick-disconnect	Diagram 5	22 x 32 x 12	PDF
OPT2017	\$01nv#:							4-pin M12 quick-disconnect, 200mm [7.87 in] cable			PDF
OPT2018	,\$01nv!:							4-pin M8 quick-disconnect, 200mm [7.87 in] cable			PDF
OPT2019	\$01nv?:							Pigtail, 2m [6.5 ft] cable			PDF
OPT2170	,\$04]og:	0 - 3 [0 - 9.84]	1	Switching	500HZ	Hysteresis < 15mm	2 mutually independent switching PNP	5-pin M12 quick-disconnect	Diagram 6	50 x 50 x 20	PDF
OPT2171	,\$-04]oi:						2 mutually independent switching NPN		Diagram 6		PDF
OPT2172	,\$-04]oj:	0 - 1 [0 - 3.28]				Hysteresis < 20mm	2 mutually independent switching PNP	4-pin M8 quick-disconnect	Diagram 7	22 x 32 x 12	PDF
OPT2173	,\$04]ok:							4-pin M8 quick-disconnect, 200mm [7.87 in] cable			PDF
OPT2174	,\$-04]ol:										PDF
Retro-Reflective (Transit Time)											
OPT2015*	\$007?4:	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 (N.O./N.C.)	8-pin M12 quick-disconnect	Diagram 4	55 x 81 x 30	PDF

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

Accessories for QM and FM Series

Photoelectric Sensors

Right-angle Mounting Brackets

Mounting bracket, right-angle vertical, 304 stainless steel. For use with QM & FM series photoelectric sensors. Mounting hardware included.

Accessories for QM and FM Series Photoelectric Sensors				
Part Number	Price	Description	Drawing Link	Weight [lb]
ST101	\$5.11	Micro Detectors mounting bracket, right-angle vertical, 304 stainless steel. For use with QM & FM series photoelectric sensors. Mounting hardware included.	PDF	0.04
ST102	\$5.72	Micro Detectors mounting bracket, right-angle horizontal, 304 stainless steel. For use with QM & FM series photoelectric sensors. Mounting hardware included.	PDF	0.05
ST104	\$5.10	Micro Detectors mounting bracket, protective horizontal, 304 stainless steel. For use with prewired QM & FM series photoelectric sensors only. Mounting hardware included.	PDF	0.05



[ST101](#)



[ST102](#)



[ST104](#)

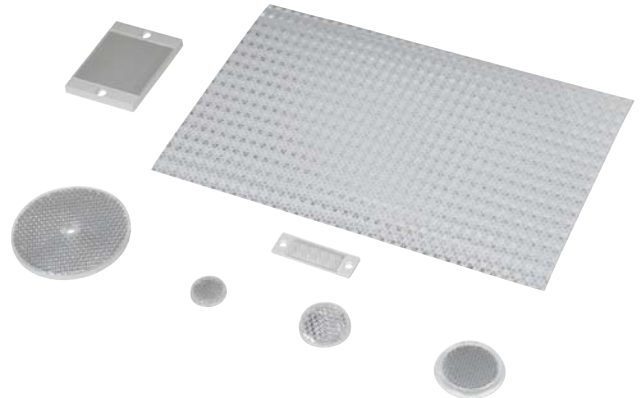
Reflectors

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[j:	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.