



# M12 Metal Photoelectric Sensors

## M12 (12mm) Metal – DC



**LTR-M12MA-PMK-603**  
**LTR-M12MA-PMS-101**

- Diffuse, retroreflective, through-beam styles
- Axial cable or M12 quick-disconnect models; purchase cable separately
- Complete overload protection
- IP67 rated
- 2-year warranty
- IO-Link v1.0 on PNP models

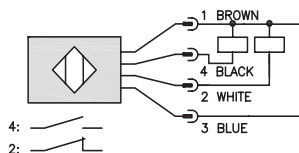


M12 Metal Photoelectric Sensors									
Part Number	Price	Sensing Range	Switching Frequency	Light Emission	Logic	Output Function	Connection Type	Wiring	Drawing Link
Diffuse reflective									
<a href="#">LTR-M12MA-PMK-603</a>	\$40.50	5-800mm [0.196 - 31.49 in]	1.5 kHz	Visible red	PNP	Complementary Light-on / Dark-on	4-wire pigtail	Diagram 2	<a href="#">PDF</a>
<a href="#">LTR-M12MA-PMK-101</a>	\$40.50	5-800mm [0.196 - 31.49 in]	1.5 kHz	Visible red	NPN		4-wire pigtail	Diagram 1	<a href="#">PDF</a>
<a href="#">LTR-M12MA-PMS-603</a>	\$40.50	5-800mm [0.196 - 31.49 in]	1.5 kHz	Visible red	PNP		4-pin M12 quick-disconnect	Diagram 2	<a href="#">PDF</a>
<a href="#">LTR-M12MA-PMS-101</a>	\$40.50	5-800mm [0.196 - 31.49 in]	1.5 kHz	Visible red	NPN		4-pin M12 quick-disconnect	Diagram 1	<a href="#">PDF</a>
*Retroreflective sensor									
<a href="#">LRR-M12MA-NMK-603</a>	\$45.50	0.15-4m [0.005 -13.12 ft]	1.5 kHz	Visible red	PNP	Complementary Light-on / Dark-on	4-wire pigtail	Diagram 2	<a href="#">PDF</a>
<a href="#">LRR-M12MA-NMK-101</a>	\$45.50	0.15-4m [0.005 -13.12 ft]	1.5 kHz	Visible red	NPN		4-wire pigtail	Diagram 1	<a href="#">PDF</a>
<a href="#">LRR-M12MA-NMS-603</a>	\$45.50	0.15-4m [0.005 -13.12 ft]	1.5 kHz	Visible red	PNP		4-pin M12 quick-disconnect	Diagram 2	<a href="#">PDF</a>
<a href="#">LRR-M12MA-NMS-101</a>	\$45.50	0.15-4m [0.005 -13.12 ft]	1.5 kHz	Visible red	NPN		4-pin M12 quick-disconnect	Diagram 1	<a href="#">PDF</a>
*Purchase reflector separately									
Through-beam emitters									
<a href="#">LLR-M12MA-NMK-400</a>	\$27.50	0-10m [0 - 32.80 ft]	1 kHz	Visible red	N/A	N/A	4-wire pigtail	Diagram 3	<a href="#">PDF</a>
<a href="#">LLR-M12MA-NMS-400</a>	\$27.50	0-10m [0 - 32.80 ft]	1 kHz	Visible red	N/A	N/A	4-pin M12 quick-disconnect	Diagram 3	<a href="#">PDF</a>
Through-beam receivers									
<a href="#">LLR-M12MA-NMK-603</a>	\$38.00	0-10m [0 - 32.80 ft]	1 kHz	N/A	PNP	Complementary Light-on / Dark-on	4-wire pigtail	Diagram 2	<a href="#">PDF</a>
<a href="#">LLR-M12MA-NMK-101</a>	\$38.00	0-10m [0 - 32.80 ft]	1 kHz	N/A	NPN		4-wire pigtail	Diagram 1	<a href="#">PDF</a>
<a href="#">LLR-M12MA-NMS-603</a>	\$38.00	0-10m [0 - 32.80 ft]	1 kHz	N/A	PNP		4-pin M12 quick-disconnect	Diagram 2	<a href="#">PDF</a>
<a href="#">LLR-M12MA-NMS-101</a>	\$38.00	0-10m [0 - 32.80 ft]	1 kHz	N/A	NPN		4-pin M12 quick-disconnect	Diagram 1	<a href="#">PDF</a>

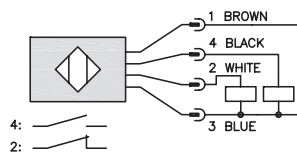
Warning: These products are not safety sensors and are not suitable for use in personal safety applications.

## Wiring Diagrams

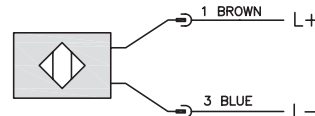
**Diagram 1**  
**4-Wire NPN Output**



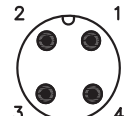
**Diagram 2**  
**4-Wire PNP Output**



**Diagram 3**  
**Emitter**



**M12 connector**





# M12 Metal Photoelectric Sensors Specifications



M12 Metal Photoelectric Sensors Specifications			
Sensor type	Diffuse reflective (LTR)	Retroreflective (LRR)	Through-Beam (LLR)
<b>Sensing Distance</b> <sup>1</sup>	5-800mm [0.196 - 31.49 in]	0.15-4m [0.005 - 13.12 ft]	0-10m [0 - 32.80 ft]
<b>Operating Range</b>	6 - 650 mm [0.23 - 25.59 in]	20 - 3,200 mm [0.78 - 125.98 in]	0 - 8000 mm [0 - 314.96]
<b>Light Spot Diameter (Distance)</b>	15mm - [0.3 m] 25mm - [0.6 m]	20mm [0.5 m] 80mm [2m]	6mm [2m] 15mm [5m]
<b>Emission</b>	LED, red 645nm	LED, red 645nm	LED, red 630nm
<b>Sensitivity</b>	90 - 800 mm, 3/4 turn pot	500 - 4,000 mm I/O-Link only	2,000 - 10,000 mm, IO-Link only
<b>Output Types</b>	NPN or PNP		
<b>Operating Voltage</b>	10-30 VDC		
<b>No Load Supply Current</b>	≤ 15mA	≤ 15mA	≤ 10mA
<b>Operating (Load) Current</b>	≤ 200mA		
<b>Response Time</b> <sup>1</sup>	≤ 300ms (normal) / ≤ 1ms / ≤ 100μs	≤ 300ms (normal) / ≤ 1ms / ≤ 100μs	≤ 500s (normal) / ≤ 1ms / ≤ 250μs
<b>Switching Frequency</b> <sup>1</sup>	≤ 700Hz (normal) ≤ 450Hz / ≤ 1kHz	≤ 1.5 kHz (normal) ≤ 500Hz / ≤ 5kHz	≤ 1kHz (normal) / ≤ 500Hz / ≤ 2kHz
<b>Ripple</b>	10%Vpp		
<b>Voltage Reversal Protection</b>	Yes		
<b>Short-circuit Protection</b>	Yes		
<b>Operating Temperature</b>	-25 to 65°C [-13 to 149°F]		
<b>Protection Degree</b>	IP67		
<b>LED Indicators - Switching Status</b>	Green LED: excess gain; Yellow LED: sensing state		
<b>Housing Material</b>	Chrome plated brass		
<b>Lens Material</b>	PMMA - Poly (methyl methacrylate)		
<b>Shock/Vibration</b>	IEC 60947-5-2		
<b>Tightening Torque</b>	1 N•m [0.73 lb•ft]		
<b>Weight</b>	14.3 g [0.50 oz] Connector version 79g [2.79 oz] Cable version		
<b>IO-Link</b>	IO-Link v1.0, PNP units only		
<b>Connectors</b>	PVC, 2m [6.5 ft] 3-wire or 4-wire; 4-pin M12 quick-disconnect		
<b>Agency Approvals</b>	cULus, CE		

<sup>1</sup>By default, "Normal" mode. "Fine" and "Fast" modes selectable via IO-Link.

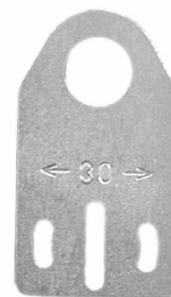
To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page.

# Accessories for 12mm Sensors

## Axial Mounting Bracket

Mounting bracket, axial, available in zinc-plated steel or 316L stainless steel. For use with 12mm sensors. Has two mounting holes (use 3mm screws) and allows the rotation of an optical axis for right-angle adapter sensors. Hexagonal nuts not included.

Accessories for 12mm Sensors				
Part Number	Price	Description	Drawing Link	Weight lb [g]
<a href="#"><u>ST12A</u></a>	\$2.00	Micro Detectors mounting bracket, axial, zinc plated steel. For use with 12mm sensors.	<a href="#"><u>PDF</u></a>	0.03 [13.6]
<a href="#"><u>ST12A7W</u></a>	\$7.25	Micro Detectors mounting bracket, axial, 316L stainless steel. For use with 12mm sensors.	<a href="#"><u>PDF</u></a>	0.03 [13.6]



[ST12A](#)

## Right-angle Mounting Bracket

Mounting bracket, right-angle, zinc-plated steel or 316L stainless steel. For use with 12mm sensors. Has two mounting holes (use 3mm screws) and allows the rotation of an optical axis for axial sensors. Hexagonal screws not included.

Accessories for 12mm Sensors				
Part Number	Price	Description	Drawing Link	Weight lb [g]
<a href="#"><u>ST12C</u></a>	\$2.00	Micro Detectors mounting bracket, right-angle, zinc plated steel. For use with 12mm sensors.	<a href="#"><u>PDF</u></a>	0.03 [13.6]
<a href="#"><u>ST12C7W</u></a>	\$7.25	Micro Detectors mounting bracket, right-angle, 316L stainless steel. For use with 12mm sensors.	<a href="#"><u>PDF</u></a>	0.03 [13.6]



[ST12C](#)

# Accessories for 12mm Sensors

## Right-angle Mounting Brackets

Mounting bracket, right-angle, fixed insertion stop adjustment, plastic. For use with 12mm sensors. Available with or without fixed insertion stop.

Accessories for 12mm Sensors				
Part Number	Price	Description	Drawing Link	Weight lb [g]
<a href="#"><u>OPT2102</u></a>	\$8.00	Wenglor mounting bracket, right-angle, fixed insertion stop adjustment, plastic. For use with 12mm sensors.	<a href="#"><u>PDF</u></a>	0.05 [22.7]
<a href="#"><u>OPT2103</u></a>	\$8.00	Wenglor mounting bracket, right-angle, plastic. For use with 12mm sensors.	<a href="#"><u>PDF</u></a>	0.05 [22.7]



[OPT2102](#), [OPT2103](#)

## Right-angle Swivel Mounting Systems

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

Accessories for 12mm Sensors						
Part Number	Price	Description	Mounting Head	Mounting Plate	Drawing Link	Weight lb [g]
<a href="#"><u>OPT2114</u></a>	\$11.50	Wenglor mounting bracket, right-angle swivel, 360 degree vertical and horizontal adjustment, aluminum, 12mm rod mount. For use with 12mm sensors.	Aluminum	Stainless steel	<a href="#"><u>PDF</u></a>	0.14 [63.5]
<a href="#"><u>OPT2115</u></a>	\$21.00	Wenglor mounting bracket, right-angle swivel, 360 degree vertical and horizontal adjustment, 304 stainless steel, 12mm rod mount. For use with 12mm sensors.	304 Stainless steel	304 Stainless steel	<a href="#"><u>PDF</u></a>	0.27 [122.5]

Note: 304 stainless steel mounting rods sold separately: [OPT2109](#) (200mm [7.87 in] length), [OPT2110](#) (300mm [11.81 in] length), and [OPT2111](#) (500mm [19.69 in] length).



[OPT2114](#), [OPT2115](#)

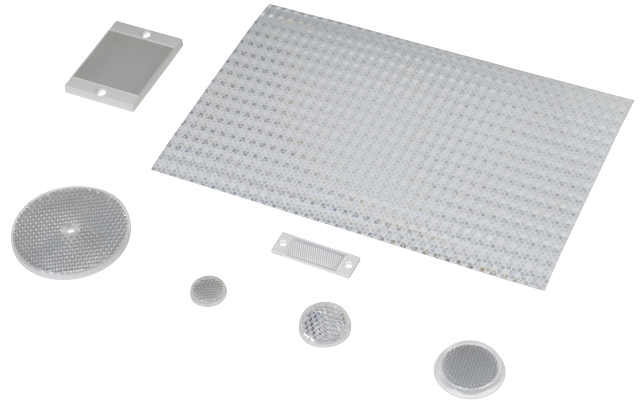
# Reflectors

## 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>	\$38.00	<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>	\$4.25		1	[0.98]				
<a href="#">RL103</a>	\$42.50	<a href="#">PDF</a>	10	34.5				
<a href="#">RL103-1</a>	\$4.75		1	[1.36]				
<a href="#">RL104</a>	\$42.50	<a href="#">PDF</a>	10	46				
<a href="#">RL104-1</a>	\$4.75		1	[1.81]				
<a href="#">RL105G</a>	\$38.00	<a href="#">PDF</a>	10	95 x 38		Two 4.3 mm holes		
<a href="#">RL105G-1</a>	\$4.25		1	[3.74 x 1.50]				
<a href="#">RL106G</a>	\$42.50	<a href="#">PDF</a>	10	182 x 42		Two 6mm holes		
<a href="#">RL106G-1</a>	\$4.75		1	[7.17 x 1.65]				
<a href="#">RL110</a>	\$19.00	<a href="#">PDF</a>	10	84		One 5mm hole		
<a href="#">RL110-1</a>	\$2.00		1	[3.31]				
<a href="#">RL116</a>	\$19.00	<a href="#">PDF</a>	10	41 x 60		Two 3mm holes		
<a href="#">RL116-1</a>	\$2.00		1	[3.54 x 2.36]				
<a href="#">RL100DA4</a>	\$38.50	NA	1	200 x 300		Self-adhesive		Paper (Acrylic tape with micro prism)
<a href="#">RL100DC4</a>	\$12.00	NA	1	50 x 300				
<a href="#">RL100DQ1</a>	\$8.75	NA	1	100 x 100				
<a href="#">RL111G</a>	\$60.00	<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>	\$7.25		1	[0.89 x 1.85]				
<a href="#">RL112G</a>	\$44.00	<a href="#">PDF</a>	10	19 x 73				
<a href="#">RL112G-1</a>	\$4.75		1	[0.75 x 2.87]				
<a href="#">RL113G</a>	\$53.00	<a href="#">PDF</a>	10	51.4 x 60.3	Two 4mm slots			
<a href="#">RL113G-1</a>	\$6.00		1	[2.02 x 2.37]				

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