



# M18 Metal Photoelectric Sensors



LTR-M18MA-PMS-603

## M18 (18mm) Metal – DC

- Diffuse, diffuse with adjustable background suppression, retroreflective, through-beam styles
- M12 quick-disconnect models; purchase cable separately
- Complete overload protection
- IP67 rated
- 2-year warranty
- IO-Link V 1.0 on PNP models

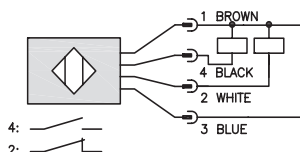


| M18 Metal Photoelectric Sensors       |         |                             |                     |                |       |                                  |                            |           |                     |
|---------------------------------------|---------|-----------------------------|---------------------|----------------|-------|----------------------------------|----------------------------|-----------|---------------------|
| Part Number                           | Price   | Sensing Range               | Switching Frequency | Light Emission | Logic | Output Function                  | Connection Type            | Wiring    | Drawing Link        |
| <b>Diffuse Reflective</b>             |         |                             |                     |                |       |                                  |                            |           |                     |
| <a href="#">LTR-M18MA-PMS-603</a>     | \$40.50 | 3-1200mm<br>[0.11-47.24 in] | 1.5 kHz             | Visible red    | PNP   | Complementary Light-on / Dark-on | 4-pin M12 quick-disconnect | Diagram 2 | <a href="#">PDF</a> |
| <a href="#">LTR-M18MA-PMS-101</a>     | \$40.50 | 3-1200mm<br>[0.11-47.24 in] | 1.5 kHz             | Visible red    | NPN   | Complementary Light-on / Dark-on | 4-pin M12 quick-disconnect | Diagram 1 | <a href="#">PDF</a> |
| <b>*Retroreflective Sensor</b>        |         |                             |                     |                |       |                                  |                            |           |                     |
| <a href="#">LRR-M18MA-NMS-603</a>     | \$41.50 | 0.02-7m<br>[0.06-22.96 ft]  | 1.5 kHz             | Visible red    | PNP   | Complementary Light-on / Dark-on | 4-pin M12 quick-disconnect | Diagram 2 | <a href="#">PDF</a> |
| <a href="#">LRR-M18MA-NMS-101</a>     | \$41.50 | 0.02-7m<br>[0.06-22.96 ft]  | 1.5 kHz             | Visible red    | NPN   | Complementary Light-on / Dark-on | 4-pin M12 quick-disconnect | Diagram 1 | <a href="#">PDF</a> |
| <b>*Purchase reflector separately</b> |         |                             |                     |                |       |                                  |                            |           |                     |
| <b>Background Suppression</b>         |         |                             |                     |                |       |                                  |                            |           |                     |
| <a href="#">LHR-M18MA-PMS-603</a>     | \$51.50 | 10-250mm<br>[0.39-9.84 in]  | 700 Hz              | Visible red    | PNP   | Complementary Light-on / Dark-on | 4-pin M12 quick-disconnect | Diagram 2 | <a href="#">PDF</a> |
| <a href="#">LHR-M18MA-TMS-603</a>     | \$51.50 | 10-250mm<br>[0.39-9.84 in]  | 700 Hz              | Visible red    | PNP   | Complementary Light-on / Dark-on | 4-pin M12 quick-disconnect | Diagram 2 | <a href="#">PDF</a> |
| <a href="#">LHR-M18MA-PMS-101</a>     | \$51.50 | 10-250mm<br>[0.39-9.84 in]  | 700 Hz              | Visible red    | NPN   | Complementary Light-on / Dark-on | 4-pin M12 quick-disconnect | Diagram 1 | <a href="#">PDF</a> |
| <a href="#">LHR-M18MA-TMS-101</a>     | \$51.50 | 10-250mm<br>[0.39-9.84 in]  | 700 Hz              | Visible red    | NPN   | Complementary Light-on / Dark-on | 4-pin M12 quick-disconnect | Diagram 1 | <a href="#">PDF</a> |
| <b>Through-beam Emitters</b>          |         |                             |                     |                |       |                                  |                            |           |                     |
| <a href="#">LLR-M18MA-NMS-400</a>     | \$27.50 | 0-30m<br>[0-98.43 ft]       | 1 kHz               | Visible red    | N/A   | N/A                              | 4-pin M12 quick-disconnect | Diagram 3 | <a href="#">PDF</a> |
| <b>Through-beam Receivers</b>         |         |                             |                     |                |       |                                  |                            |           |                     |
| <a href="#">LLR-M18MA-NMS-603</a>     | \$38.00 | 0-30m<br>[0-98.43 ft]       | 1 kHz               | N/A            | PNP   | Complementary Light-on / Dark-on | 4-pin M12 quick-disconnect | Diagram 2 | <a href="#">PDF</a> |
| <a href="#">LLR-M18MA-NMS-101</a>     | \$38.00 | 0-30m<br>[0-98.43 ft]       | 1 kHz               | N/A            | NPN   | Complementary Light-on / Dark-on | 4-pin M12 quick-disconnect | Diagram 1 | <a href="#">PDF</a> |

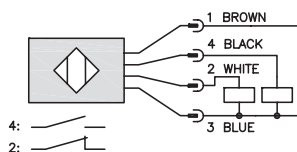
Warning: These products are not safety sensors and are not suitable for use in personal safety applications.

## Wiring Diagrams

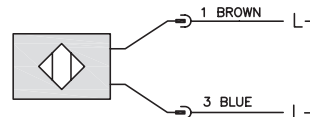
**Diagram 1**  
4-Wire NPN Output



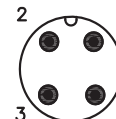
**Diagram 2**  
4-Wire PNP Output



**Diagram 3**  
Emitter



**M12 connector**





# M18 Metal Photoelectric Sensors Specifications



| M18 Metal Photoelectric Sensors Specifications    |                                                   |                                          |                                                                      |                                                |
|---------------------------------------------------|---------------------------------------------------|------------------------------------------|----------------------------------------------------------------------|------------------------------------------------|
| Sensor type                                       | Diffuse reflective (LTR)                          | Retroreflective (LRR)                    | Diffuse reflective with adjustable background suppression (LHR)      | Through-Beam (LLR)                             |
| <b>Sensing Distance <sup>1</sup> (Except LRR)</b> | 3 - 1200 mm<br>[0.11 - 47.24 in]                  | 20 - 7,000 mm<br>[0.78 - 275.59 in]      | 10 - 250 mm<br>[0.39 - 9.84 in]                                      | 0 - 30,000 mm<br>[0 - 1181.10 in]              |
| <b>Operating Range <sup>1</sup> (Except LRR)</b>  | 5 - 1,000 mm<br>[0.19 - 39.37 in]                 | 30 - 5,500 mm<br>[1.18 - 216.53 in]      | 15 - 210 mm<br>[0.59 - 8.26 in]                                      | 0 - 25,000 mm<br>[0 - 984.25 in]               |
| <b>Light Spot Diameter (Distance)</b>             | Ø 11 mm [500mm]<br>Ø 21 mm [1m]                   | Ø 21 mm [1m]<br>Ø 110 mm [6m]            | Ø 6 mm [100mm]<br>Ø 10 mm [250mm]                                    | Ø 35mm [500mm]<br>Ø 250mm [6m]<br>1000mm [25m] |
| <b>Emission</b>                                   | LED, red 630nm                                    | LED, red 630nm                           | Pinpoint LED, red 640nm                                              | LED, red 630nm                                 |
| <b>Sensitivity</b>                                | 30 - 1,200 mm, 3/4-turn pot.                      | 2,500 - 7,000 mm, IO-Link                | 30 - 250 mm,<br>PM models 3/4-turn pot<br>TM models pushbutton teach | 7,000 - 30,000 mm<br>via 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                                   | ≤ 30mA                                                               | ≤ 7mA (emitter)/<br>≤ 13mA (receiver)          |
| <b>Operating (Load) Current</b>                   | ≤ 200mA                                           |                                          |                                                                      |                                                |
| <b>Response Time <sup>2</sup></b>                 | ≤ 300ms (normal)/<br>≤ 1ms/≤ 100 µs               | ≤ 340ms (normal)/<br>≤ 1ms/≤ 115 µs      | ≤ 700ms (normal)/<br>≤ 1.1 ms/≤ 500 µs                               | ≤ 500ms (normal)/<br>≤ 1ms/≤ 250 µs            |
| <b>Switching Frequency <sup>2</sup></b>           | ≤ 1.5 kHz (normal)/<br>≤ 500Hz/≤ 5 kHz            | ≤ 1.5 kHz (normal)/<br>≤ 500Hz/≤ 4.5 kHz | ≤ 700Hz (normal)/<br>≤ 450Hz/≤ 1 kHz                                 | ≤ 1kHz (normal)/<br>≤ 500Hz/≤ 2 kHz            |
| <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>                           | Stainless Steel                                   |                                          |                                                                      |                                                |
| <b>Lens Material</b>                              | PMMA - Poly (methyl methacrylate)                 |                                          |                                                                      |                                                |
| <b>Shock/Vibration</b>                            | IEC 60947-5-2                                     |                                          |                                                                      |                                                |
| <b>Tightening Torque</b>                          | 20 N•m max                                        |                                          |                                                                      |                                                |
| <b>Weight</b>                                     | 14g [0.49 oz]                                     |                                          |                                                                      |                                                |
| <b>IO-Link</b>                                    | IO-Link version 1.0, PNP units only               |                                          |                                                                      |                                                |
| <b>Connectors</b>                                 | 4-pin M12 quick-disconnect                        |                                          |                                                                      |                                                |
| <b>Agency Approvals</b>                           | cULus file E239373, CE                            |                                          |                                                                      |                                                |

<sup>1</sup> Object with 90% reflectance (standard white paper)

<sup>2</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 18mm Sensors

## Axial Mounting Bracket

Axial mounting bracket available in zinc plated steel or 316L stainless steel. 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. For use with 18mm sensors.

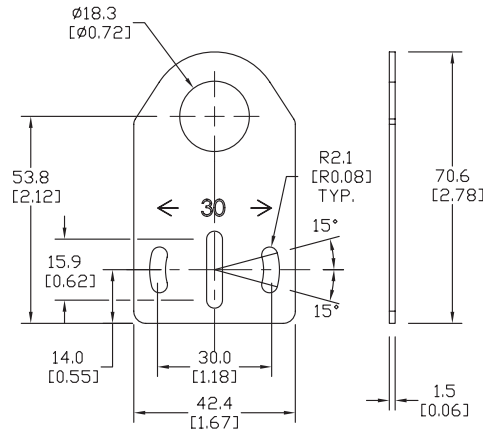
| Accessories for 18mm Sensors   |        |                                                                                           |               |
|--------------------------------|--------|-------------------------------------------------------------------------------------------|---------------|
| Part Number                    | Price  | Description                                                                               | Weight lb [g] |
| <a href="#"><u>ST18A</u></a>   | \$2.00 | Micro Detectors mounting bracket, axial, zinc plated steel. For use with 18mm sensors.    | 0.06 [27.2]   |
| <a href="#"><u>ST18A7W</u></a> | \$7.25 | Micro Detectors mounting bracket, axial, 316L stainless steel. For use with 18mm sensors. | 0.06 [27.2]   |



**ST18A**

## Dimensions

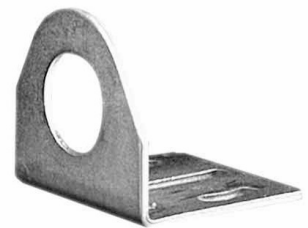
mm [inches]



## 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.

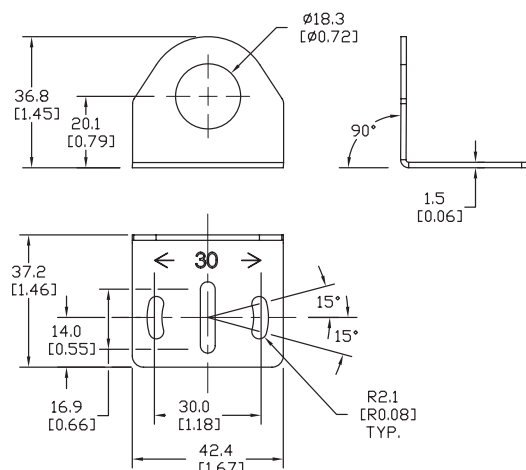
| Accessories for 18mm Sensors   |        |                                                                                                 |               |
|--------------------------------|--------|-------------------------------------------------------------------------------------------------|---------------|
| Part Number                    | Price  | Description                                                                                     | Weight lb [g] |
| <a href="#"><u>ST18C</u></a>   | \$2.00 | Micro Detectors mounting bracket, right-angle, zinc plated steel. For use with 18mm sensors.    | 0.06 [27.2]   |
| <a href="#"><u>ST18C7W</u></a> | \$7.25 | Micro Detectors mounting bracket, right-angle, 316L stainless steel. For use with 18mm sensors. | 0.06 [27.2]   |



**ST18C**

## Dimensions

mm [inches]



# 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                                                                                                 | Drawing Link        | Weight lb [g] |
| <a href="#">OPT2104</a>      | \$10.50 | Wenglor mounting bracket, right-angle, fixed insertion stop adjustment, plastic. For use with 18mm sensors. | <a href="#">PDF</a> | 0.06 [27.2]   |
| <a href="#">OPT2105</a>      | \$10.50 | Wenglor mounting bracket, right-angle, plastic. For use with 18mm sensors.                                  | <a href="#">PDF</a> | 0.06 [27.2]   |



[OPT2104](#), [OPT2105](#)

## 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      | Drawing Link        | Weight lb [g] |
| <a href="#">OPT2116</a>      | \$11.50 | Wenglor mounting bracket, right-angle swivel, 360 degree vertical and horizontal adjustment, aluminum, 12mm rod mount. For use with 18mm sensors.            | Aluminum            | 304 Stainless steel | <a href="#">PDF</a> | 0.15 [68.0]   |
| <a href="#">OPT2117</a>      | \$21.00 | Wenglor mounting bracket, right-angle swivel, 360 degree vertical and horizontal adjustment, 304 stainless steel, 12mm rod mount. For use with 18mm sensors. | 304 Stainless steel | 304 Stainless steel | <a href="#">PDF</a> | 0.28 [127.0]  |



[OPT2116](#), [OPT2117](#)

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).

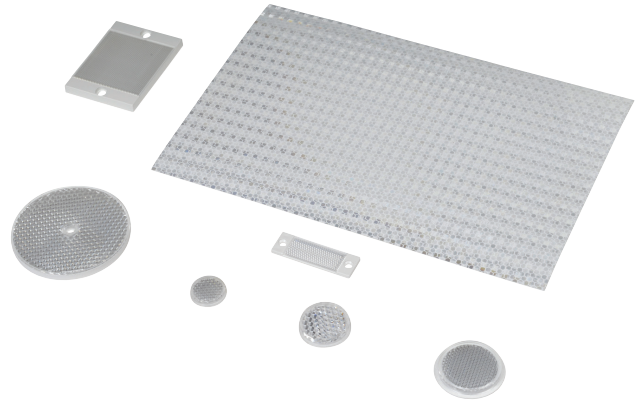
# Reflectors

## 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<br>Polymethylmethacrylate (acrylic)<br><br>Base material: ABS<br>(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<br>Polymethylmethacrylate (acrylic)<br><br>Base material: ABS<br>(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.