

# OPT Series Contrast Sensors



## Features

- White light emission
- 12–40 mm sensing distance
- 10–30 VDC supply voltage
- -25 to 60°C [-13° to 140°F] temperature range
- NPN or PNP
- 5kHz or 25kHz switching frequency
- Plastic housing
- Teach-in sensitivity adjustment
- 4-pin M12 or 8-pin M12 quick-disconnect (Purchase cable separately)
- IP67
- Mounting brackets also available

## OPT Series Contrast Sensors Selection Chart

| Part Number             | Price    | Sensing Range                  | Spot Dimension | Switching Frequency | Output State                   | Logic | Connection                    | Wiring    | Drawing Link        |
|-------------------------|----------|--------------------------------|----------------|---------------------|--------------------------------|-------|-------------------------------|-----------|---------------------|
| <a href="#">OPT2024</a> | \$131.00 | 12 - 18 mm<br>[0.47 - 0.71 in] | 1.5 x 2.5 mm   | 5kHz                | N.O.                           | PNP   | 4-pin M12<br>quick-disconnect | Diagram 1 | <a href="#">PDF</a> |
| <a href="#">OPT2025</a> | \$131.00 |                                |                |                     |                                | NPN   |                               | Diagram 2 | <a href="#">PDF</a> |
| <a href="#">OPT2026</a> | \$224.00 | 12 - 16 mm<br>[0.47 - 0.63 in] | 0.7 x 2mm      | 25kHz               | N.O. and N.C.<br>Complementary | PNP   | 8-pin M12<br>quick-disconnect | Diagram 3 | <a href="#">PDF</a> |
| <a href="#">OPT2027</a> | \$224.00 |                                |                |                     |                                | NPN   |                               |           | <a href="#">PDF</a> |
| <a href="#">OPT2028</a> | Retired  | 30 - 40 mm<br>[1.18 - 1.57 in] | 1.4 x 4mm      |                     |                                | PNP   |                               |           | <a href="#">PDF</a> |
| <a href="#">OPT2029</a> | \$224.00 |                                |                |                     |                                | NPN   |                               |           | <a href="#">PDF</a> |

## Wiring Diagrams

Diagram 1

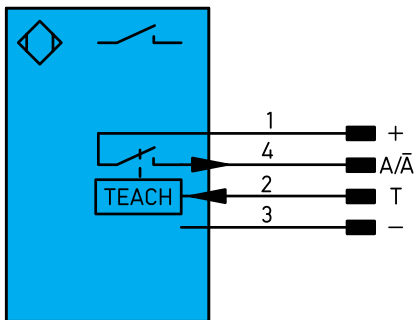
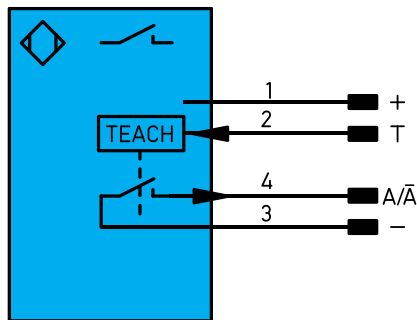
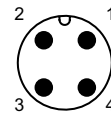


Diagram 2



## Connectors

### 4-Pin M12 connector



### 8-Pin M12 connector

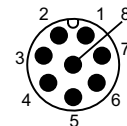
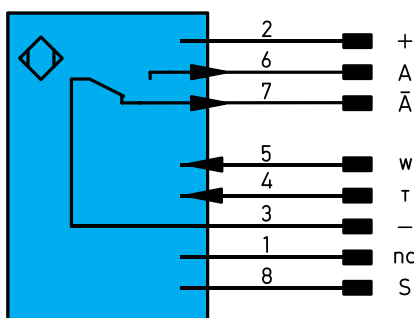


Diagram 3



## Legend

|     |                              |
|-----|------------------------------|
| +   | Supply Voltage +             |
| -   | Supply Voltage 0V            |
| A   | Switching Output (N.O.)      |
| Ā   | Switching Output (N.C.)      |
| A/Ā | Switching Output (N.O./N.C.) |
| T   | Teach Input                  |
| W   | Trigger Input                |
| nc  | Not connected                |
| S   | Shielding                    |

# OPT Series Contrast Sensors

## Specifications

| OPT Series Contrast Sensors Specifications |                              |         |                            |         |                            |         |
|--|------------------------------|---------|----------------------------|---------|----------------------------|---------|
|  | OPT2024                      | OPT2025 | OPT2026                    | OPT2027 | OPT2028                    | OPT2029 |
| Sensing distance                           | 12 - 18mm [0.47 - 0.71 in]   |         | 12 - 16mm [0.47 - 0.63 in] |         | 30 - 40mm [1.18 - 1.57 in] |         |
| Spot diameter                              | 1.5 x 2.5 mm                 |         | 0.7 x 2 mm                 |         | 1.4 x 4 mm                 |         |
| Spot orientation                           | Vertical                     |         |                            |         |                            |         |
| Emission                                   | White light LED 400 to 700nm |         |                            |         |                            |         |
| Sensitivity                                | Teach in via pushbutton      |         |                            |         |                            |         |
| Output                                     | PNP                          | NPN     | PNP                        | NPN     | PNP                        | NPN     |
| Output type                                | N.O.                         |         | N.O./N.C. Complementary    |         |                            |         |
| Operating voltage                          | 10–30 VDC                    |         |                            |         |                            |         |
| No-load supply current                     | < 30mA                       |         | < 50mA                     |         |                            |         |
| Operation (load) current                   | 200mA                        | 100mA   | 200mA                      | 100mA   | 200mA                      | 100mA   |
| Voltage drop                               | < 2.5 V                      |         | 1.5 V                      |         |                            |         |
| Switching frequency                        | 5kHz                         |         | 25kHz                      |         |                            |         |
| Response time                              | 100μs                        |         | 20μs                       |         |                            |         |
| Temperature drift                          | < 2%                         |         | < 1%                       |         |                            |         |
| On/Off delay                               | 20ms (off delay only)        |         | 0 to 100 ms                |         |                            |         |
| Reverse polarity protection                | Yes                          |         |                            |         |                            |         |
| Short circuit protection                   | Yes                          |         |                            |         |                            |         |
| Temperature range                          | -25 to 60°C [-13 to 140°F]   |         |                            |         |                            |         |
| Degree of protection                       | IP67                         |         |                            |         |                            |         |
| Housing material                           | Plastic                      |         |                            |         |                            |         |
| Shock                                      | EN60068-2-27                 |         |                            |         |                            |         |
| Vibration                                  | EN60068-2-6                  |         |                            |         |                            |         |
| Connection                                 | 4-pin M12                    |         | 8-pin M12                  |         |                            |         |
| Agency Approval                            | CE cULus E189727             |         |                            |         |                            |         |

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

# Contrast Print Mark Sensors

Contrast sensors bridge the gap between photoelectric sensors and vision systems when a very fast and precise detection response time is needed; they are designed to detect slight differences of similar colors. Photoelectric sensors only detect the amount of reflected light, while contrast or print mark sensors detect differences in the frequency of the reflected light, often corresponding to a "target color" and a "background color".

The sensor typically uses a threshold that is halfway between the target and the background, and reflected light above the threshold triggers one state, while anything below the threshold triggers the opposite state.

Some contrast sensors (such as our Datalogic models) emit RGB (Red, Green, Blue) light, and the built-in receiver evaluates the reflected light. Datalogic contrast sensors automatically select the optimal color light source for an application based on the colors of the target and background - usually determined using the "teach function". Other contrast sensors (such as our Wenglor line) emit white light and evaluate the reflected light in a similar fashion. The Wenglor sensors also use a teach-in function for setting the target and background colors.

While detecting print marks (lines or boxes of solid color in the margins of printed material) as shown in the image on the right is one typical application, there are many other applications: presence detection of tamper-proof seals, shrink-wrap seals, inserts, labels, or even barcode stickers (without needing to read the actual bar code).



- RGB or white light emission
- Vertical or horizontal spot orientation
- 6 - 40mm sensing distance
- Selectable Light-on / Dark-on output state
- NPN or PNP logic
- Switching frequencies from 5-50 kHz
- Teach-in sensitivity adjustment
- IP67 or IP67/IP69K rating
- 2-year warranty

# Accessories for OPT2024 - OPT2025

## Photoelectric Sensors

### Right-angle Mounting Brackets

Mounting bracket, right-angle, vertical adjustment, nickel plated steel. For use with OPT2024-OPT2025 photoelectric sensors.

| Mounting Brackets for OPT Series Photoelectric Sensors |        |  |     |                     |               |
|--|--------|--|-----|---------------------|---------------|
| Part Number  | Price  | Description  | Qty | Drawing Link        | Weight g [oz] |
| <a href="#">OPT2034</a>                                | \$7.50 | Wenglor mounting bracket, right-angle, vertical adjustment, nickel plated steel. For use with OPT2024 & OPT2025 photoelectric sensors. | 1   | <a href="#">PDF</a> | 38<br>[1.34]  |



[OPT2034](#)

### Right-angle Swivel Mounting Systems

Mounting bracket, right-angle swivel, 360 degree vertical and horizontal adjustment, 12mm rod mount. For use with OPT2024-OPT2025 photoelectric sensors. Available in all 304 stainless steel or with an aluminum mounting head and 304 stainless steel mounting plate.

| Accessories for 25mm Sensors |         |   |                     |                     |                     |             |
|------------------------------|---------|---|---------------------|---------------------|---------------------|-------------|
| Part Number                  | Price   | Description   | Mounting Head       | Mounting Plate      | Drawing Link        | Weight [lb] |
| <a href="#">OPT2124</a>      | \$12.50 | Wenglor mounting bracket, right-angle swivel, 360 degree vertical and horizontal adjustment, aluminum, 12mm rod mount. For use with OPT2024 & OPT2025 photoelectric sensors.            | Aluminum            | 304 Stainless Steel | <a href="#">PDF</a> | 0.15        |
| <a href="#">OPT2125</a>      | \$20.50 | Wenglor mounting bracket, right-angle swivel, 360 degree vertical and horizontal adjustment, 304 stainless steel, 12mm rod mount. For use with OPT2024 & OPT2025 photoelectric sensors. | 304 Stainless Steel | 304 Stainless Steel | <a href="#">PDF</a> | 0.27        |

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



[OPT2124](#), [OPT2125](#)

# Accessories for OPT Series 50x50mm Photoelectric Sensors

## Right-angle Brackets

Mounting bracket, right-angle, nickel-plated steel or 304 stainless steel.  
For use with OPT series 50x50mm photoelectric sensors.

| Accessories for OPT Series 50x50mm Photoelectric Sensors |         |  |                            |             |
|--|---------|--|----------------------------|-------------|
| Part Number  | Price   | Description  | Drawing Link               | Weight [lb] |
| <a href="#"><u>OPT2031</u></a>                           | \$7.50  | Wenglor mounting bracket, right-angle, nickel-plated brass. For use with OPT series 50x50mm photoelectric sensors.                                     | <a href="#"><u>PDF</u></a> | 0.24        |
| <a href="#"><u>OPT2038</u></a>                           | \$12.00 | Wenglor mounting bracket, right-angle, vertical and horizontal adjustment, 304 stainless steel. For use with OPT series 50x50mm photoelectric sensors. | <a href="#"><u>PDF</u></a> | 0.19        |



[OPT2031](#)



[OPT2038](#)

# Accessories for OPT Series 50x50mm Photoelectric Sensors

## Right-angle Swivel Mounting Systems

Mounting bracket, right-angle swivel, 360 degree vertical and horizontal adjustment, 12mm rod mount. For use with OPT series 50x50mm photoelectric sensors. Available in all stainless steel or with an aluminum head with a stainless steel mounting plate.

| Accessories for OPT Series 50x50mm Photoelectric Sensors |         |  |                     |                     |                            |             |
|--|---------|--|---------------------|---------------------|----------------------------|-------------|
| Part Number  | Price   | Description  | Mounting Head       | Mounting Plate      | Drawing Link               | Weight [lb] |
| <a href="#"><u>OPT2122</u></a>                           | \$12.50 | Wenglor mounting bracket, right-angle swivel, 360 degree vertical and horizontal adjustment, aluminum, 12mm rod mount. For use with OPT series 50x50mm photoelectric sensors.            | Aluminum            | 304 Stainless Steel | <a href="#"><u>PDF</u></a> | 0.19        |
| <a href="#"><u>OPT2123</u></a>                           | \$22.50 | Wenglor mounting bracket, right-angle swivel, 360 degree vertical and horizontal adjustment, 304 stainless steel, 12mm rod mount. For use with OPT series 50x50mm photoelectric sensors. | 304 Stainless Steel | 304 Stainless Steel | <a href="#"><u>PDF</u></a> | 0.31        |

**NOTE:**

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



[OPT2122,](#)  
[OPT2123](#)

# Mounting Rods and Brackets

## 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   | Drawing Link        | Weight lb (g)    |
| <a href="#">OPT2109</a>                                 | \$14.00 | Wenglor mounting rod, 12mm diameter, 200mm length, 304 stainless steel. | <a href="#">PDF</a> | 0.41<br>[185.97] |
| <a href="#">OPT2110</a>                                 | \$17.50 | Wenglor mounting rod, 12mm diameter, 300mm length, 304 stainless steel. | <a href="#">PDF</a> | 0.60<br>[272.16] |
| <a href="#">OPT2111</a>                                 | \$22.50 | Wenglor mounting rod, 12mm diameter, 500mm length, 304 stainless steel. | <a href="#">PDF</a> | 0.98<br>[444.52] |



## Right-angle Mounting Bracket

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

| Right-angle Mounting Brackets for 12mm Sensors |         |   |                     |                |
|--|---------|---|---------------------|----------------|
| Part Number                                    | Price   | Description   | Drawing Link        | Weight lb [g]  |
| <a href="#">OPT2108</a>                        | \$17.50 | Wenglor mounting bracket, right-angle, nickel-plated brass. For use with 12mm mounting rods OPT2109, OPT2110 & OPT2111. | <a href="#">PDF</a> | 0.07<br>[31.8] |

