

# Retro-Reflex Sensor

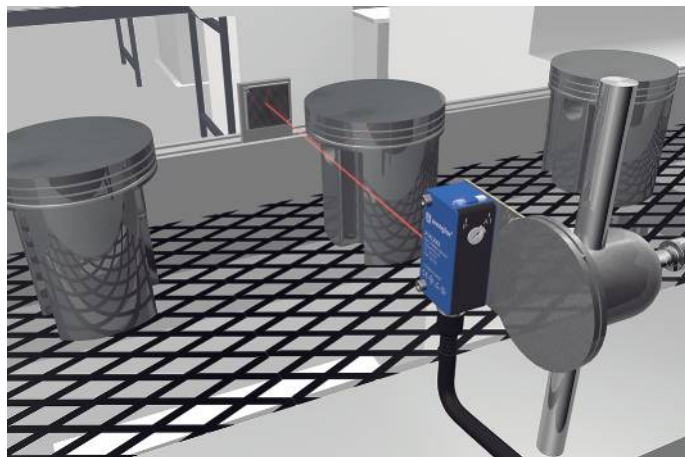
## P1KL015 LASER

Part Number



- Condition monitoring
- Detect extremely small parts starting at 1 mm
- High switching frequency
- IO-Link 1.1

The retro-reflex sensor works with a fine laser beam and a reflector. The collimated laser beam of laser class 1 detects objects, for instance, when conducting installation, feed or presence controls, starting at a size of one millimeter over the entire range. The IO-Link interface can be used to configure retro-reflective barriers (PNP/NPN, NC/NO, switching distance), as well as for reading out switching statuses and signal values.

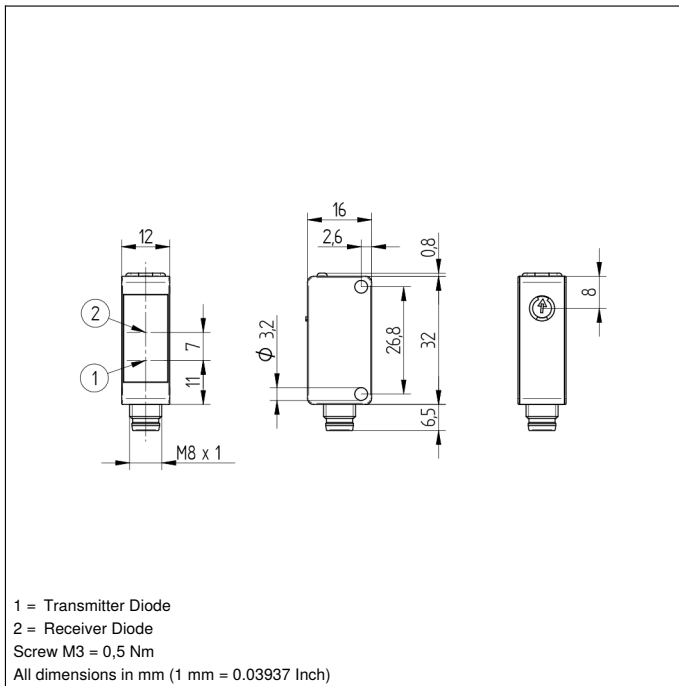


### Technical Data

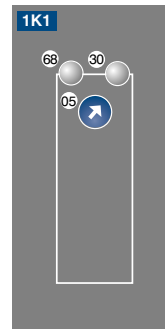
| Optical Data                                |                         |
|---------------------------------------------|-------------------------|
| Range                                       | 12000 mm                |
| Reference Reflector/Reflector Foil          | RE6151BM                |
| Smallest Recognizable Part                  | see Table 2             |
| Switching Hysteresis                        | < 15 %                  |
| Light Source                                | Laser (red), collimated |
| Wavelength                                  | 655 nm                  |
| Polarization Filter                         | yes                     |
| Service Life (T = +25 °C)                   | 100000 h                |
| Laser Class (EN 60825-1)                    | 1                       |
| Max. Ambient Light                          | 10000 Lux               |
| Light Spot Diameter                         | see Table 1             |
| Two-Lens Optic                              | yes                     |
| Electrical Data                             |                         |
| Supply Voltage                              | 10...30 V DC            |
| Supply Voltage with IO-Link                 | 18...30 V DC            |
| Current Consumption (U <sub>b</sub> = 24 V) | < 15 mA                 |
| Switching Frequency                         | 2000 Hz                 |
| Switching frequency (speed mode)            | 4000 Hz                 |
| Response Time                               | 0,25 ms                 |
| Response time (speed mode)                  | 0,125 ms                |
| Temperature Drift                           | < 10 %                  |
| Temperature Range                           | -40...60 °C             |
| Switching Output Voltage Drop               | < 2 V                   |
| Switching Output/Switching Current          | 100 mA                  |
| Residual Current Switching Output           | < 50 µA                 |
| Short Circuit and Overload Protection       | yes                     |
| Reverse Polarity Protection                 | yes                     |
| Lockable                                    | yes                     |
| Interface                                   | IO-Link V1.1            |
| Protection Class                            | III                     |
| FDA Accession Number                        | 1710976-001             |
| Mechanical Data                             |                         |
| Setting Method                              | Potentiometer           |
| Housing Material                            | Plastic                 |
| Degree of Protection                        | IP67/IP68               |
| Connection                                  | M8 × 1; 3-pin           |
| Optic Cover                                 | PMMA                    |
| Safety-relevant Data                        |                         |
| MTTFd (EN ISO 13849-1)                      | 2633,47 a               |
| IO-Link                                     | ●                       |
| NPN NO                                      | ●                       |
| Connection Diagram No.                      | 171                     |
| Control Panel No.                           | 1K1                     |
| Suitable Connection Equipment No.           | 8                       |
| Suitable Mounting Technology No.            | 400                     |

### Complementary Products

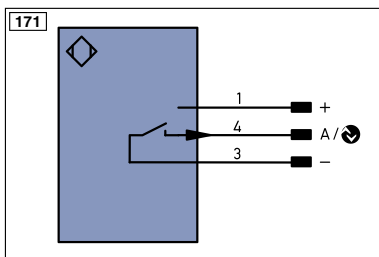
|                           |  |
|---------------------------|--|
| IO-Link Master            |  |
| Reflector, Reflector Foil |  |
| Software                  |  |



## Ctrl. Panel



05 = Switching Distance Adjuster  
30 = Switching Status/Contamination Warning  
68 = Supply Voltage Indicator



## Legend

|          |                                            |       |                                |                                    |                     |
|----------|--------------------------------------------|-------|--------------------------------|------------------------------------|---------------------|
| +        | Supply Voltage +                           | PT    | Platinum measuring resistor    | ENAR5422                           | Encoder A/Ä (TTL)   |
| -        | Supply Voltage 0 V                         | nc    | not connected                  | ENB5422                            | Encoder B/B̄ (TTL)  |
| ~        | Supply Voltage (AC Voltage)                | U     | Test Input                     | ENa                                | Encoder A           |
| A        | Switching Output (NO)                      | U     | Test Input inverted            | ENb                                | Encoder B           |
| Ä        | Switching Output (NC)                      | W     | Trigger Input                  | AMIN                               | Digital output MIN  |
| V        | Contamination/Error Output (NO)            | W-    | Ground for the Trigger Input   | AMAX                               | Digital output MAX  |
| V̄       | Contamination/Error Output (NC)            | O     | Analog Output                  | AOK                                | Digital output OK   |
| E        | Input (analog or digital)                  | O-    | Ground for the Analog Output   | SY in                              | Synchronization In  |
| T        | Teach Input                                | BZ    | Block Discharge                | SY OUT                             | Synchronization OUT |
| Z        | Time Delay (activation)                    | AWV   | Valve Output                   | OLT                                | Brightness output   |
| S        | Shielding                                  | a     | Valve Control Output +         | M                                  | Maintenance         |
| RxD      | Interface Receive Path                     | b     | Valve Control Output 0 V       | rsv                                | reserved            |
| TxD      | Interface Send Path                        | SY    | Synchronization                | Wire Colors according to IEC 60757 |                     |
| RDY      | Ready                                      | SY-   | Ground for the Synchronization | BK                                 | Black               |
| GND      | Ground                                     | E+    | Receiver-Line                  | BN                                 | Brown               |
| CL       | Clock                                      | S+    | Emitter-Line                   | RD                                 | Red                 |
| E/A      | Output/Input programmable                  | ⊕     | Grounding                      | OG                                 | Orange              |
| IO-Link  | IO-Link                                    | SnR   | Switching Distance Reduction   | YE                                 | Yellow              |
| PoE      | Power over Ethernet                        | Rx+/- | Ethernet Receive Path          | GN                                 | Green               |
| IN       | Safety Input                               | Tx+/- | Ethernet Send Path             | BU                                 | Blue                |
| OSSD     | Safety Output                              | Bus   | Interfaces-Bus A(+)/B(-)       | VT                                 | Violet              |
| Signal   | Signal Output                              | La    | Emitted Light disengageable    | GY                                 | Grey                |
| BI-D+/-  | Ethernet Gigabit bidirect. data line (A-D) | Mag   | Magnet activation              | WH                                 | White               |
| EN0.5422 | Encoder 0-pulse 0-0̄ (TTL)                 | RES   | Input confirmation             | PK                                 | Pink                |
|          |                                            | EDM   | Contactur Monitoring           | GNYE                               | Green/Yellow        |

**Table 1**

|                     |       |       |       |
|---------------------|-------|-------|-------|
| Working Distance    | 0,1 m | 5 m   | 12 m  |
| Light Spot Diameter | 4 mm  | 11 mm | 22 mm |

**Table 2**

|                               |        |      |        |
|-------------------------------|--------|------|--------|
| Distance, Sensor to Reflector | 2 m    | 4 m  | 12 m   |
| Smallest Recognizable Part    | 1,5 mm | 1 mm | 2,5 mm |

## Feasible reflector distance

Reflector type, mounting distance

|           |             |           |              |
|-----------|-------------|-----------|--------------|
| RQ100BA   | 0,1...16 m  | RR21_M    | 0,1...7 m    |
| RE18040BA | 0,1...12 m  | Z90R004   | 0,15...5 m   |
| RQ84BA    | 0,1...16 m  | Z90R005   | 0,15...5,9 m |
| RR84BA    | 0,1...16 m  | ZRAE02B01 | 0,1...7 m    |
| RE9538BA  | 0,1...4,5 m | ZRME01B01 | 0,1...3 m    |
| RE6151BM  | 0,1...12 m  | ZRME03B01 | 0,1...4,5 m  |
| RR50_A    | 0,1...16 m  | ZRMR02K01 | 0,1...5 m    |
| RE6040BA  | 0,1...15 m  | ZRMS02_01 | 0,1...7 m    |
| RE8222BA  | 0,1...10 m  | RF505     | 0,1...2 m    |
| RR34_M    | 0,1...2,5 m | RF508     | 0,1...2 m    |
| RE3220BM  | 0,1...7 m   | RF258     | 0,1...2 m    |
| RE6210BM  | 0,1...4,5 m | ZRDF03K01 | 0,1...4 m    |
| RR25_M    | 0,1...7 m   | ZRDF10K01 | 0,1...4 m    |
| RR25KP    | 0,1...2,5 m |           |              |

