

# Contrast Sensor

## P1PW001

Part Number



- Innovative display unit for simple diagnosis
- Intuitive operating concept
- Print mark mode
- Teach-in key and external teach-in
- Very high contrast resolution

These contrast sensors work with a white light LED emitter and an RGB receiver. They reliably detect all color and brightness combinations between the contrast marking and the background. The intuitive operating concept with the LED bar graph display and the well-conceived functions simplify initial start-up and make the sensors suitable for flexible use. The contrast sensors can also be parameterized via IO-Link. Extensive condition monitoring functions are also available for predictive maintenance and trouble-free operation.



### Technical Data

#### Optical Data

|                           |              |
|---------------------------|--------------|
| Working Range             | 30...40 mm   |
| Working Distance          | 35 mm        |
| Resolution (Gray Scale)   | 100          |
| Switching Hysteresis      | < 1 %        |
| Light Source              | White Light  |
| Wavelength                | 400...700 nm |
| Service Life (T = +25 °C) | 100000 h     |
| Max. Ambient Light        | 10000 Lux    |
| Light Spot Diameter       | 1,1 × 3,5 mm |

#### Electrical Data

|                                             |              |
|---------------------------------------------|--------------|
| Supply Voltage                              | 10...30 V    |
| Supply Voltage with IO-Link                 | 18...30 V    |
| Current Consumption (U <sub>b</sub> = 24 V) | < 50 mA      |
| Switching Frequency                         | 50 kHz       |
| Response Time                               | 13 µs        |
| Jitter                                      | 5 µs         |
| Temperature Drift                           | < 6 %        |
| Temperature Range                           | -25...60 °C  |
| Switching Output Voltage Drop               | 1,5 V        |
| Switching Output/Switching Current          | 100 mA       |
| Short Circuit Protection                    | yes          |
| Reverse Polarity Protection                 | yes          |
| Lockable                                    | yes          |
| Mode of operation                           | Print mark   |
| Interface                                   | IO-Link V1.1 |
| IO-Link transmission speed                  | COM2         |
| Protection Class                            | III          |
| IO-Link Version                             | 1.1          |

#### Mechanical Data

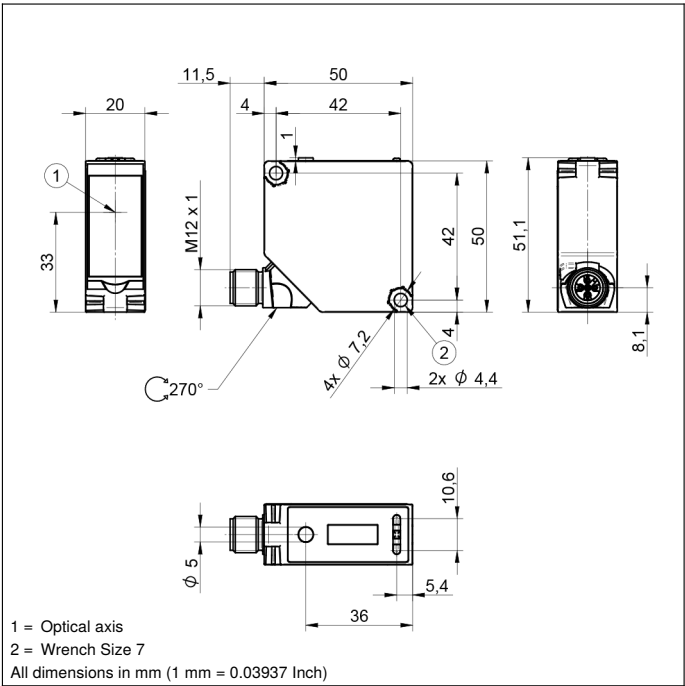
|                      |                |
|----------------------|----------------|
| Setting Method       | Teach-In       |
| Housing Material     | Plastic, ABS   |
| Optic Cover          | Plastic, PMMA  |
| Degree of Protection | IP67           |
| Connection           | M12 × 1; 5-pin |

#### Safety-relevant Data

|                                   |          |
|-----------------------------------|----------|
| MTTFd (EN ISO 13849-1)            | 719,27 a |
| PNP NC, PNP NO                    | ●        |
| External teach-in input           | ●        |
| Connection Diagram No.            | 317      |
| Control Panel No.                 | X9       |
| Suitable Connection Equipment No. | 2   35   |
| Suitable Mounting Technology No.  | 380      |

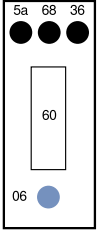
### Complementary Products

|                |
|----------------|
| IO-Link Master |
| Software       |

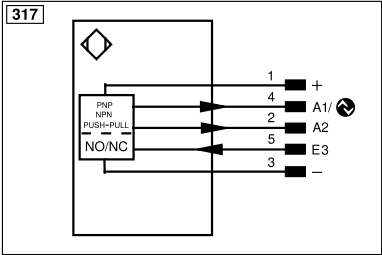


Ctrl. Panel

X9

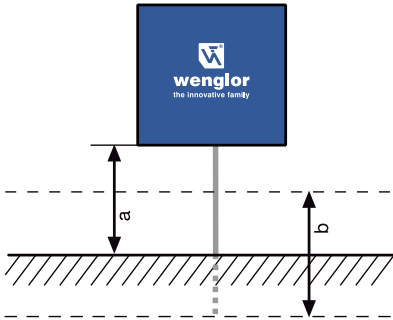


06 = Teach Button  
36 = Mode Indicator  
5a = Switching Status Indicator, A1  
60 = display  
68 = Power LED



| Legend    |                                            |       |                                |                                        |                     |
|-----------|--------------------------------------------|-------|--------------------------------|----------------------------------------|---------------------|
| +         | Supply Voltage +                           | PT    | Platinum measuring resistor    | ENARs422                               | Encoder A/Ä (TTL)   |
| -         | Supply Voltage 0 V                         | nc    | Not connected                  | ENBRs422                               | Encoder B/ß (TTL)   |
| ~         | Supply Voltage (AC Voltage)                | U     | Test Input                     | ENa                                    | Encoder A           |
| A         | Switching Output (NO)                      | Ü     | 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  |
| Û         | 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 |
| R         | Reset input                                | Amv   | Valve Output                   | OLt                                    | Brightness output   |
| Z         | Time Delay (activation)                    | a     | Valve Control Output +         | M                                      | Maintenance         |
| S         | Shielding                                  | b     | Valve Control Output 0 V       | rsv                                    | Reserved            |
| RxD       | Interface Receive Path                     | SY    | Synchronization                | Wire Colors according to DIN IEC 60757 |                     |
| TxD       | Interface Send Path                        | SY-   | Ground for the Synchronization |                                        |                     |
| RDY       | Ready                                      | E+    | Receiver-Line                  | BK                                     | Black               |
| GND       | Ground                                     | S+    | Emitter-Line                   | BN                                     | Brown               |
| CL        | Clock                                      | ≡     | Grounding                      | RD                                     | Red                 |
| E/A       | Output/Input programmable                  | SnR   | Switching Distance Reduction   | OG                                     | Orange              |
| IO-Link   | IO-Link                                    | Rx+/- | Ethernet Receive Path          | YE                                     | Yellow              |
| PoE       | Power over Ethernet                        | Tx+/- | Ethernet Send Path             | GN                                     | Green               |
| IN        | Safety Input                               | Bus   | Interfaces-Bus A(+)/B(-)       | BU                                     | Blue                |
| QSSD      | Safety Output                              | La    | Emitted Light disengageable    | VT                                     | Violet              |
| Signal    | Signal Output                              | Mag   | Magnet activation              | GY                                     | Grey                |
| BL_D+/-   | Ethernet Gigabit bidirect. data line (A-D) | RES   | Input confirmation             | WH                                     | White               |
| ENo RS422 | Encoder 0-pulse 0/0 (TTL)                  | EDM   | Contact Monitoring             | PK                                     | Pink                |
|           |                                            |       |                                | GNYE                                   | Green/Yellow        |

Ideal Working Distance



a = working distance  
b = Working Range

