



## Distance sensor

### VDM28-50-R1-IO/110/116/122-Ex



- Retroreflective laser distance sensor
- Measuring method PRT (Pulse Ranging Technology)
- Accurate, clear, and reproducible measuring results
- Red laser as the light emitter
- Version with laser class 1
- Version with IO-Link interface
- Version with analog output
- Suitable for operation in Zone 1, Zone 2, Zone 21 and Zone 22

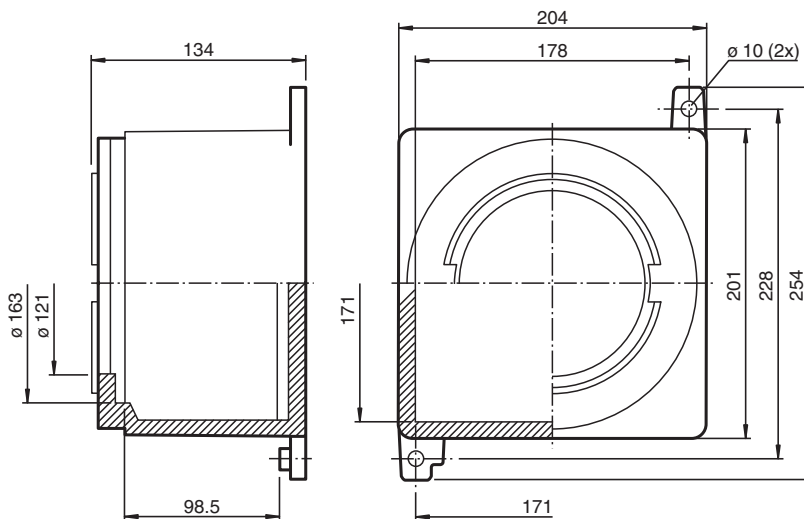
Universal distance sensor, measurement to reflector, IO-Link interface, measuring method PRT, 50 m detection range, red laser light, laser class 1, push-pull output, analog output, terminal block



### Function

The VDM28 distance measurement device employs Pulse Ranging Technology (PRT). It has a repeat accuracy of 5 mm with an operating range of 0.5 ... 50 m and an absolute accuracy of 25 mm.

### Dimensions



### Technical Data

#### General specifications

|                 |                        |
|-----------------|------------------------|
| Device type     | GUBW1.D.OS-VDM28-50-R1 |
| Measuring range | 0.5 ... 50 m           |

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## Technical Data

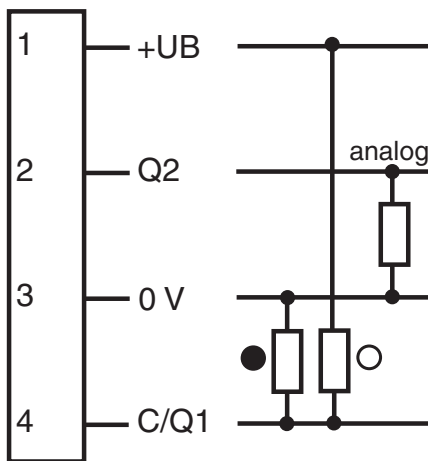
|   |   |  |
|---|---|--|
| Reference target                            | OFR-100/100   |  |
| Light source                                | laser diode<br>typ. service life 85,000 h at Ta = +25 °C  |  |
| Light type                                  | modulated visible red light   |  |
| Laser nominal ratings                       |   |  |
| Note  | LASER LIGHT , DO NOT STARE INTO BEAM  |  |
| Laser class                                 | 1   |  |
| Wave length                                 | 660 nm  |  |
| Beam divergence                             | < 1.5 mrad  |  |
| Pulse length                                | approx. 4 ns  |  |
| Repetition rate                             | 250 kHz   |  |
| max. pulse energy                           | < 1.5 nJ  |  |
| Angle deviation                             | max. ± 2°   |  |
| Measuring method                            | Pulse Ranging Technology (PRT)  |  |
| Diameter of the light spot                  | < 50 mm at a distance of 50 m at 20 °C  |  |
| Ambient light limit                         | 50000 Lux   |  |
| <b>Functional safety related parameters</b> |   |  |
| MTTF <sub>d</sub>                           | 200 a   |  |
| Mission Time (T <sub>M</sub> )              | 10 a  |  |
| Diagnostic Coverage (DC)                    | 0 %   |  |
| <b>Indicators/operating means</b>           |   |  |
| Operation indicator                         | LED green   |  |
| Function indicator                          | 2 LEDs yellow for switching state   |  |
| Teach-in indicator                          | Teach-In: LED green/yellow equiphase flashing; 2.5 Hz<br>Teach Error: LED green/yellow non equiphase flashing; 8.0 Hz |  |
| Control elements                            | 5-step rotary switch for operating modes selection (threshold setting and operating modes)                            |  |
| Control elements                            | Switch for setting the threshold values   |  |
| <b>Electrical specifications</b>            |   |  |
| Operating voltage                           | U <sub>B</sub>  | 10 ... 30 V DC / when operating in IO-Link mode: 18 ... 30 V |
| Ripple                                      |   | 10 % within the supply tolerance                             |
| No-load supply current                      | I <sub>0</sub>  | ≤ 70 mA / 24 V DC  |
| Time delay before availability              | t <sub>v</sub>  | < 1.5 s at 20 °C   |
| <b>Interface</b>                            |   |  |
| Interface type                              | IO-Link   |  |
| Protocol                                    | IO-Link V1.0  |  |
| Cycle time                                  | min. 2.3 ms   |  |
| Mode  | COM2 (38.4 kBit/s)  |  |
| Process data width                          | 16 bit  |  |
| SIO mode support                            | yes   |  |
| <b>Output</b>                               |   |  |
| Signal output                               | Push-pull output, short-circuit protected, reverse polarity protected   |  |
| Switching voltage                           | max. 30 V DC  |  |
| Switching current                           | max. 100 mA   |  |
| Measurement output                          | 1 analog output 4 ... 20 mA, short-circuit/overload protected   |  |
| Switching frequency                         | f   | 50 Hz  |
| Response time                               | 10 ms   |  |
| <b>Conformity</b>                           |   |  |
| Electromagnetic compatibility               | EN 61000-6-2, EN 61000-6-4  |  |
| Laser safety                                | IEC 60825-1:2014  |  |
| <b>Measurement accuracy</b>                 |   |  |
| Absolute accuracy                           | ± 25 mm   |  |
| Repeat accuracy                             | < 5 mm  |  |
| <b>Approvals and certificates</b>           |   |  |

**Technical Data**

|                                  |   |
|----------------------------------|---|
| IECEX approval                   | IECEX INE 14.0042X  |
| ATEX approval                    | INERIS 14 ATEX 0035X  |
| Marking                          | Ⓜ II 2 GD<br>Ex db IIC T6 Gb<br>Ex tb IIIC T85°C Db   |
| Protection class                 | III   |
| FDA approval                     | IEC 60825-1:2014 Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3 as described in Laser Notice 56, dated May 8, 2019. |
| <b>Ambient conditions</b>        |   |
| Ambient temperature              | -30 ... 45 °C (-22 ... 113 °F)  |
| Storage temperature              | -30 ... 70 °C (-22 ... 158 °F)  |
| <b>Mechanical specifications</b> |   |
| Cable gland                      | Clamping range 3 ... 8.5 mm   |
| Enclosure cover                  | threaded round cover  |
| Cover fixing                     | flamepath thread  |
| Flamepath grease                 | petroleum jelly   |
| Degree of protection             | IP66  |
| Connection                       | Connection terminals, max. wire cross-section 2.5 mm <sup>2</sup>   |
| <b>Material</b>                  |   |
| Enclosure                        | aluminum alloy  |
| Glass                            | thermo-resistant tempered glass   |
| Finish                           | epoxy coated RAL 7005 (grey)  |
| Mass                             | approx. 6.6 kg  |
| Grounding                        | M6 external grounding points  |

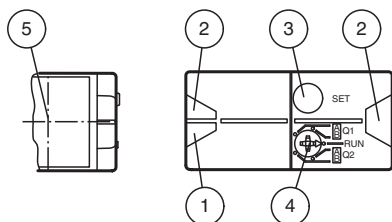
**Connection Assignment**

Option:



- = Light on
- = Dark on

**Assembly**



|   |                    |        |
|---|--------------------|--------|
| 1 | Operating display  | green  |
| 2 | Signal display     | yellow |
| 3 | TEACH-IN button    |        |
| 4 | Mode rotary switch |        |
| 5 | Laser output       |        |

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**Teach-In**

You can use the rotary switch to select the relevant switching threshold A and/or B for teaching in for switching output **Q1**. The yellow LEDs indicate the current state of the selected output.

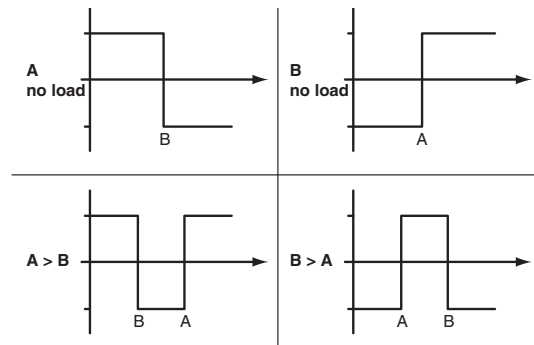
To store a switching threshold (distance measured value), press and hold the "SET" button until the yellow and green LEDs flash in phase (approx. 2 s). Teach-In starts when the "SET" button is released.

Successful Teach-In is indicated by alternating flashing (2.5 Hz) of the yellow and green LEDs.

An unsuccessful Teach-In is indicated by rapidly alternating flashing (8 Hz) of the yellow and green LEDs.

After an unsuccessful Teach-In, the sensor continues to operate with the previous valid setting after the relevant visual fault signal is issued.

Different switching modes can be defined by teaching in the relevant distance measured values for the switching thresholds A and B:



Every taught-in switching threshold can be rethought (overwritten) by pressing the SET button again.

Pressing and holding the "SET" button for > 5 s completely deletes the taught-in value. The yellow and green LEDs go out simultaneously to indicate that this procedure has been completed.

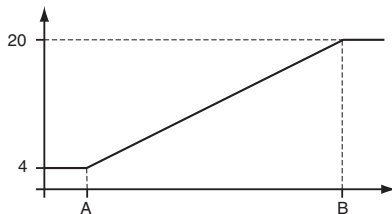
Minimum and maximum values for the analog output **Q2** are taught in in the same way as those for the switching output:

The following values apply: A = 4 mA

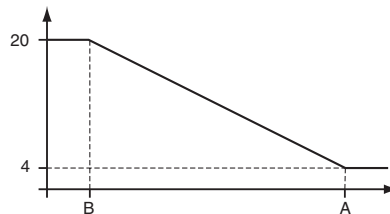
B = 20 mA

This provides three different options for operation:

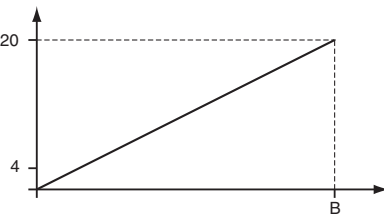
**A < B -> rising slope**



**A > B -> falling slope**



**A empty -> zero start point**



**Reset to default settings:**

Factory setting for switching output Q1:

- Switching output inactive

Factory setting for analog output Q2:

A = 200 mm

B = 5000 mm



Value B cannot be deleted

The "zero start point" operating mode can be obtained by deleting value A

- Set the rotary switch to the "RUN" position
- Press and hold the "SET" button until the yellow and green LEDs stop flashing in phase (approx. 10 s)
- When the green LED lights up continuously, the procedure is complete.

**Error messages:**

- Short circuit: In the event of a short circuit at the sensor output, the green LED flashes with a frequency of approx. 4 Hz.

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- Teach error: In the event of a teach error, the yellow and green LEDs flash alternately with a frequency of approx. 8 Hz.

**Note!**

The difference in the taught-in distance measured values for switching thresholds A and B must be greater than 20 mm.

If the difference in the taught-in measured values is the same as or smaller than the set switching hysteresis, the sensor will visually signal an unsuccessful Teach-In. The last distance measured value that was taught in will not be adopted by the sensor.

Select a new distance measured value for switching threshold A or B with a greater difference between the switching thresholds.

Teach in this distance measured value on the sensor again.

Switching threshold A can be deleted or set to a value of zero.  
(E.g., when setting the "zero start point" curve).

However, switching threshold B can neither be deleted nor set to a value of zero.

## Application

- Object identification or classification
- Positioning
- Level measurement
- Collision avoidance/distance measurement
- Compartment occupied checks
- Rack fine positioning
- Stack height control
- Coil measurement
- Dip monitoring
- Lift height checks
- Opening impulse sensor and closing edge monitoring on automatic doors, industrial gates and barrier systems
- Vehicle detection for traffic engineering purposes (e.g. monitoring of individual parking spaces)
- Height measurement in tunnels and entranceways
- Anti-collision protection on automated transport systems