



## Distance sensor

VDM28-15-L1-IO/73c/110/122



- Distance measurement using object
- Measuring method PRT (Pulse Ranging Technology)
- IO-Link interface for service and process data
- Analog output 0/4 mA ... 20 mA
- Accurate, clear, and reproducible measuring results
- Laser class 1, eyesafe

Universal distance sensor, measurement to object, IO-Link interface, measuring method PRT, 15 m detection range, red laser light, laser class 1, push-pull output, analog output, M12 plug

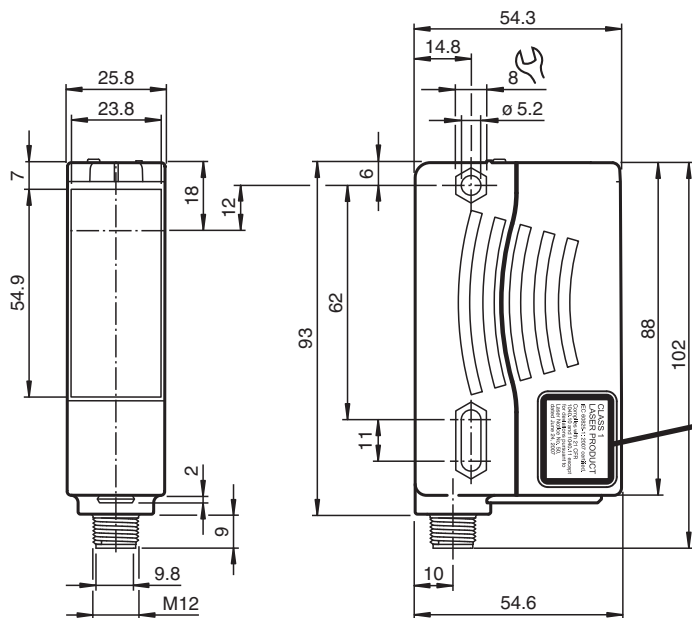


IO-Link

### Function

The VDM28 distance measurement device employs Pulse Ranging Technology (PRT). It has a repeat accuracy of 5 mm with an operating range of 0.2 ... 15 m and an absolute accuracy of 25 mm. The compact housing of the Series 28 photoelectric sensors, with dimensions of 88 mm (height), 26 mm (width) and 54 mm (depth), make it the smallest device available in its class.

### Dimensions



#### CLASS 1 LASER PRODUCT

IEC 60825-1: 2007 certified.  
Complies with 21 CFR  
1040.10 and 1040.11 except  
for deviations pursuant to  
Laser Notice No. 50,  
dated June 24, 2007

### Technical Data

#### General specifications

|                   |                                                          |
|-------------------|----------------------------------------------------------|
| Measurement range | 0.2 ... 15 m                                             |
| Reference target  | Kodak white (90%)                                        |
| Light source      | laser diode<br>typ. service life 85,000 h at Ta = +25 °C |

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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**PEPPERL+FUCHS**

## Technical Data

|                                             |                |                                                                                                                       |
|---------------------------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------|
| 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. $\pm 2^\circ$                                                                                                    |
| Measuring method                            |                | Pulse Ranging Technology (PRT)                                                                                        |
| Diameter of the light spot                  |                | < 15 mm at a distance of 15 m at 20 °C                                                                                |
| Ambient light limit                         |                | 50000 Lux                                                                                                             |
| Temperature influence                       |                | typ. $\leq 0.25$ mm/K                                                                                                 |
| <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> | $\leq 70$ mA / 24 V DC                                                                                                |
| Time delay before availability              | t <sub>v</sub> | 1.5 s                                                                                                                 |
| <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 60825-1:2007                                                                                                      |
| <b>Measurement accuracy</b>                 |                |                                                                                                                       |
| Absolute accuracy                           |                | $\pm 25$ mm                                                                                                           |
| Repeat accuracy                             |                | < 5 mm                                                                                                                |
| <b>Approvals and certificates</b>           |                |                                                                                                                       |
| Protection class                            |                | III                                                                                                                   |
| UL approval                                 |                | cULus Listed, Class 2 Power Source, Type 1 enclosure                                                                  |

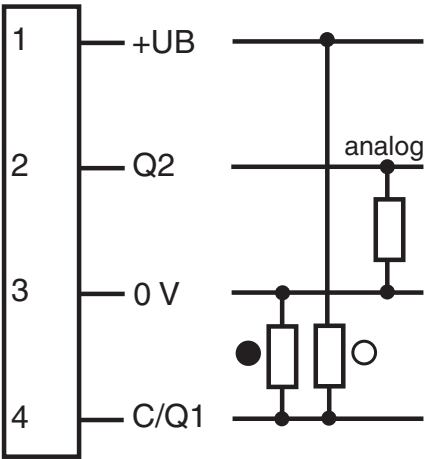
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Technical Data

|                           |                                                                                                                                      |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| CCC approval              | CCC approval / marking not required for products rated ≤36 V                                                                         |
| FDA approval              | IEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007 |
| Ambient conditions        |                                                                                                                                      |
| Ambient temperature       | -30 ... 55 °C (-22 ... 131 °F)                                                                                                       |
| Storage temperature       | -30 ... 70 °C (-22 ... 158 °F)                                                                                                       |
| Mechanical specifications |                                                                                                                                      |
| Degree of protection      | IP67                                                                                                                                 |
| Connection                | 4-pin, M12 x 1 connector                                                                                                             |
| Material                  |                                                                                                                                      |
| Housing                   | Plastic ABS                                                                                                                          |
| Optical face              | PMMA                                                                                                                                 |
| Mass                      | 90 g                                                                                                                                 |
| Dimensions                |                                                                                                                                      |
| Height                    | 88 mm                                                                                                                                |
| Width                     | 25.8 mm                                                                                                                              |
| Depth                     | 54.6 mm                                                                                                                              |

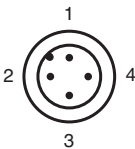
Connection Assignment

Option:



○ = Light on  
● = Dark on

Connection Assignment



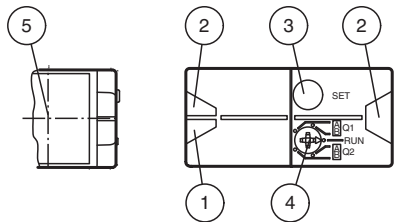
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Connection Assignment

Wire colors in accordance with EN 60947-5-2

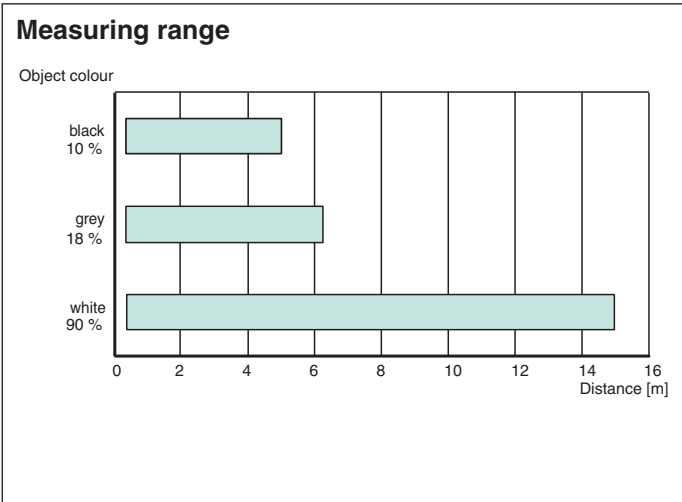
- |   |    |         |
|---|----|---------|
| 1 | BN | (brown) |
| 2 | WH | (white) |
| 3 | BU | (blue)  |
| 4 | BK | (black) |

Assembly



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

Characteristic Curve



Application



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Safety Information



Safety Information

**Laser Class 1 Information**  
The irradiation can lead to irritation especially in a dark environment. Do not point at people!  
Maintenance and repairs should only be carried out by authorized service personnel!  
Attach the device so that the warning is clearly visible and readable.  
Caution – Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

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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.

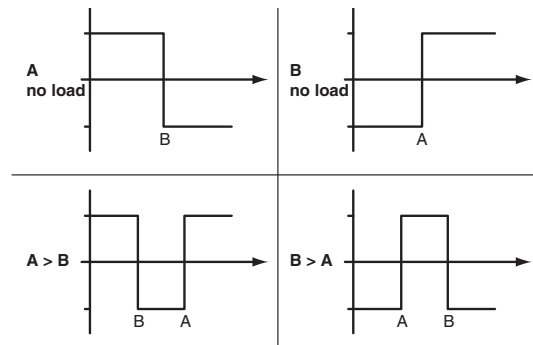
To store a switching threshold (distance measured value), press and hold the "SET" button until the yellow and green LEDs flash in phase (approx. 2 s). Teach-In starts when the "SET" button is released.

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 retaught (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.

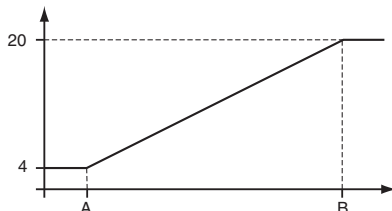
Minimum and maximum values for the analog output **Q2** are taught in in the same way as those for the switching output:

The following values apply: A = 4 mA

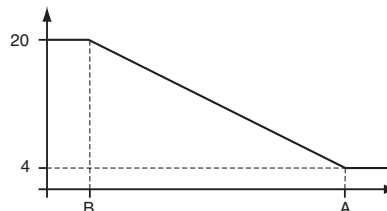
B = 20 mA

This provides three different options for operation:

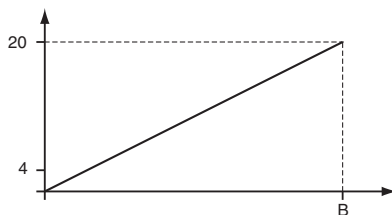
**A < B -> rising slope**



**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.

- 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.