Distance sensor

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

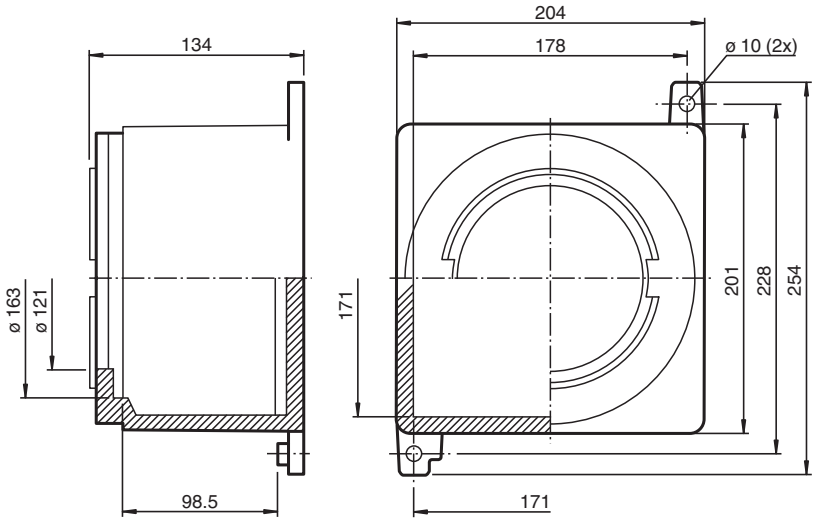
- Retroreflective laser distance sensor
- Measuring method PRT (Pulse Ranging Technology)
- Accurate, clear, and reproducible measuring results
- Red laser as the light emitter
- Version with laser class 1
- Version with IO-Link interface
- Version with analog output
- Suitable for operation in Zone 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
Measurement range		0.5 ... 50 m

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Technical Data

Reference target		OFR-100/100
Light source		laser diode 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
Temperature influence		typ. ≤ 0.25 mm/K
Functional safety related parameters		
$MTTF_d$		200 a
Mission Time (T_M)		10 a
Diagnostic Coverage (DC)		0 %
Indicators/operating means		
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 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
Electrical specifications		
Operating voltage	U_B	10 ... 30 V DC / when operating in IO-Link mode: 18 ... 30 V
Ripple		10 % within the supply tolerance
No-load supply current	I_0	≤ 70 mA / 24 V DC
Time delay before availability	t_v	1.5 s
Interface		
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
Output		
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
Conformity		
Electromagnetic compatibility		EN 61000-6-2, EN 61000-6-4
Laser safety		IEC 60825-1:2007
Measurement accuracy		
Absolute accuracy		± 25 mm
Repeat accuracy		< 5 mm

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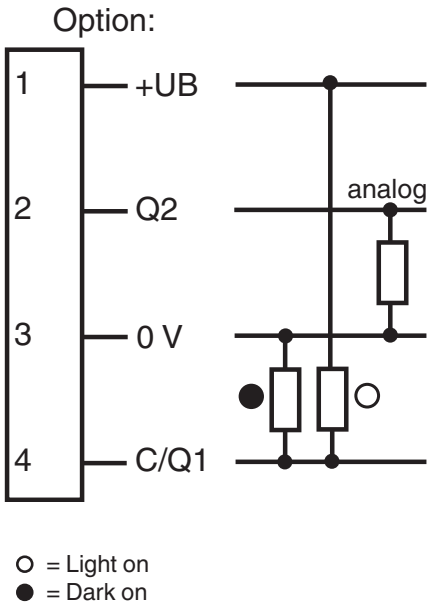
Technical Data

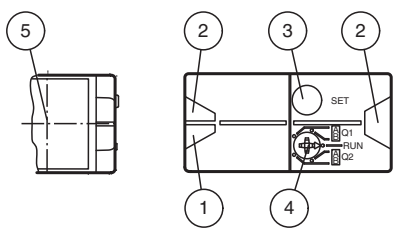
Approvals and certificates		
IECEx approval		IECEx INE 14.0042X
ATEX approval		INERIS 14 ATEX 0035X
Marking		Ⓔx II 2 GD Ex db IIC T6 Gb Ex tb IIIC T85°C Db
Protection class		III
Ambient conditions		
Ambient temperature		-30 ... 45 °C (-22 ... 113 °F)
Storage temperature		-30 ... 70 °C (-22 ... 158 °F)
Mechanical specifications		
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 mm²
Material		
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



○ = 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

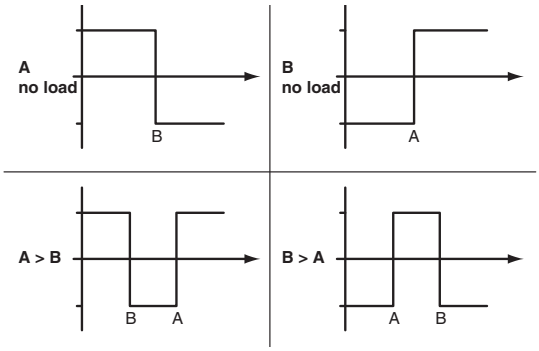
You can use the rotary switch to select the relevant switching threshold A and/or B for teaching in for switching output **Q1**.
The yellow LEDs indicate the current state of the selected output.

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.

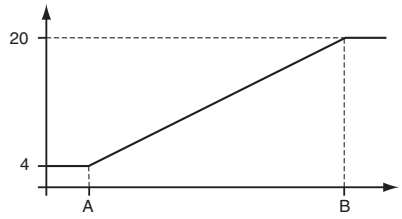
Different switching modes can be defined by teaching in the relevant distance measured values for the switching thresholds A and B:



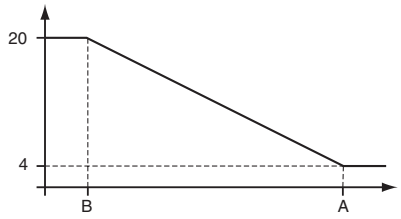
Every taught-in switching threshold can be retaught (overwritten) by pressing the SET button again.

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:

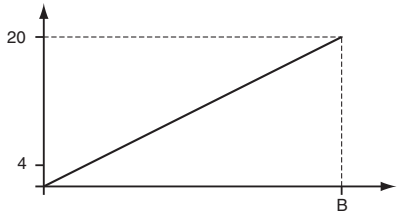
A < B -> rising slope



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.

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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

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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