Distance sensor

VDM28-50-R1-IO/73c/136

- Retroreflective laser distance sensor
- Measuring method PRT (Pulse Ranging Technology)
- Accurate, clear, and reproducible measuring results
- Red laser as the light emitter
- Version with IO-Link interface
- Laser class 1, eyesafe

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, M12 plug

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 ... 50 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.

Application

- Object identification or object 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

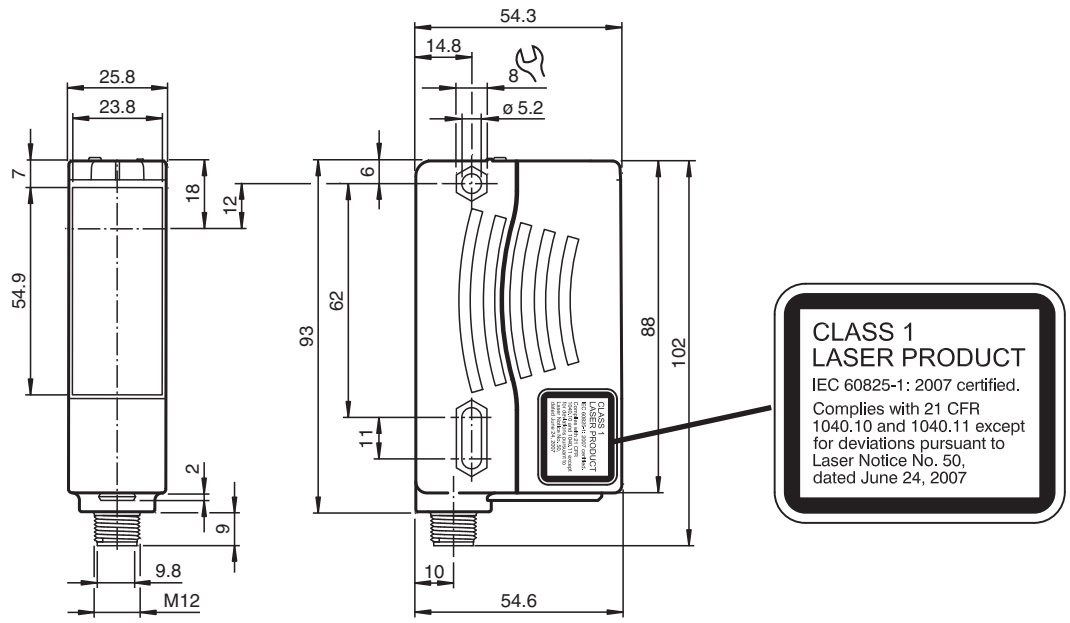
Safety Information

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!

Release date: 2021-09-08 Date of issue: 2021-09-08 Filename: 297899_eng.pdf

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.

Dimensions



Technical Data

General specifications	
Measurement range	0.2 ... 50 m
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	

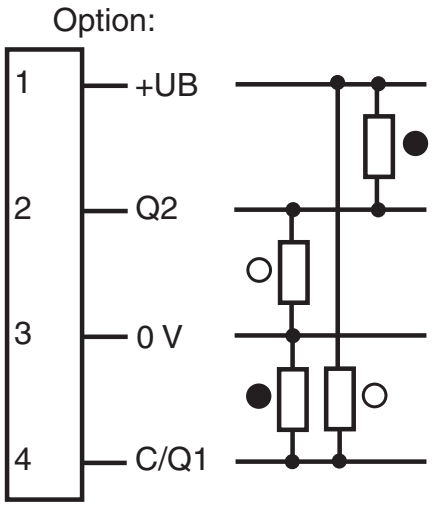
Release date: 2021-09-08 Date of issue: 2021-09-08 Filename: 297899_eng.pdf

Technical Data

$MTTF_d$		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
Output		
Signal output		2 push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protected
Switching voltage		max. 30 V DC
Switching current		max. 100 mA
Switching frequency	f	50 Hz
Response time		10 ms
Conformity		
Product standard		EN 60947-5-2
Laser safety		IEC 60825-1:2007
Approvals and certificates		
EAC conformity		TR CU 020/2011
Protection class		II, rated voltage ≤ 250 V AC with pollution degree 1-2 according to IEC 60664-1
UL approval		cULus Listed, Class 2 Power Source, Type 1 enclosure
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
Measurement accuracy		
Absolute accuracy		± 25 mm
Repeat accuracy		< 5 mm
Ambient conditions		
Ambient temperature		-30 ... 55 °C (-22 ... 131 °F)
Storage temperature		-30 ... 70 °C (-22 ... 158 °F)
Mechanical specifications		
Housing width		25.8 mm
Housing height		88 mm
Housing depth		54.6 mm
Degree of protection		IP67
Connection		4-pin, M12 x 1 connector
Material		
Housing		Plastic ABS
Optical face		Plastic pane
Mass		90 g

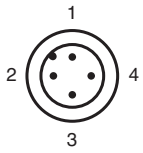
Release date: 2021-09-08 Date of issue: 2021-09-08 Filename: 297899_eng.pdf

Connection Assignment



○ = Light on
● = Dark on

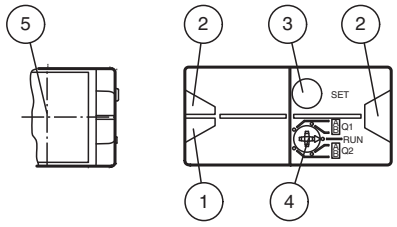
Connection Assignment



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	

Release date: 2021-09-08 Date of issue: 2021-09-08 Filename: 297899_eng.pdf

Application

Accessories

	PACTware 4.1	FDT Framework
	IO-Link-Master02-USB	IO-Link master, supply via USB port or separate power supply, LED indicators, M12 plug for sensor connection
	OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
	OMH-07-01	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
	OMH-21	Mounting bracket
	OMH-22	Mounting bracket
	OMH-VDM28-01	Metal enclosure for inserting protective panes or apertures
	OMH-VDM28-02	Mounting and fine adjustment device for sensors from the 28 series
	OMH-RLK29-HW	Mounting bracket for rear wall mounting
	OMH-RL28-C	Weld slag cover model
	OMH-K01	dove tail mounting clamp
	OMH-K03	dove tail mounting clamp
	OFR-100/100	Reflective tape 100 mm x 100 mm
	REF-MH82	Reflector with Micro-structure, rectangular 82 mm x 60 mm, mounting holes

Release date: 2021-09-08 Date of issue: 2021-09-08 Filename: 297899_eng.pdf

Accessories

	**REF-MH50**	Reflector with Micro-structure, rectangular 50.9 mm x 50.9 mm, mounting holes, fixing strap
	**REF-MH78**	Reflector with Micro-structure, hexagonal 78 mm x 61 mm, mounting holes
	**V1-G-2M-PVC**	Female cordset single-ended M12 straight A-coded, 4-pin, PVC cable grey
	**V1-G-2M-PUR**	Female cordset single-ended M12 straight A-coded, 4-pin, PUR cable grey
	**V1-W-2M-PUR**	Female cordset single-ended M12 angled A-coded, 4-pin, PUR cable grey

Release date: 2021-09-08 Date of issue: 2021-09-08 Filename: 297899_eng.pdf

Teach-In

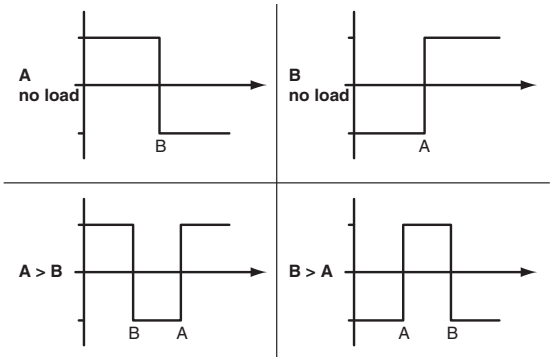
You can use the rotary switch to select the output **Q1** or **Q2** and the relevant switching threshold A or B for teaching in.
The yellow LEDs indicate the current state of the selected output.

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

An unsuccessful Teach-In is indicated by 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.

Default setting:
In general, no switching points are set at the factory. The outputs are switched to low.

Reset to default settings:
- 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)
- If the green LED lights up, 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 the switching thresholds A and B must be greater than the switching hysteresis set in the sensor.
On delivery, the switching hysteresis is 15 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.

Release date: 2021-09-08 Date of issue: 2021-09-08 Filename: 297899_eng.pdf