



Distance sensor

VDM28-15-L1-IO/110/115b/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

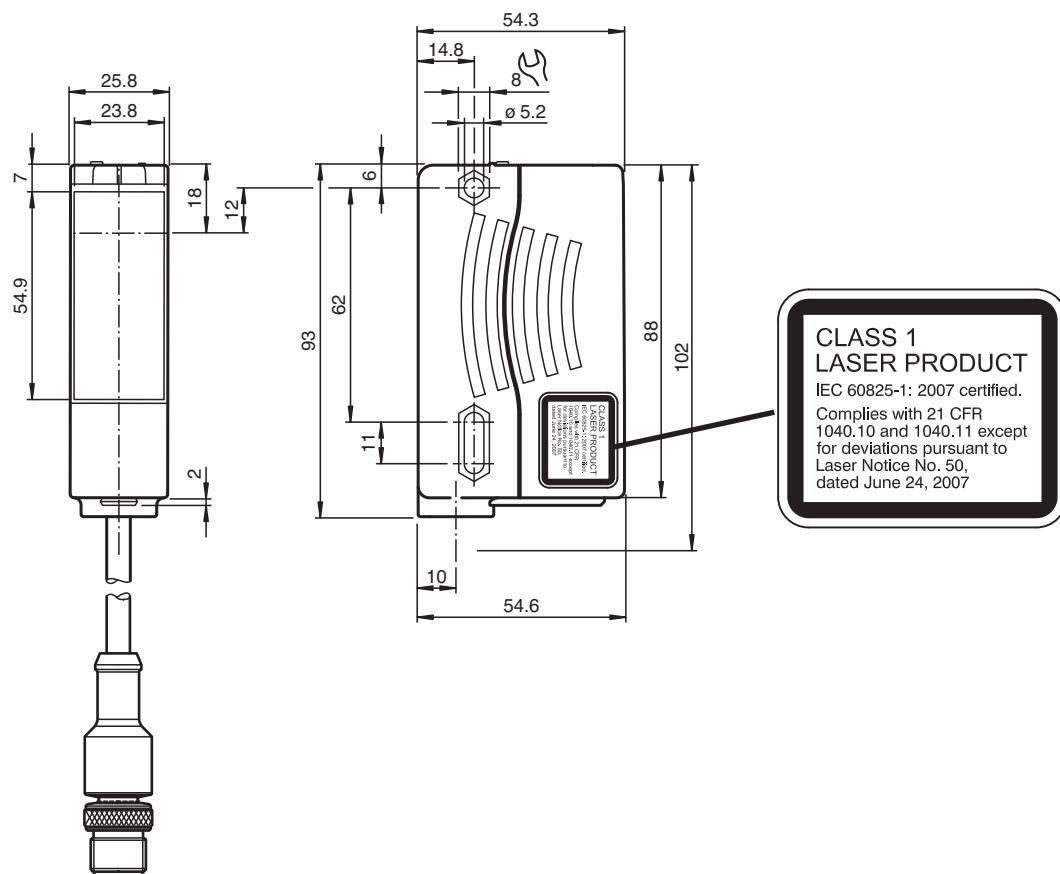
Universal distance sensor, measurement to object, IO-Link interface, measuring method: PRT, 15 m detection range, red laser light, laser class 1, push-pull output, analog output, fixed cable with M12 plug



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 ... 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



Technical Data

General specifications

Measuring range	0.2 ... 15 m
Reference target	Kodak white (90%)
Light source	laser diode typ. service life 85,000 h at $T_a = +25^\circ\text{C}$
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. $\pm 2^\circ$
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

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	$\leq 70 \text{ mA} / 24 \text{ V DC}$
Time delay before availability	t_v	< 1.5 s at 20°C

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
Response time	10 ms

Conformity

Electromagnetic compatibility	EN 61000-6-2, EN 61000-6-4
Laser safety	IEC 60825-1:2014

Compliance with standards and directives

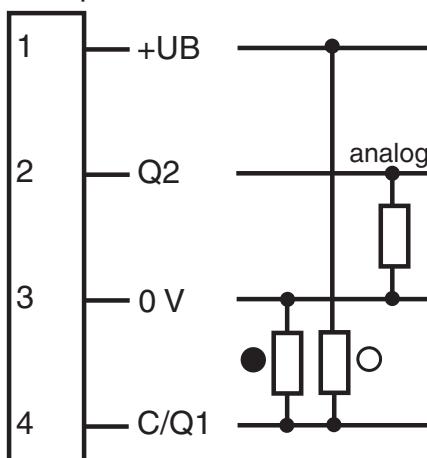
Standard conformity	
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Technical Data

Standards	
Measurement accuracy	
Absolute accuracy	± 25 mm
Repeat accuracy	< 5 mm
Approvals and certificates	
Protection class	III
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 60825-1:2014 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.
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	300 mm fixed cable with M12 x 1, 4-pin connector
Material	
Housing	Plastic ABS
Optical face	PMMA
Cable	
Cable diameter	4.3 mm ± 0.1 mm
Mass	90 g
Dimensions	
Height	88 mm
Width	25.8 mm
Depth	54.6 mm

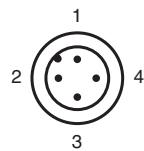
Connection Assignment

Option:



○ = Light on
 ● = Dark on

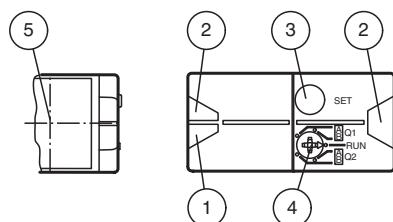
Connection Assignment



Wire colors in accordance with EN 60947-5-2

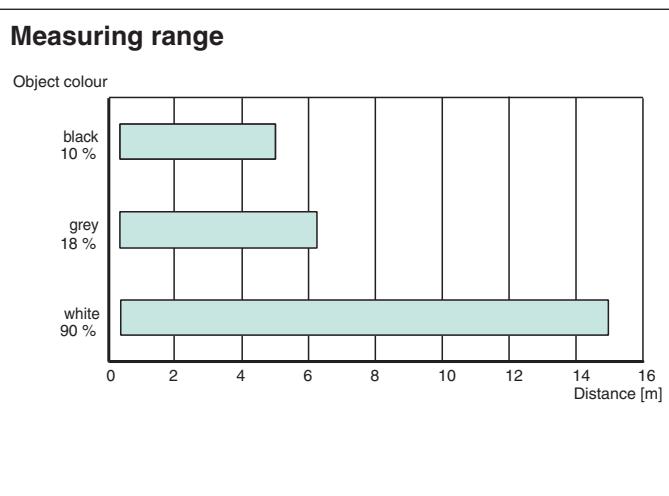
1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Assembly



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

Characteristic Curve



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.

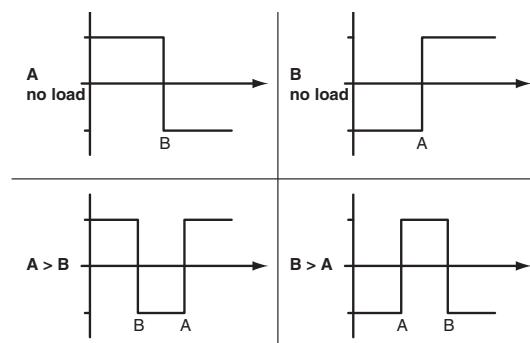
To store a switching threshold (distance measured value), press and hold the "SET" button until the yellow and green LEDs flash in phase (approx. 2 s). Teach-In starts when the "SET" button is released.

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.

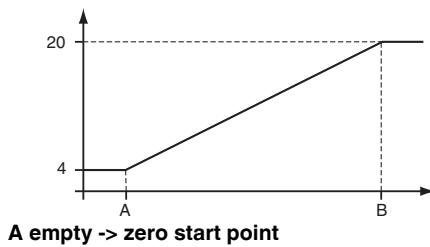
Minimum and maximum values for the analog output **Q2** are taught in in the same way as those for the switching output:

The following values apply: A = 4 mA

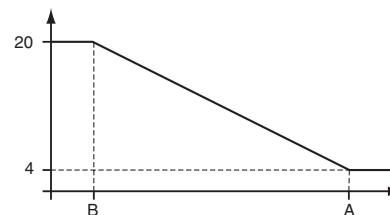
B = 20 mA

This provides three different options for operation:

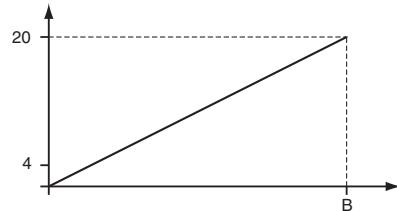
A < B -> rising slope



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.