

Distance sensor (PRT) OMD8000-R300-IEP-V1-L



- Extremely long detection range paves the way for new applications
- Pulse Ranging Technology (PRT)
- Analog output 4 ... 20 mA
- Visible light source for easy alignment
- Minimal black-white difference
- Absolutely reliable background suppression

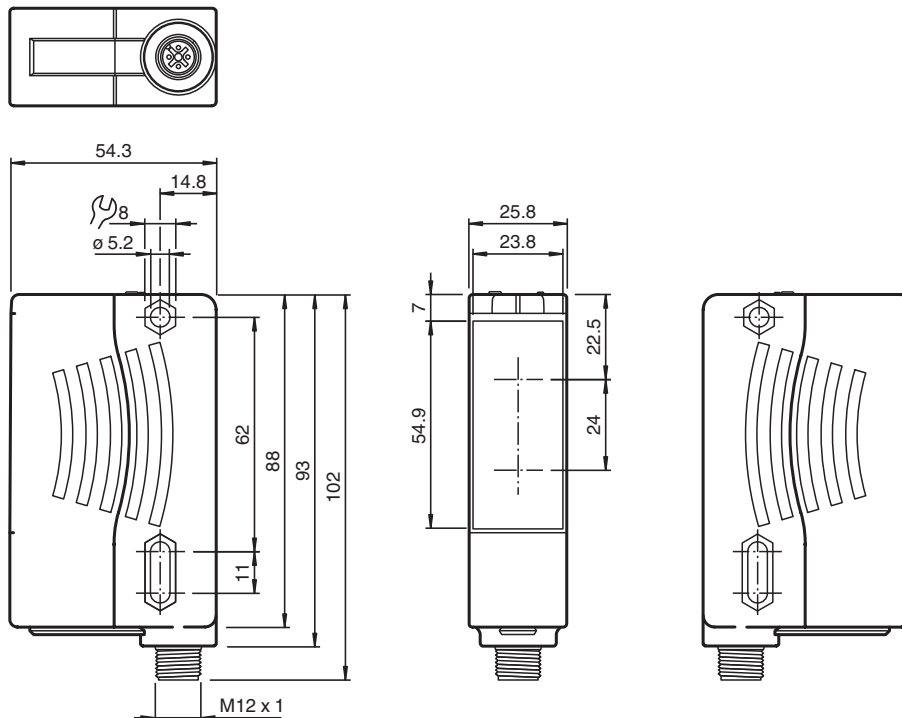
Distance sensor (PRT)



Function

The sensors in the R300 series represent a versatile product line and adopt various functional principles. All sensors operate using proven Pulse Ranging Technology (PRT) and are characterized by high sensing ranges and detection ranges. Contained within the compact housing of the 28 series of light barriers, the R300 offers all of the properties of PRT such as maximum reliability when detecting objects and immunity against ambient light and cross-talk. To achieve this, the sensors in the R300 series make use of a number of different kinds of measurement data. What's more, the sensors are equipped with red light that is safe for the human eye as standard, making it easier to align the devices, even across expansive work areas. These features, combined with an innovative and intuitive operating concept, provide solutions for conventional automation tasks delivering the highest level of performance.

Dimensions



Technical Data

General specifications

Detection range	0.03 ... 8 m
Adjustment range	0.05 ... 8 m

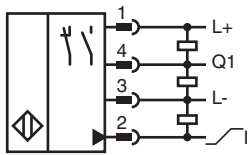
Technical Data

Reference target	Kodak white (90%)	
Light type	modulated visible red light	
Laser nominal ratings		
Note	LASER LIGHT , DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS	
Laser class	1M	
Wave length	660 nm	
Beam divergence	< 25 mrad	
Pulse length	4 ns	
Repetition rate	250 kHz	
max. pulse energy	< 2.4 nJ	
Black-white difference (6 %/90 %)	< 0.5 %	
Angle deviation	max. $\pm 2^\circ$	
Measuring method	Pulse Ranging Technology (PRT)	
Diameter of the light spot	vertical 60 mm , horizontal 30 mm at a distance of 2 m	
Ambient light limit	50000 Lux	
Resolution	12 bit, however > 0.5 mm	
Functional safety related parameters		
MTTF _d	100 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
Ripple	10 % within the supply tolerance	
No-load supply current	I ₀	≤ 80 mA / 24 V DC
Time delay before availability	t _v	< 0.7 s , for temperatures < -30 °C compliance of the specification 5 mins after power on
Output		
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected, overvoltage protected 1 analog output 4 ... 20 mA, short-circuit/overload protected	
Switching voltage	max. 30 V DC	
Switching current	max. 100 mA	
Measurement output	1 analog output 4 ... 20 mA ; Rmax = 470 Ω	
Switching frequency	f	50 Hz
Response time	5 ms	
Conformity		
Product standard	EN 60947-5-2	
Laser safety	EN 60825-1:2014	
Measurement accuracy		
Repeat accuracy	< 5 mm	
Approvals and certificates		
UL approval	E87056 , cULus Listed , class 2 power supply , type rating 1	
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	-40 ... 55 °C (-40 ... 131 °F)	
Storage temperature	-40 ... 70 °C (-40 ... 158 °F)	

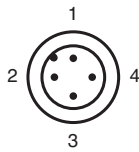
Technical Data

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	54.3 mm

Connection



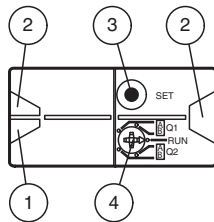
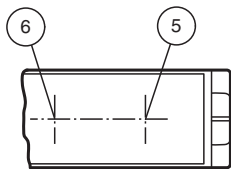
Connection Assignment



Wire colors in accordance with EN 60947-5-2

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

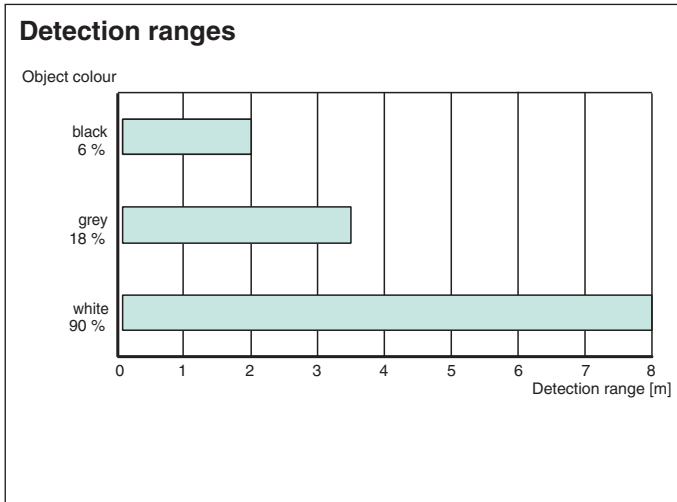
Assembly



1	Operating indicator	green
2	Signal indicator	yellow
3	Teach-in push button	
4	Mode rotary switch	
5	Emitter	
6	Receiver	

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Characteristic Curve



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Intended Use

Mounting Instructions:

The sensor can be mounted directly with thru-holes or by using a fixing bracket or mounting clamp (not included in the scope of delivery).

Ensure that the surface is level in order to prevent the housing from becoming distorted when the fittings are tightened. It is advisable to secure the nuts and screws using spring disks to prevent the sensor from being misaligned.

Connection:

Connect the device as set out in the connection diagram.

Adjustment:

The green LED lights up when the operating voltage is applied.

Adjust the sensor so that the laser point is on the center of the target.

Installation Note

A pressure equalization membrane is fitted on the sensor nameplate.

Settings

Teach-in:

Use the rotary switch for switching signal **Q1** or **Q2** to select the relevant switching threshold

Select A and/or B to teach in.

The yellow LEDs indicate the current state of the selected output.

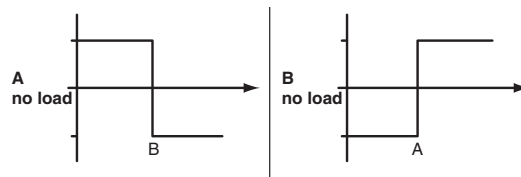
To teach in a switching threshold, press and hold the "SET" button until the yellow and green LEDs flash in phase (approx. 1 s). Teach-in starts when the "SET" button is released.

A successful teach-in is indicated by the yellow and green LEDs flashing alternately (2.5 Hz). An unsuccessful teach-in is indicated by the yellow and green LEDs rapidly flashing alternately (8 Hz).

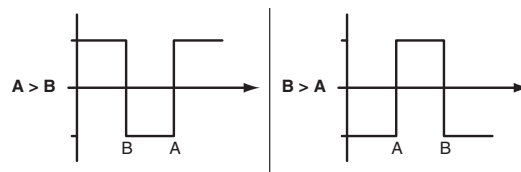
After an unsuccessful teach-in, the sensor continues to operate with the previous valid setting after the relevant visual fault signal is issued.

Different switching modes can be defined by teaching in the relevant distance data for switching thresholds A and B.

Single-point operation:



Window operation:



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

A taught-in value can be reset by pressing the "SET" button for > 4 s. The yellow and green LEDs go out simultaneously to indicate that this procedure has been completed. The reset process starts when the "SET" button is released. The yellow and green LEDs flash alternately (2.5 Hz) to indicate that the reset has completed successfully.

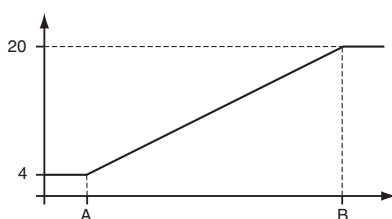
Minimum and maximum values for the analog output **Q2** are taught in in the same way as those for the switching output:

The following values apply: A = 4 mA

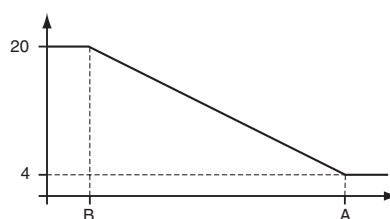
B = 20 mA

This provides three different options for operation:

A < B -> rising slope



A > B -> falling slope



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Resetting to Factory Settings:

No switching points are set at the factory. The outputs are deactivated.

Factory settings can be restored by pressing the "SET" button for > 10 s with the rotary switch in the "Run" position. The yellow and green LEDs go out simultaneously to indicate that this procedure has been completed. The reset starts when the "SET" button is released. The green LED lights up to indicate that the reset has completed successfully. After completing the reset, the sensor will immediately function with the factory settings.