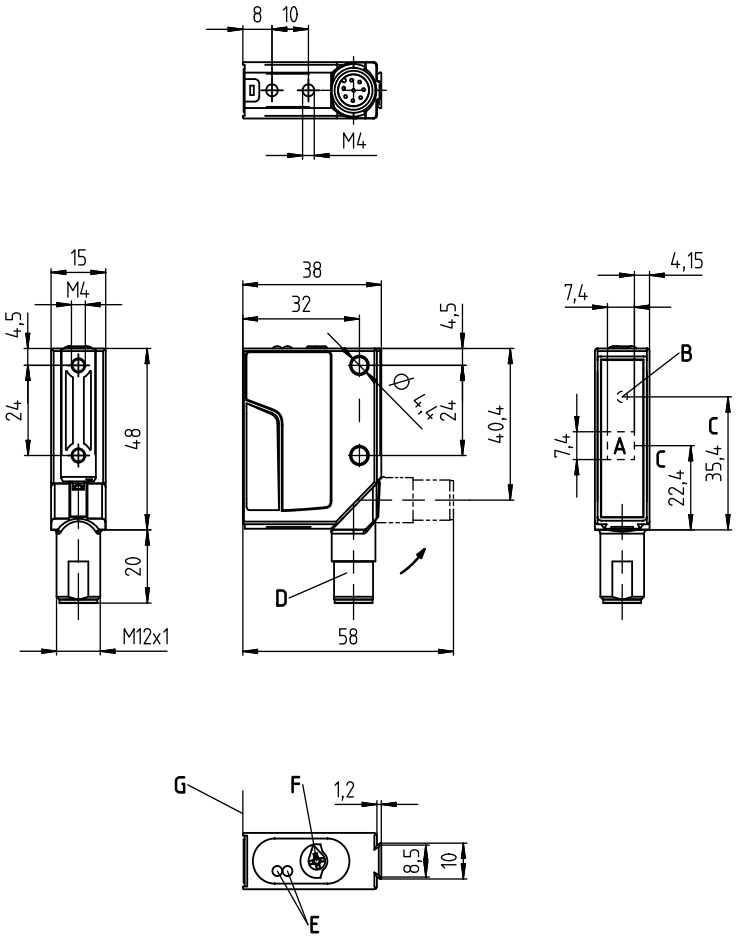
ODSL 8 — Optical laser distance sensors

en 07-2018/12 50114951-06

20 … 500 mm

- Reflection-independent distance information
- Highly insensitive to extraneous light
- Analog voltage output or current output (can be inverted, teachable)
- 2 teachable switching outputs (push-pull)
- M12 turning connector
- Easy alignment through visible red light

Dimensioned drawing



A Receiver
B Transmitter
C Optical axis
D 90° turning connector
E LED yellow, green
F Operational control (rotary switch)
G Reference edge for the measurement (optics cover)

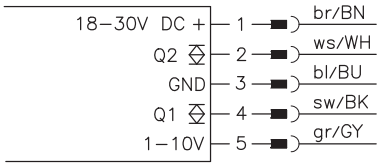
Accessories:

(available separately)

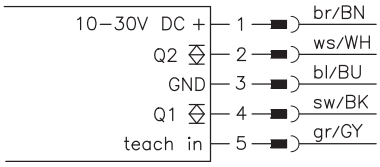
- Mounting systems
- Cable with M12 connector (KD …)
- Control guard

Electrical connection

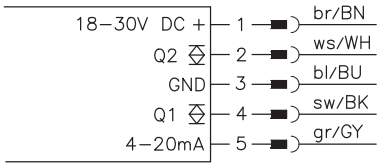
ODSL 8/V66…-500-S12



ODSL 8/66…-500-S12



ODSL 8/C66…-500-S12



Specifications

Optical data

Measurement range [1]	20 … 500mm
Resolution [2]	0.1 … 0.5mm
Light source	laser
Laser class	2 acc. to IEC 60825-1:2007
Wavelength	650nm (visible red light)
Max. output power	< 1.2mW
Pulse duration	4ms
Light spot	2x6mm² at 500mm

Error limits (relative to measurement distance)

Absolute measurement accuracy [1]	± 2% up to 200mm / ± 4% 200 … 500mm
Repeatability [3]	± 1% up to 200mm / ± 3% 200 … 500mm
B/W detection thresh. (6 … 90% rem.)	≤ 1.5%
Temperature drift	≤ 0.2%/°C

Timing

Measurement time	2 … 7ms
Response time	≤ 20ms
Delay before start-up	≤ 300ms

Electrical data

Operating voltage U_B	without analog output: 10 … 30VDC with analog output: 18 … 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of U_B
Open-circuit current	≤ 50mA
Switching output/function [4]	2 push-pull switching outputs pin 2: Q2, PNP light switching, NPN dark switching pin 4: Q1, PNP light switching, NPN dark switching
Signal voltage high/low	≥ (U_B-2 V)/≤ 2V
Analog output	voltage 1 … 10V, R_L ≥ 2kΩ / current 4 … 20mA, R_L 500Ω

Indicators

Green LED	continuous light	ready
	flashing	fault (teach values were not applied)
	off	no voltage
Yellow LED	continuous light	object within Q1 switching range [5]
	flashing	teach values were not applied
	off	object out of Q1 switching range [6]

Mechanical data

Housing	metal
Optics cover	glass or plastic
Weight	70g
Connection type	M12 connector, 5-pin, turning

Environmental data

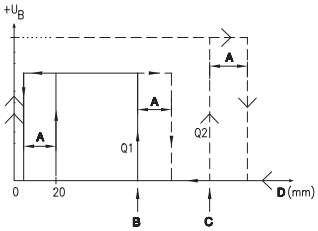
Ambient temp. (operation/storage)	-40°C … +50°C/-40°C … +70°C
Protective circuit [6]	2, 3
VDE safety class [7]	II, all-insulated
Protection class [8]	IP 67, IP 69K [9]
Environmentally tested acc. to	ECOLAB
Standards applied	IEC 60947-5-2
Certifications	UL 508, CSA C22.2 No.14

1) Luminosity coefficient 6% … 90%, at 20°C, measurement object ≥ 50x50mm²
2) Minimum and maximum value depend on measurement distance and configuration of the analog output
3) Same object, identical environmental conditions, measurement object ≥ 50x50mm²
4) The push-pull switching outputs must not be connected in parallel
5) No display for output Q2
6) 2=polarity reversal protection, 3=short circuit protection for all outputs
7) Rating voltage 250VAC
8) In stop position of the turning connector (turning connector locked)
9) IP 69K test acc. to DIN 40050 part 9 simulated, high pressure cleaning conditions without the use of additives, acids and bases are not part of the test

Tables

Diagrams

Characteristic curve of switching outputs:



A Hysteresis
B Switching point Q1 (teach point)
C Switching point Q2 (teach point)
D Measurement distance

Remarks

Operate in accordance with intended use!

- This product is not a safety sensor and is not intended as personnel protection.
- The product may only be put into operation by competent persons.
- Only use the product in accordance with the intended use.

- Measurement time depends on the reflectivity of the measurement object and on the measurement mode.

Order guide

Preferred types

Order code ➔ / Features ⬇	ODSL 8/V66-500-S12 Part No. 50101879	ODSL 8/V66.01-500-S12 Part No. 50117717	ODSL 8/C66-500-S12 Part No. 50108361	ODSL 8/C66.02-500-S12 Part No. 50138207	ODSL 8/66-500-S12 Part No. 50101880			
Optics cover								
Glass	●		●		●			
Plastic		●		●				
Outputs								
Analog output, voltage	●	●						
Analog output, current			●	●				
2 switching outputs	●	●	●	●	●			
Output factory settings								
Analog output, voltage	20 … 500 mm	20 … 500 mm	–	–	–			
Analog output, current	–	–	20 … 500 mm	20 … 500 mm	–			
Switching output Q1, light switching	20 … 250 mm[1)]	20 … 30.2 mm[1)]	20 … 250 mm[1)]	20 … 250 mm[1)]	20 … 250 mm[1)]			
Switching output Q2, light switching	20 … 250 mm[1)]	28.8 … 400 mm[1)]	20 … 250 mm[1)]	20 … 250 mm[1)]	20 … 250 mm[1)]			
Number of measurements for averaging	3	3	3	3	3			

1) automatic, distance-dependent adjustment of the switching hysteresis

Types with pre-set parameterization

Order code ➔ / Features ⬇	ODSL 8/V66.03-500-S12 Part No. 50114589	ODSL 8/V66.04-500-S12 Part No. 50117717	ODSL 8/V66.05-500-S12 Part No. 50114591	ODSL 8/V66.06-500-S12 Part No. 50114593	ODSL 8/V66.07-500-S12 Part No. 50114595	ODSL 8/V66.08-500-S12 Part No. 50114597	ODSL 8/V66.09-500-S12 Art.-Nr. 50120371	ODSL 8/C66.01-500-S12 Part No. 50116178
Optics cover								
Glass	●	●	●	●	●	●	●	●
Plastic								
Outputs								
Analog output, voltage	●	●	●	●	●	●	●	
Analog output, current								●
2 switching outputs	●	●	●	●	●	●	●	●
Output factory settings								
Analog output, voltage	100 … 400 mm	20 … 500 mm	210 … 300 mm	20 … 300 mm	300 … 350 mm	150 … 200 mm	140 … 190 mm	–
Analog output, current	–	–	–	–	–	–	–	20 … 400 mm
Switching output Q1, light switching	20 … 200 mm, hysteresis 1 mm	20 … 30.2 mm[1)]	210 … 240 mm, hysteresis 1 mm	20 … 100 mm, hysteresis 1 mm	300 … 320 mm, hysteresis 1 mm	150 … 170 mm, hysteresis 1 mm	140 … 160 mm[1)]	20 … 250 mm[1)]
Switching output Q2, light switching	20 … 300 mm, hysteresis 1 mm	28.8 … 400 mm[1)]	270 … 300 mm, hysteresis 1 mm	200 … 300 mm, hysteresis 1 mm	330 … 350 mm, hysteresis 1 mm	180 … 200 mm, hysteresis 1 mm	170 … 190 mm[1)]	20 … 250 mm[1)]
Number of measurements for averaging	10	3	10	10	10	10	10	50

1) automatic, distance-dependent adjustment of the switching hysteresis

Laser safety notices

ATTENTION, LASER RADIATION – LASER CLASS 2

Never look directly into the beam!

The device satisfies the requirements of IEC 60825-1:2007 (EN 60825-1:2007) safety regulations for a product in **laser class 2** as well as the U.S. 21 CFR 1040.10 regulations with deviations corresponding to "Laser Notice No. 50" from June 24th, 2007.

- Never look directly into the laser beam or in the direction of reflecting laser beams!
  If you look into the beam path over a longer time period, there is a risk of injury to the retina.
- Do not point the laser beam of the device at persons!
- Intercept the laser beam with an opaque, non-reflective object if the laser beam is accidentally directed towards a person.
- When mounting and aligning the device, avoid reflections of the laser beam off reflective surfaces!
- CAUTION! Use of controls or adjustments or performance of procedures other than specified herein may result in hazardous light exposure.
- Adhere to the applicable legal and local regulations regarding protection from laser beams.
- The device must not be tampered with and must not be changed in any way.
  There are no user-serviceable parts inside the device.
  Repairs must only be performed by Leuze electronic GmbH + Co. KG.

NOTICE

Affix laser information and warning signs!

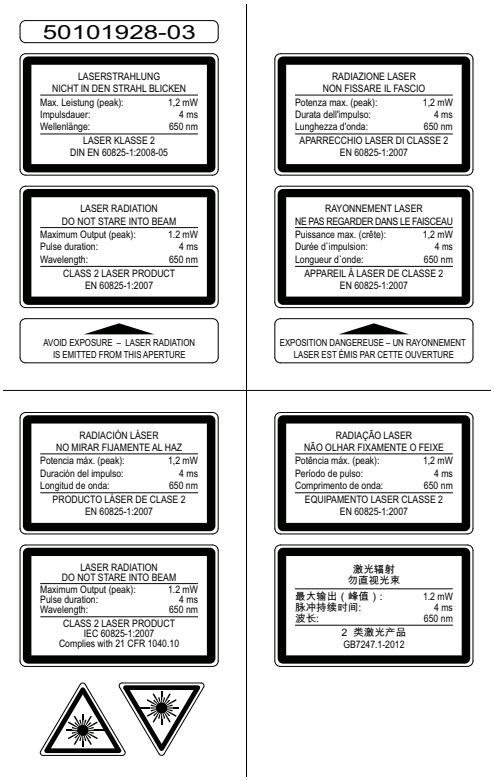
Laser information and warning signs are affixed to the device (see ①). In addition, self-adhesive laser information and warning signs (stick-on labels) are supplied in several languages (see ②).

- Affix the laser information sheet with the language appropriate for the place of use to the device.
  When using the device in the US, use the stick-on label with the "Complies with 21 CFR 1040.10" notice.
- Affix the laser information and warning signs near the device if no signs are attached to the device (e.g. because the device is too small) or if the attached laser information and warning signs are concealed due to the installation position.
  Affix the laser information and warning signs so that they are legible without exposing the reader to the laser radiation of the device or other optical radiation.

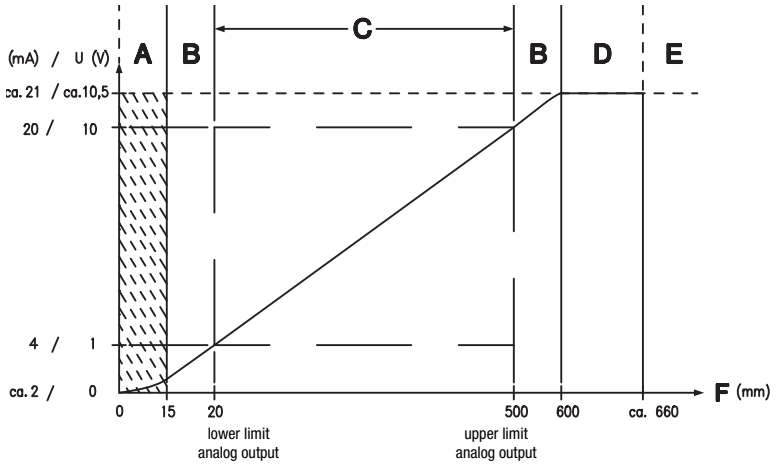
①

A Laser exit opening
B Laser warning sign

②



Characteristic curve of analog output



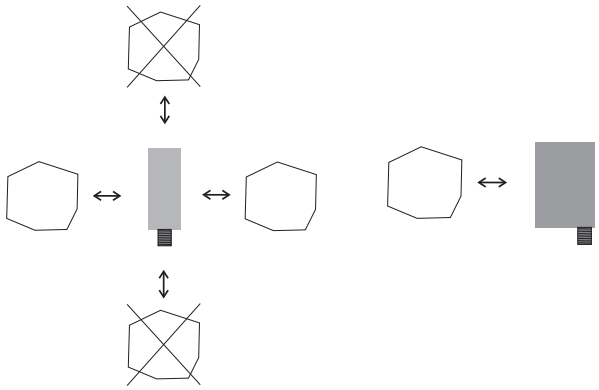
Setting of the analog output is type dependent, see order guide!

A Area not defined
B Linearity not defined
C Measurement range
D Object present
E No object detected
F Measurement distance

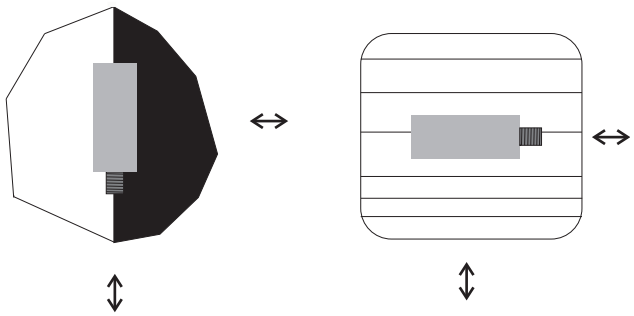
Installation instructions

Mounting systems are available which have to be ordered separately at Leuze electronic. Apart from this, the drilled-through holes and threaded holes are suitable for the individual mounting of the ODSL 8, depending on the area in which it is used. When mounting, avoid application of excessive force on the housing.

Preferred movement of the objects

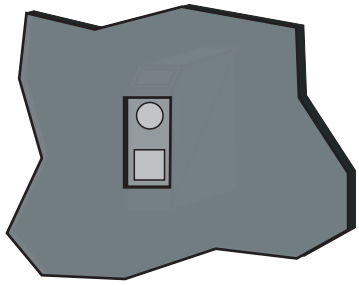


Preferred mounting in connection to objects with structured surface



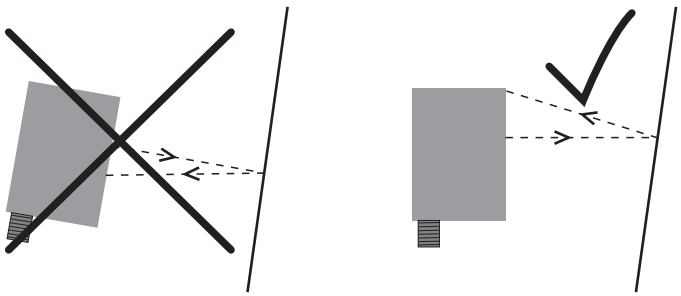
View through a chase

If the ODSL 8 has to be installed behind a cover, the chase has to have at least the size of the optical glass cover. Otherwise, a correct measurement is not possible or can not be guaranteed.

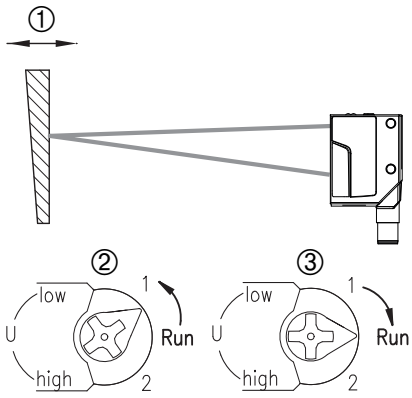


Alignment to measurement objects with reflecting surfaces

If the measurement object to be detected has a reflecting surface, a measurement may not be possible depending on the angle in which the light is reflected by the measurement object's surface. Adjust the angle between the sensor and the measurement object such that the sensor can reliably detect the measurement object.



T_I teach-in with rotary switch



1. Position measurement object at the desired measurement distance (①).

2. Turn rotary switch into the desired position (Low, High, 1, 2) (②).
Wait for optical confirmation by flashing of the LEDs.

Teach function	Rotary switch position	Green LED	Yellow LED
Analog output 1V/4mA	low	On	Flashes
Analog output 10V/20mA	high	Flashes	On
Switching output Q1	1	Flash synchronously	
Switching output Q2	2	Flash alternatingly	

3. For teaching, position rotary switch onto "Run" (③).
Wait for optical confirmation by end of flashing signal (green LED on).

T_I teach-in via input

1. Position measurement object at the desired measurement distance.

2. The respective teach function is activated by applying $+U_B$ to teach input (pin 5).
The teach event is signaled by flashing of the LEDs.

Teach function	Duration of the teach signal	Green LED	Yellow LED
Switching output Q1	2 … 4s	Flash synchronously	
Switching output Q2	4 … 6s	Flash alternatingly	

3. To finish the teach event, disconnect the teach input from $+U_B$ or switch it to 0V after the desired time.

4. A successful teach event is signaled by the end of the flashing (green LED on)

Reset of the analog output to factory settings

Reset 1V/4mA analog output at 20mm:

1. Position measurement object just below start of measurement range (20mm).

2. Position rotary switch on "Low". Wait for optical confirmation by flashing of the LEDs.

3. For teaching, position rotary switch onto "Run".
Wait for optical confirmation by end of flashing signal (green LED on).

Reset 10V/20mA analog output at 500mm:

1. Position measurement object just beyond end of measurement range (500mm).

2. Position rotary switch on "High". Wait for optical confirmation by flashing of the LEDs.

3. For teaching, position rotary switch onto "Run".
Wait for optical confirmation by end of flashing signal (green LED on).

Error messages

Continuously flashing LEDs in switch position "Run" signal an unsuccessful teach event (sensor not ready):

Green LED	Yellow LED	Error
Oon	Flashes	Teach 1V/4mA analog output unsuccessful
Flashes	On	Teach 10V/20mA analog output unsuccessful
Flash synchronously		Teach switching output Q1 unsuccessful
Flash alternatingly		Teach switching output Q1 unsuccessful

Remedy:

- Repeat teach event or
- Disconnect sensor from voltage to restore the old values.