ODSL 96B Ex d — Optical laser distance sensors

en 07-2018/10 50108369-04

150 … 2000 mm

18 - 30 V DC

IO-Link

- Reflection-independent distance information
- Highly insensitive to extraneous light
- Analog current output
- Configurable measurement range and measure mode
- Configuration via PC/OLED display and key pad (the sensor must be removed from the Ex housing for this purpose)
- Teachable switching output and analog output
- EC type examination certificate DEKRA 13 ATEX 0209
- Ex II 2G Ex db op is IIB+H_2 T4 Gb
- Ex II 2D Ex tb op is IIIC T135°C Db
- Cable 15 m, 5-wire

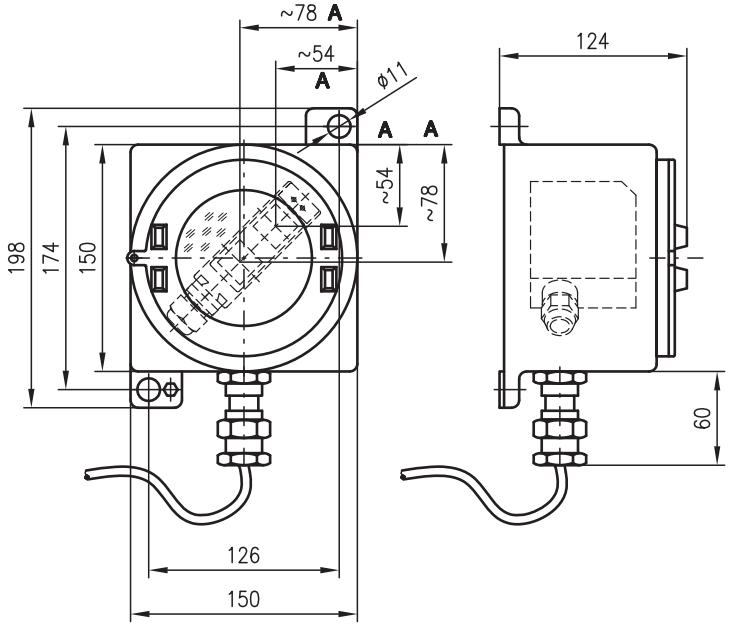
CDRH IP 66 IP 67 IEC 60947... IEC 60947...

Accessories:

(available separately)

- Configuration software

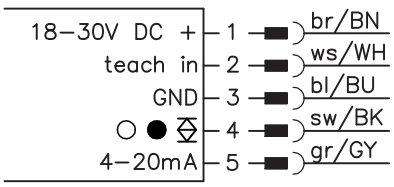
Dimensioned drawing



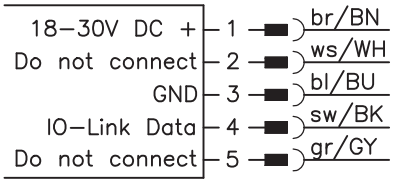
A Optical axis

Electrical connection

ODSL 96B M/C6-2000 Ex d



ODSL 96B M/L-2000 Ex d



Specifications

Optical data

Measurement range [1]	150 … 2000mm
Resolution [2]	1 … 3mm
Light source	laser
Laser class	2 in accordance with IEC 60825-1:2007
Wavelength	650nm
Max. output power	1.2mW
Pulse duration	22ms
Light spot	divergent, 2x6mm² at 2m

Error limits (relative to measurement distance)

Absolute measurement accuracy [1]	± 1,5%
Repeatability [3]	± 0,5%
B/W detection thresh. (6 … 90% rem.)	≤ 1%
Temperature compensation	yes [4]

Timing

Measurement time	1 … 5[1]ms
Response time [1]	≤ 15ms
Delay before start-up	≤ 300ms

Electrical data

Operating voltage U_B	18 … 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of U_B
Open-circuit current	≤ 150mA

Outputs ODSL 96B M/C6-2000 Ex d

Switching output	push-pull switching output [5], 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

Sensor operating mode ODSL 96B M/L-2000 Ex d

IO-Link	COM2 (38.4kBaud), Frame 2.2, Vers. 1.0, min. cycle time 2.2ms
SIO	not supported

Indicators		**Teach-in on GND**	**Teach-in on +U_B**
Green LED	continuous light	ready	
	flashing	fault	teach event
	off	no voltage	
Yellow LED	continuous light	object inside teach-in measurement distance	
	flashing		teach event
	off	object outside teach-in measurement distance	

Mechanical data	**Metal housing**
Housing	diecast zinc
Optics cover	glass
Weight	3941g
Connection type	Cable 15m, 5-wire

Environmental data

Ambient temp. (operation/storage)	-20°C … +50°C/-30°C … +70°C
Protective circuit [6]	1, 2, 3
VDE safety class [7]	II, all-insulated
Protection class	IP 66, IP 67
Standards applied	IEC 60947-5-2

Explosion protection

Certification (CENELEC)	Ex II 2G Ex db op is IIB+H_2 T4 Gb
	Ex II 2D Ex tb op is IIIC T135°C Db

1) Luminosity coefficient 6% … 90%, complete measurement range, at 20°C, medium range of U_B, measurement object ≥ 50x50mm²
2) Minimum and maximum value depend on measurement distance
3) Same object, identical environmental conditions, measurement object ≥ 50x50mm²
4) Typ. ± 0.02 %/K
5) The push-pull switching outputs must not be connected in parallel
6) 1=transient protection, 2=polarity reversal protection, 3=short circuit protection for all outputs
7) Rating voltage 250VAC, with cover closed

Order guide

	Designation	**Part no.**
Cable connection, 15m		
Current output	ODSL 96B M/C6-2000 Ex d	50106735
IO-Link interface	ODSL 96B M/L-2000 Ex d	50136154

Tables

Diagrams

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.

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!

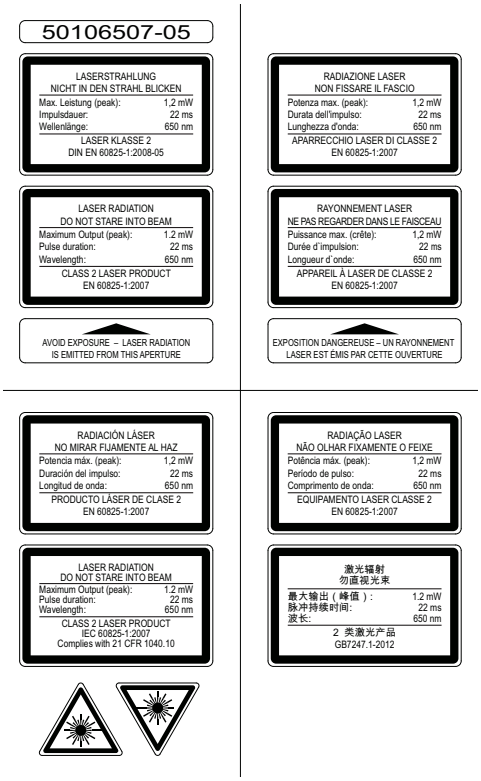
Laser information and warning signs are affixed to the device(see ①). In addition, self-adhesive laser information and warning signs (stick-on labels) are supplied in several languages (see ②).

- 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



Notices for the safe use of sensors in potentially explosive areas

Intended application range

The distance sensors of the ODSL 96B Ex d series, without making contact, detect objects which are located in or move through the light beam and measure the distance to these objects.

Validity

The sensors have an encapsulated, pressure-proof housing and can be used in the following areas with these classifications:

Device group	Device category	Equipment protection level	Zone
II	2G	Gb	Zone 1
II	2D	Db	Zone 21

Attention!

- Check whether the equipment classification corresponds to the requirements of the application.
- The devices are not suited for the protection of persons and may not be used for emergency shutdown purposes.
- A safe operation is only possible if the equipment is used properly and for its intended purpose.
- Electrical equipment may endanger humans and (where applicable) animal health, and may threaten the safety of goods if used incorrectly or under unfavorable conditions in potentially explosive areas.
- The applicable national regulations (e.g. EN 60079-14) for the configuration and installation of explosion-proof systems must be observed.

Installation, Commissioning

Attention!

Electrical equipment may endanger humans and (where applicable) animal health, and may threaten the safety of goods if used incorrectly and under unfavorable conditions in potentially explosive areas.

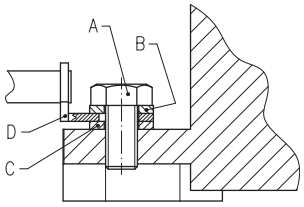
A safe operation in potentially explosive areas is only possible if the equipment is used properly and for its intended purpose.

The distance sensors of type ODSL 96B Ex d must only be installed and maintained by trained electricians.

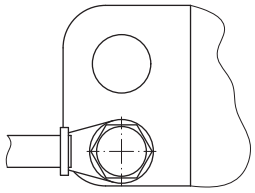
When installing the sensors in Ex zones 1 and 21, the connection cable must be connected in a connection space with increased safety Ex e, or outside the Ex area.

The housing must be connected to the protective conductor system at the marked external connection terminal. For this purpose, always use a cable lug and make the connection as shown in the diagram. Fastening screw (A) is to be secured with a lock washer (B) to protect against loosening.

The respective applicable national regulations for the installation of electrical equipment in potentially explosive areas must be observed.



A Screw M6
B Lock washer
C Washer
D Cable lug



Maintenance

No changes may be made to the devices of type ODSL 96B Ex d for potentially explosive areas.

Repairs to the sensors may only be performed by persons trained for such work or by the manufacturer. Defective devices must be replaced immediately.

The housing must not be opened while the power is on! After switching off power, wait at least 10 min. before opening the housing.

Cyclical maintenance of the sensors is not necessary.

Depending on the environmental conditions, it may occasionally be necessary to clean the light-emission surfaces of the sensors. This cleaning must only be performed by persons trained for performing this task. A soft, damp cloth should be used for this purpose. Cleaning agents that contain solvents must not be used.

Chemical resistance

The sensors of type ODSL 96B Ex d demonstrate good resistance against many diluted acids and bases.

Exposure to organic solvents is possible only under certain circumstances and only for short periods of time.

Resistance to chemicals should be examined on a case by case basis.

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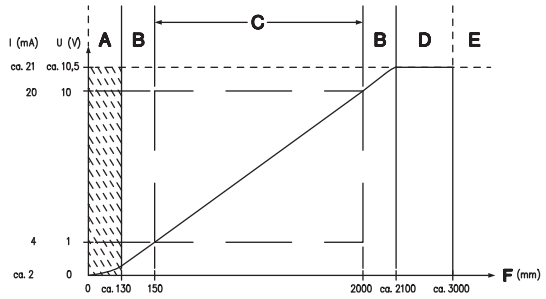
Analog output



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

Teach-in of switching outputs and characteristic output curve (Time Control, factory setting)

- Position the measured object at the desired distance.
- Activate the "**teach in**" input (pin 2) (with factory settings by applying $+U_B$).

The duration of the activation of the teach input determines the teach step according to the table shown below. The teach event is indicated by the flashing of the LEDs and on the display.

Teach function	Duration of teach signal	Green LED	Yellow LED
Switching output Q1 Teach point	2 … 4s	Flash synchronously	
Distance value for start of measurement range = 1V / 4mA at analogue output (pin 5)	4 … 6s	Continuous light	Flash
Distance value for end of measurement range = 10V / 20mA at analogue output (pin 5)	6 … 8s	Flash	Continuous light

At the end of the given teach event:
- Reconnect the teach input to GND.

A successful teach event is signaled by the end of the flashing of the LEDs.

Notice

If the measurement range start is taught to a distance greater than the measurement range end, a declining characteristic output curve is automatically set.

Error messages

Continuously flashing LEDs signal an unsuccessful teach event. The sensor remains ready for operation and continues to function with the old values.

Remedy:
- Repeat teach event **or**
- Activate teach input for more than 8s **or**
- Disconnect sensor from voltage to restore the old values.

ODSL 96B M/L-2000 Ex d

IO-Link process data

Output data device

Data bit															
A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4	A3	A2	A1	A0
MSB	16 bit measurement value														LSB

16 bit measurement value: distance
1 bit output resolution: 1mm
Signal too weak: 65535
Laser error: 65533