

# ODKL 96B

## Optical laser distance sensors

en 02-2013/01 50118031

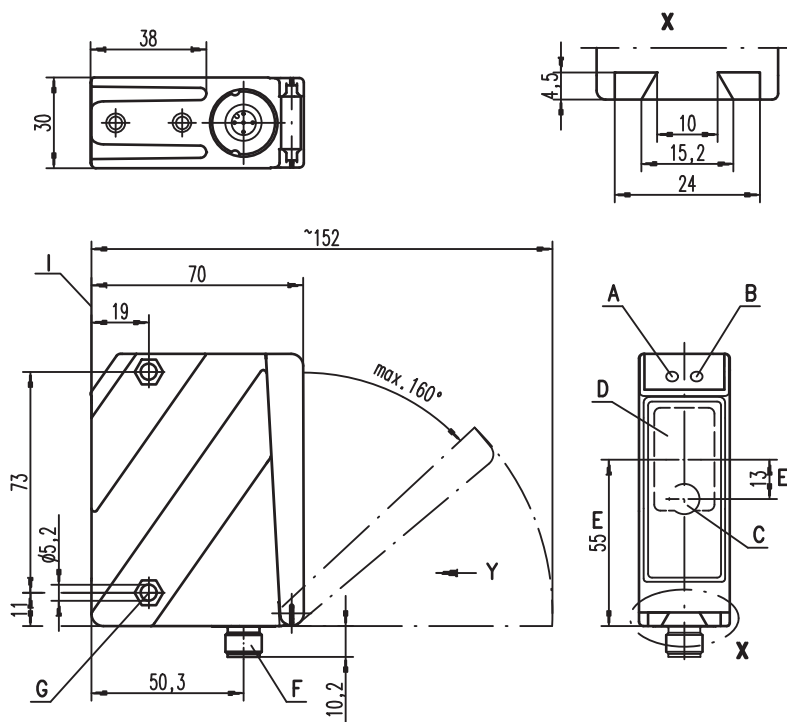


**0.3 ... 25m**

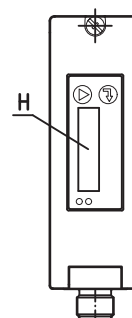


- Measurement range up to 25000mm onto high-gain foil
- Highly insensitive to extraneous light
- IO-Link/OLED display and key pad for configuration
- Measurement value is indicated in mm on OLED display
- Measurement range and mode adjustable

## Dimensioned drawing



- A Green indicator diode
- B Indicator diode yellow
- C Transmitter
- D Receiver
- E Optical axis
- F Device plug M12x1
- G Countersinking for SK nut M5, 4.2mm deep
- H OLED display and membrane keyboard
- I Reference edge for the measurement (cover glass)



## Electrical connection

ODKL 96B M/L-S12

18-30V DC +	1	br/BN
Do not connect	2	ws/WH
GND	3	bl/BU
I/O-Link Data	4	sw/BK
Do not connect	5	gr/GY



## Accessories:

(available separately)

- Mounting systems
- Cable with M12 connector (K-D ...)
- High-gain foil REF 7-A-100x100 (Part No. 50111527)
- IO-Link master set MD12-US2-IOL1 (50112085) and K-DS M12A-M12A-4P-2m-PVC cable (50110126)

We reserve the right to make changes • DS\_ODKL96BML\_en\_50118031.fm

## Specifications

### Optical data

Measurement range	300 ... 25000mm onto high-gain foil
Resolution	3mm
Light source	laser
Wavelength	658nm (visible red light)
Light spot	approx. 7x7/mm <sup>2</sup> at 10m
Max. output power	248mW
Pulse duration	6.5ns

### Error limits (relative to measurement range end value 25000mm)

Absolute measurement accuracy <sup>1)</sup>	± 0.2 %
Repeatability <sup>2)</sup>	± 10mm
Temperature drift	± 1.5mm/K

### Timing

Measurement time <sup>3)</sup>	"Fast" operating mode: 1.4ms "Standard" operating mode: 10ms "Precision" operating mode: 50ms (factory setting)
Delay before start-up	≤ 1s

### Electrical data

Operating voltage U <sub>B</sub>	18 ... 30V (incl. residual ripple)
Residual ripple	≤ 15% of U <sub>B</sub>
Open-circuit current	≤ 150mA

### Sensor operating mode

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

### Indicators

Green LED	continuous light	ready
	off	no voltage
Yellow LED	continuous light	object within measurement range
	off	no object within measurement range

### Mechanical data

Housing	diecast zinc
Optics cover	glass
Weight	380g
Connection type	M12 connector

### Metal housing

### Environmental data

Ambient temp. (operation/storage)	-20°C ... +50°C / -30°C ... +70°C
Protective circuit <sup>4)</sup>	1, 2, 3
VDE safety class <sup>5)</sup>	II, all-insulated
Protection class	IP 67, IP 69K <sup>6)</sup>
Laser class	2 (acc. to EN 60825-1)
Standards applied	IEC 60947-5-2

- 1) For 300 ... 25000mm measurement range, "Precision" operating mode, floating average calculation taking 30 measurement values into account, at 20°C, medium range of U<sub>B</sub>, measuring on high gain foil REF 7-A-100x100 (50111527)
- 2) Same object, identical environmental conditions, "Precision" operating mode, floating average calculation taking 30 measurement values into account, measuring on high gain foil REF 7-A-100x100 (50111527)
- 3) Internal measurement time distance sensor
- 4) 1=transient protection, 2=polarity reversal protection, 3=short circuit protection for all outputs
- 5) Rating voltage 250VAC, with cover closed
- 6) IP 69K test in accordance with DIN 40050 part 9 simulated, high pressure cleaning conditions without the use of additives. Acids and bases are not part of the test

## Order guide

	Designation	Part no.
IO-Link interface	ODKL 96B M/L-S12	50109301

## Tables

## Diagrams

## Remarks

- **Approved purpose:**  
This product may only be used by qualified personnel and must only be used for the approved purpose. This sensor is not a safety sensor and is not to be used for the protection of persons.

**ODKL 96B**

**Optical laser distance sensors**

**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: 1 mm

Signal too weak: 65535

Signal error: 65534

## IO-Link service data

Sensors with IO-Link interface can be configured and diagnosed via the service data.

### Parameters

#### Measure mode

A measurement mode for adapting to the application task can be activated with this parameter.

There is a selection of three measurement modes (standard, precision, speed). By selecting the mode, the following results are achieved:

- **Standard:** standard setting
- **Precision:** factory setting, twice as accurate as the standard setting, approx. 5 times slower
- **Speed:** three times less accuracy than the standard setting, approx. 8 times faster

The following table provides an overview of the effects of the individual parameters on the measurement function.

	Accuracy	Measurement time	Measurement value update	Ambient light
<b>Standard</b>	+	10 ms	+	++
<b>Precision</b>	++	50 ms	--	++
<b>Speed</b>	-	1.4 ms	++	++

#### Measurement filter

A measurement filter for adapting to the application task can be activated with this parameter.

There is a selection of three options (off, averaging, center value). By selecting the filter, the following results are achieved:

- **Off:** no filtering of the measurement values.
- **Averaging:** a moving average from the last 2 ... 99 measurement values (setting of the number with `measurement_count`) is calculated and output. If the measurement value changes abruptly, the output value moves linearly over `n` measurements from the old to the new measurement value. The time until the measurement value is updated is therefore not affected by the number of measurements; the response time for distance changes slows down.
- **Center value:** filtering out of extreme values - the average is calculated from 10 ... 50 individual measurements. The number of individual measurements used for this purpose is selected via `measurement_count` (10, 20, 30, 40 or 50). The setting under `filter_depth` specifies whether only the most extreme (`coarse`), the middle (`medium`) or the lowest deviations (`fine`) should be filtered out.

The following table provides an overview of the effects of the individual parameters on the measurement function.

	Updating measurement time	Response time for small change in distance	Response time for large change in distance	Filtering of individual faulty measurements	Filtering of cumulative faulty measurements
<b>Off</b>	+	+	+	--	--
<b>Averaging</b>	+	-	-	0	-
<b>Center value</b>	--	-	-	++	+

#### Number of measurement values (averaging)

This parameter defines the number of individual measurements which are used for filtering.

#### Number of measurement values (center value)

This parameter defines the number of individual measurements which are used for filtering.

#### Filter depth (center value)

This parameter defines the filter gauge (medium, coarse, fine).

#### Display

This parameter determines the display setting on the sensor (on, off, auto).

#### Button lock

This parameter determines whether the key pad on the sensor is locked or activated.

**ODKL 96B****Optical laser distance sensors****System commands:*****Laser transmitter activation***

This system command switches on the laser transmitter.

***Laser transmitter deactivation***

This system command switches off the laser transmitter.

If the sensor is deactivated, the last measurement value detected is frozen. The state of the laser can be seen from the sensor status.

***Setting to factory setting***

This system command restores the factory settings of the sensor.

**Diagnostics (observation)*****Signal too weak [process value 65535] or signal failure [process value 65534]***

Reception signal is not sufficient: either no object is in the measurement range or the signal from the object is too weak for detection. A permanently displayed signal failure indicates that the sensor has a defect.

***Signal warning***

Low reception signal: the object is not detected reliably, e.g. because the signal from the object is very weak.

***Laser activation***

Status information on whether the laser transmitter is activated or deactivated.

***Measurement range sensor***

Status information on whether an object is located in the measurement range of the sensor.

***Notice!***

*If parameters are changed on the device via the display and keyboard, the master is not signaled. In the event the master sends an explicit request, however, the changed value is available.*

***Notice!***

*Detailed information about the IO-Link service data and the IODD can be found at [www.leuze.com](http://www.leuze.com).*

## Working safely



### **Attention Laser Radiation!**

*The optical distance sensors ODKL 96B operate with a red light laser of class 2 acc. to EN 60825-1. If you look into the beam path over a longer time period, the retina of your eye may be damaged!*

*Never look directly into the beam path! Do not point the laser beam of the ODKL 96B at persons!*

*When mounting and aligning the ODKL 96B take care to avoid reflections of the laser beam off reflective surfaces!*

*The use of operating and adjusting devices other than those specified in the technical description, carrying out of differing procedures, or improper use of the optical laser distance sensor may lead to dangerous exposure to radiation!*

*The use of optical instruments or devices in combination with the device increases the danger of eye damage!*

*Adhere to the applicable legal and local regulations regarding protection from laser beams acc. to EN 60825-1 in its latest version.*

*The ODKL 96B uses a laser diode with low power in the visible red light range with an emitted wavelength of about 658nm.*

*The glass optics cover is the only opening through which the laser radiation can escape from the device. The housing of the ODKL 96B is sealed and has no parts that need to be adjusted or maintained by the user. The device must not be tampered with and must not be changed in any way! The destruction of the seal voids the warranty!*



### **Notice!**

*It is important that you attach the sticky labels supplied to the device (notice signs)! If the signs would be covered due to the installation situation of the ODKL 96B, attach them close to the ODKL 96B such that reading the notices cannot lead to looking into the laser beam!*