# **Technical data sheet Optical distance sensor** Part no.: 50141728 ODS9L2.8/LA6.01-200-M12

Contents - Technical data - Dimensioned drawings Electrical connection -- Diagrams - Operation and display Part number code -Notes \_ - Accessories CE O IO-Link For Illustration purposes only



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## **Technical data**

# Leuze

#### **Basic data**

Series	9
Application	Fill-level monitoring
	Length measurement in material cutting
	Object measurement
Type of scanning system	Against object

Polarization filter

#### **Special version**

Special version

#### **Optical data**

Beam path	Collimated
Light source	Laser, Red
Wavelength	650 nm
Laser class	2, IEC/EN 60825-1:2014
Transmitted-signal shape	Pulsed
Pulse duration	22,000 µs
Light spot size [at sensor distance]	1 mm [200 mm]
Type of light spot geometry	Round

#### **Measurement data**

Measurement range	50 200 mm
Resolution	0.01 mm with measurement range of 50 mm 100 mm
	0.1 mm with measurement range of 100 mm 200 mm
Resolution	0.1 mm
Accuracy, short range	0.5 %50 100 mm
Accuracy, distant range	1 %100 200 mm
Reference value, accuracy	Measurement distance
Reproducibility (1 sigma)	0.05 mm
Temperature drift	0.02 %/K
Referencing	No
Optical distance measurement prin- ciple	Triangulation

#### **Electrical data**

Protective circuit	Polarity reversal protection	
		Short circuit protected
		Transient protection
	Performance data	
	Supply voltage U <sub>B</sub>	18 30 V, DC
	Residual ripple	0 15 %, From U <sub>B</sub>
	Open-circuit current	0 50 mA
	Outputs	
	Number of analog outputs	1 Piece(s)

Number of analog outputs	1 Piece(s)
Number of digital switching outputs	2 Piece(s)

#### Analog outputs

Analog output 1	
Туре	Configurable, factory setting: current
Assignment	Connection 1, pin 2

Switching outputs Voltage type Switching voltage

DC high: ≥( $U_B$ -2V) low:  $\leq 2 \text{ V}$ 

Assignment       Connection 1, pin 4         Switching element       Transistor, Push-pull         Switching principle       IO-Link light switching (PNP)/dark switching (NPN)         Switching output 2       Assignment         Assignment       Connection 1, pin 5         Switching principle       Light switching (PNP)/dark switching (NPN)         Time behavior       Ims, Under constant ambient conditions, 90% diffuse reflection, standard measure mode         Readiness delay       300 ms         Interface       IO-Link         Type       IO-Link         COM mode       COM3         Profile       Smart sensor profile         Min. cycle time       COM3 = 0.5 ms         Frame type       2.V         Port type       A         Specification       Y1.1         SIO-mode support       Yes         Process data IN       4 byte         Process data IN       4 byte         Process data OUT       8 bit         Dual Channel       Yes         Connection 1       Piece(s)         Type of connection       Connector, Turning, 90°         Thread size       M12         Type       Male         Material       Plastic      <		Switching output d	
Switching element         Transistor, Push-pull           Switching principle         IO-Link / light switching (PNP)/dark switching (NPN)           Switching output 2         Assignment           Switching output 2         Connection 1, pin 5           Switching principle         Light switching (PNP)/dark switching (NPN)           Time behavior         Transistor, Push-pull           Response time         1 ms, Under constant ambient conditions, 90% diffuse reflection, standard measure mode           Readiness delay         300 ms           Interface         Transistor, Push-pull           Type         IO-Link           COM mode         COM3           Profile         Smart sensor profile           Min. cycle time         COM3           Profile         Smart sensor profile           Min. cycle time         COM3           Profile         Smart sensor profile           Min. cycle time         COM3           Process data N         4 byte           Prorecestit         Signal OUT		Switching output 1	Connection 1 pin 4
Switching principle         IO-Link / light switching (PNP)/dark switching (NPN)           Switching output 2         Assignment           Connection 1, pin 5         Switching principle           Switching principle         Light switching (PNP)/dark switching (NPN)           Time behavior         Ims, Under constant ambient conditions, 90% diffuse reflection, standard measure mode           Readiness delay         300 ms           Interface         IV-Link           Type         IO-Link           COM mode         COM3           Profile         Smath sensor profile           Min. cycle time         COM3 = 0.5 ms           Frame type         2.V           Portype         A           Specification         V1.1           Sio-mode support         Yes           Process data IN         4 byte           Process data OUT         8 bit           Dual Channel         Yes           Connection 1         Voltage supply           Type of connection         Connector, Turning, 90°           Thread size         M12           Type         Male           Material         Plastic           No. of pins         5-pin           Encoding         Cubic		-	
Interface         ching (NPN)           Switching output 2         Assignment         Connection 1, pin 5           Switching principle         Light switching (PNP)/dark switching           Switching principle         Light switching (PNP)/dark switching           Time behavior         1 ms, Under constant ambient conditions, 90% diffuse reflection, standard measure mode           Readiness delay         300 ms           Interface         Voltage           Type         IO-Link           COM mode         COM3           Profile         Smart sensor profile           Min. cycle time         COM3           Frame type         2.V           Portige         A           Specification         V1.1           SIO-mode support         Yes           Process data NN         4 byte           Process data OUT         Voltage supply           Type of connections         1 Piece(s)           Thread size         M12           Type         Male           Material         Plastic           No. of pins         5-pin           Encoding         A-coded           Metrial         Plastic           No. of pins         5-pin           Encoding <th></th> <th>-</th> <th>· · ·</th>		-	· · ·
Assignment         Connection 1, pin 5           Switching element         Transistor, Push-pull           Switching principle         Light switching (PNP)/dark switching           Time behavior         1 ms, Under constant ambient conditions, 90% diffuse reflection, standard measure mode           Readiness delay         300 ms           Interface         IO-Link           COM mode         COM3           Profile         Smart sensor profile           Min. cycle time         COM3 = 0.5 ms           Frame type         2.V           Port type         A           Specification         V1.1           SIO-mode support         Yes           Process data IN         4 byte           Process data OUT         8 bit           Dual Channel         Yes           Connection 1         Function           Function         Signal OUT           Voltage supply         Yout age supply           Type of connection         Connector, Turning, 90°           Thread size         M12           Type         Male           Material         Plastic           No. of pins         5 -pin           Encoding         A-coded           Dimension (W x H x L)		ST T	
Assignment         Connection 1, pin 5           Switching element         Transistor, Push-pull           Switching principle         Light switching (PNP)/dark switching (NPN)           Time behavior         1 ms, Under constant ambient conditions, 90% diffuse reflection, stan- dard measure mode           Readiness delay         300 ms           Interface         IO-Link           COM mode         COM3           Profile         Smart sensor profile           Min. cycle time         COM3 = 0.5 ms           Frame type         2.V           Port type         A           Specification         V1.1           SIO-mode support         Yes           Process data IN         4 byte           Process data OUT         8 bit           Dual Channel         Yes           Connection 1         Fince           Function         Signal OUT           Voitage supply         Yougae supply           Type of connection         Connector, Turning, 90°           Thread size         M12           Type         Male           Material         Plastic           No. of pins         5 -pin           Encoding         A-coded           Dimension (W x H x L)			
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Switching principle         Light switching (PNP)/dark switching (NPN)           Time behavior         Ims, Under constant ambient conditions, 90% diffuse reflection, stan- dard measure mode           Readiness delay         300 ms           Interface         IO-Link           Type         IO-Link           COM mode         COM3           Profile         Smart sensor profile           Min. cycle time         COM3 = 0.5 ms           Frame type         A.           Port type         A           Slo-mode support         Yes           Process data IN         4 byte           Process data OUT         8 bit           Dual Channel         Yes           Process data OUT         Signal OUT           Yupe of connections         I Piece(s)           Connection 1         Function           Type         Male           Material         Plastic           No. of pins         5 -pin           Encoding         A-coded           Dimension (W x H x L)         21 mm x 50 mm x 50 mm           Housing color         Red           Housing color         Red           Housing color         Red		•	
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Response time       1 ms, Under constant ambient conditions, 90% diffuse reflection, standard measure mode         Readiness delay       300 ms         Interface       Interface         Type       IO-Link         COM mode       COM3         Profile       Smart sensor profile         Min. cycle time       COM3 = 0.5 ms         Frame type       2.V         Port type       A         Specification       V1.1         SIO-mode support       Yes         Process data IN       4 byte         Process data OUT       8 bit         Dual Channel       Yes         Connection       1 Piece(s)         Type of connections       1 Piece(s)         Type of connection       Connector, Turning, 90°         Thread size       M12         Type       Male         Material       Plastic         No. of pins       5-pin         Encoding       A-coded         Dimension (W x H x L)       21 mm x 50 mm x 50 mm         Housing color       Red         Lens cover material       Glass with polarization filter         Not weight       50 g         Housing color       Red		Switching principle	
conditions, 90% diffuse reflection, stan- dard measure mode           Readiness delay         300 ms           Interface         Interface           Type         IO-Link           COM mode         COM3           Profile         Smart sensor profile           Min. cycle time         COM3 = 0.5 ms           Frame type         2.V           Port type         A           Specification         V1.1           Slo-mode support         Yes           Process data IN         4 byte           Process data OUT         8 bit           Dual Channel         Yes           Connection         1 Piece(s)           Connection 1         Yes           Function         Signal OUT           Voltage supply         Ype           Type of connection         Connector, Turning, 90°           Thread size         M12           Type         Male           Material         Plastic           No. of pins         5 -pin           Encoding         A-coded           Duesing material         Plastic           Lens cover material         Glass with polarization filter           Not weight         50 g <t< th=""><th>Time</th><th>behavior</th><th></th></t<>	Time	behavior	
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Interface         Type       IO-Link         IO-Link       COM mode         COM mode       COM3         Profile       Smart sensor profile         Min. cycle time       COM3 = 0.5 ms         Frame type       2.V         Port type       A         Specification       V1.1         SIO-mode support       Yes         Process data IN       4 byte         Process data OUT       8 bit         Dual Channel       Yes         Connection       1 Piece(s)         Connections         Image: Signal OUT       Signal OUT         Yold ge supply       Yold ge supply         Type of connections       1 Piece(s)         Thread size       M12         Type       Male         Material       Plastic         No. of pins       5 -pin         Encoding       A-coded         Design       Cubic         Dimension (W x H x L)       21 mm x 50 mm x 50 mm         Housing material       Plastic         Lens cover material       Glass with polarization filter         Verking color       Red         Housing color       Red			
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Process data OUT       8 bit         Dual Channel       Yes         Connection         Number of connections       1 Piece(s)         Connection 1       Signal OUT         Function 1       Signal OUT         Function 1       Connector, Turning, 90°         Type of connection       Connector, Turning, 90°         Thread size       M12         Type       Male         Material       Plastic         No. of pins       5 -pin         Encoding       A-coded         Mechanical data       Plastic         Design       Cubic         Dimension (W x H x L)       21 mm x 50 mm x 50 mm         Housing material       Plastic         Lens cover material       Glass with polarization filter         Net weight       50 g         Housing color       Red         Type of fastening       Through-hole mounting			
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Dimension (W x H x L)     21 mm x 50 mm x 50 mm       Housing material     Plastic       Lens cover material     Glass with polarization filter       Net weight     50 g       Housing color     Red       Type of fastening     Through-hole mounting			Outin
Housing materialPlasticLens cover materialGlass with polarization filterNet weight50 gHousing colorRedType of fasteningThrough-hole mounting	-		
Lens cover material     Glass with polarization filter       Net weight     50 g       Housing color     Red       Type of fastening     Through-hole mounting			
Net weight     50 g       Housing color     Red       Type of fastening     Through-hole mounting		-	
Housing color     Red       Type of fastening     Through-hole mounting			
Type of fastening Through-hole mounting		•	-
		-	
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			the option of mounting dotted



## **Technical data**

# Leuze

#### **Operation and display**

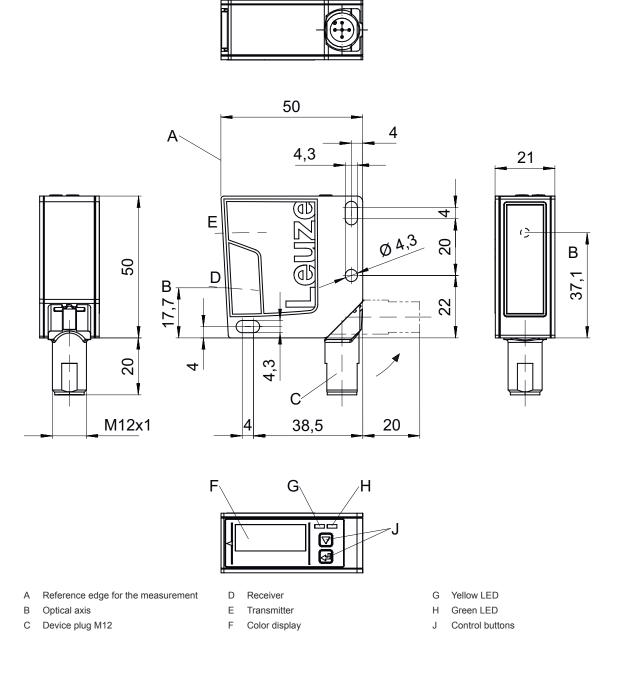
LED
OLED display
2 Piece(s)
Control buttons
PC software
-20 50 °C
-30 70 °C
20,000 lx, EN 60947-5-2
IP 67
III
UL

#### Classification

Customs tariff number	90318020
ECLASS 5.1.4	27270801
ECLASS 8.0	27270801
ECLASS 9.0	27270801
ECLASS 10.0	27270801
ECLASS 11.0	27270801
ECLASS 12.0	27270916
ECLASS 13.0	27270916
ECLASS 14.0	27270916
ECLASS 15.0	27270916
ETIM 5.0	EC001825
ETIM 6.0	EC001825
ETIM 7.0	EC001825
ETIM 8.0	EC001825
ETIM 9.0	EC001825
ETIM 10.0	EC001825

## **Dimensioned drawings**

All dimensions in millimeters



## **Electrical connection**

#### **Connection 1**

Function	Signal OUT
	Voltage supply
Type of connection	Connector
Thread size	M12
Туре	Male
Material	Plastic
No. of pins	5 -pin
Encoding	A-coded

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# **Electrical connection**

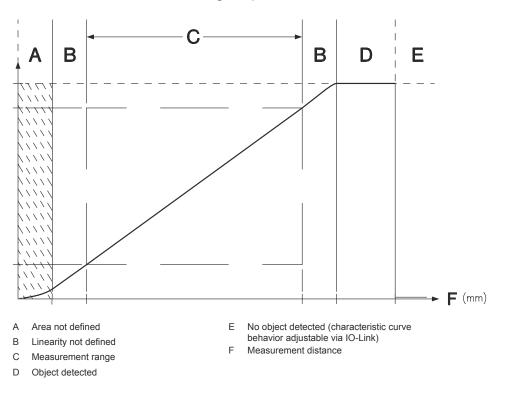
Pin	Pin assignment
1	V+
2	OUT mA / V
3	GND
4	IO-Link / OUT 1
5	OUT 2

# 3

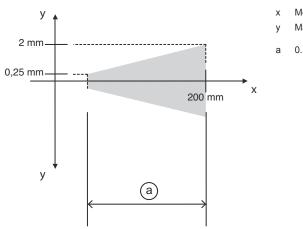
Leuze

# Diagrams

Characteristic curve of analog output



#### Accuracy of measurement



- x Measurement distance
- y Max. measurement error
- 0.5% 1% of measurement value

### **Operation and display**

LED	Display	Meaning
1	Green, continuous light	Ready
2	Yellow, continuous light	Object in the measurement range

#### Part number code

Part designation: ODS9XX.Y/ZAB-CCC-DDD

ODS9	Operating principle Optical distance sensor of the 9 series
XX	Light source L2: laser class 2 L1: laser class 1
Y	Equipment 8: OLED display and membrane keyboard for configuration
Z	Switching output/function OUT 1/IN: Pin 4 or black conductor L: IO-Link
A	<b>Switching output / function OUT 2/IN: pin 2 or white conductor</b> A: Analog output 6: push-pull switching output, PNP light switching, NPN dark switching
В	<b>Switching output / function OUT 3/IN: Pin 5</b> X: pin not used 6: push-pull switching output, PNP light switching, NPN dark switching K: Multifunction input (factory setting: deactivation input)
ccc	Operating range           100: operating range 50 100 mm           200: operating range 50 200 mm           450: operating range 50 450 mm           650: operating range 50 650 mm           1050: operating range 50 1050 mm
DDD	Electrical connection M12: M12 connector
N	ote
()	A list with all available device types can be found on the Leuze website at www.leuze.com.

#### Notes



#### Observe intended use!

 $\ensuremath{^{\ensuremath{\Downarrow}}}$  The product may only be put into operation by competent persons.

b Only use the product in accordance with its intended use.

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#### Notes

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	ATTENTION! LASER RADIATION - CLASS 2 LASER PRODUCT
	<b>Do not stare into beam!</b> The device satisfies the requirements of IEC 60825-1:2007 (EN 60825-1:2007) safety regulations for a product of <b>laser class 2</b> as well as the U.S. 21 CFR 1040.10 regulations with deviations corresponding to Laser Notice No. 50 from June 24, 2007.
1	Solution between the laser beam or in the direction of reflected 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!
	Noterrupt the laser beam using a non-transparent, 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!
	Scaution The use of operating and adjusting devices other than those specified here or the carrying out of differing procedures may lead to dangerous exposure to radiation!
	♥ Observe the applicable statutory and local laser protection regulations.
	<ul> <li>The device must not be tampered with and must not be changed in any way.</li> <li>There are no user-serviceable parts inside the device.</li> <li>Repairs must only be performed by Leuze electronic GmbH + Co. KG.</li> </ul>

#### NOTE

Affix laser information and warning signs!

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

- 🗞 "Affix the laser information sheet to the device in the language appropriate for the place of use. When using the device in the US, use the stick-on label with the "Complies with 21 CFR 1040.10" note.
- S 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.

#### Accessories

#### Connection technology - Connection unit

	Part no.	Designation	Article	Description
Contraction of the second	50144900	MD 798i-11-82/L5- 2222	IO-Link master	Type: IO-Link master Current consumption, max.: 11,000 mA Switching outputs for each sensor connection: 1 Piece(s) Switching output: Transistor, PNP Interface: IO-Link, Automatic protocol detection, EtherNet IP, Modbus TCP, PROFINET Connections: 12 Piece(s) Sensor connections: 8 Piece(s) Connections for voltage supply: 2 Piece(s) Interface connections: 2 Piece(s) Degree of protection: IP 67, IP 65, IP 69K

#### Connection technology - Connection cables

	Part no.	Designation	Article	Description
	50133855	KD S-M12-5A-V1-020	Connection cable	Connection 1: Connector, M12, Axial, Female, A-coded, 5 -pin Connector, LED: No Connection 2: Open end Shielded: Yes
Π				Cable length: 2.000 mm Sheathing material: PVC

### Accessories

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	Part no.	Designation	Article	Description
	50133856	KD S-M12-5A-V1-050	Connection cable	Connection 1: Connector, M12, Axial, Female, A-coded, 5 -pin Connector, LED: No Connection 2: Open end Shielded: Yes Cable length: 5.000 mm Sheathing material: PVC
	50132077	KD U-M12-5A-V1- 020	Connection cable	Connection 1: Connector, M12, Axial, Female, A-coded, 5 -pin Connector, LED: No Connection 2: Open end Shielded: No Cable length: 2.000 mm Sheathing material: PVC
	50132079	KD U-M12-5A-V1- 050	Connection cable	Connection 1: Connector, M12, Axial, Female, A-coded, 5 -pin Connector, LED: No Connection 2: Open end Shielded: No Cable length: 5.000 mm Sheathing material: PVC

# Mounting technology - Mounting brackets

 Part no.	Designation	Article	Description
50118543	BT 300M.5	Mounting bracket	Design of mounting device: Angle, L-shape Fastening, at system: Through-hole mounting Mounting bracket, at device: Screw type, Suited for M4 screws Type of mounting device: Adjustable Material: Stainless steel

## Mounting technology - Rod mounts

	Part no.	Designation	Article	Description
	50117252	BTU 300M-D12	Mounting system	Design of mounting device: Mounting system Fastening, at system: For 12 mm rod, Sheet-metal mounting Mounting bracket, at device: Screw type, Suited for M4 screws Type of mounting device: Clampable, Adjustable, Turning, 360° Material: Metal
C	50128380	BTU 460M-D12	Mounting system	Design of mounting device: Mounting system Fastening, at system: For 12 mm rod Mounting bracket, at device: Screw type Type of mounting device: Adjustable, Turning, 360° Material: Metal

#### Accessories

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# Configuration devices

 Part no.	Designation	Article	Description
50121098	SET MD12-US2-IL1.1 + Zub.	Diagnostics set	Interface: USB Connections: 2 Piece(s) Degree of protection: IP 20

	Note
A	<sup>t</sup> A list with all available accessories can be found on the Leuze website in the Download tab of the article detailed page.