



# LASER TRIANGULATION SENSORS

CONSISTENT, HIGH PRODUCT QUALITY THANKS TO  
PRECISE OPTICAL DISTANCE MEASUREMENT

DT20 Hi, OD Value, OD1000, OD Mini, OD Max, OD Precision, OD5000

**SICK**  
Sensor Intelligence.

# PRECISION MEETS QUALITY

With expert-developed intelligent measurement technology which proves its worth in industrial applications time and time again, SICK offers the solution to any challenge which demands maximum measurement accuracy and quality. A pioneering spirit founded on our years of experience and our own innovations in optical sensor technology. We ensure efficient processes while fulfilling the demands of even complex measuring tasks – regardless of surface, diameter, thickness, or width, and regardless of whether an object is to be positioned or measured. This is how we ensure that your products are every bit as perfect as you want them to be.



# PRECISION IN EACH DEVICE AND EACH PROCESS STEP



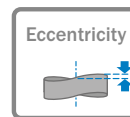
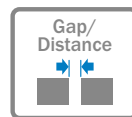
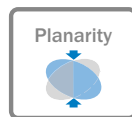
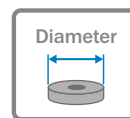
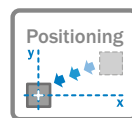
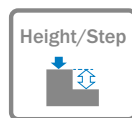
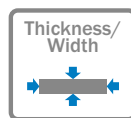
Perfect quality can only be guaranteed when each and every measurement and process step is controlled. Thanks to its wide range of optical sensors, SICK's intelligent measurement technology can offer highly accurate solutions for measuring even the smallest objects. Ensuring high standards of measurement accuracy through the use of various technologies. This plays an important role in a whole host of different industries – particularly those with a strong emphasis on the measuring, monitoring, positioning, or regulation of products and processes. Moreover, SICK's measurement technology supports quality assurance processes and delivers cost-saving benefits. → [www.sick.com/measurement-sensors](http://www.sick.com/measurement-sensors)

DAY AFTER DAY  
100 % QUALITY



Displacement measurement sensors, which include laser triangulation sensors, can measure the following:

- Thickness and width
- Height and grade
- Position
- External and internal diameters
- Profile
- Planarity
- Distance and clearances
- Eccentricity



Whether standalone or as part of a system, SICK's intelligent measurement technology can supply the perfect solutions for the demands of your industry.

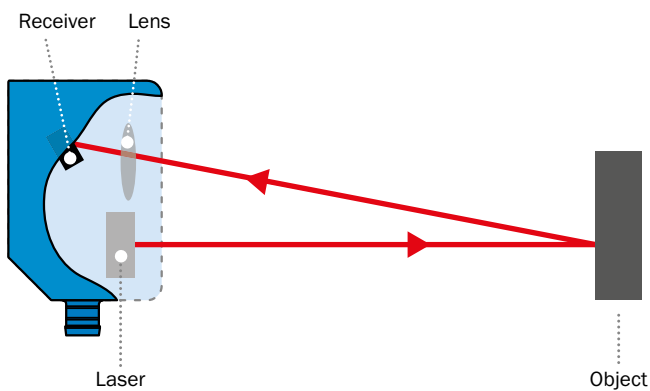


## SMART TECHNOLOGY – STRAIGHT TO THE POINT

Laser triangulation sensors from SICK excel thanks to their level of technological sophistication. Let's take a brief look at what's behind the technology and how you can benefit from it.

### Laser triangulation

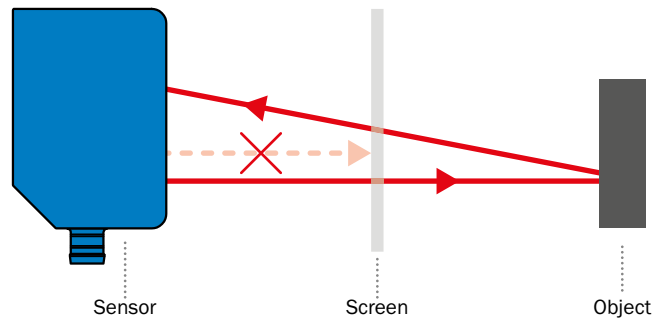
A point of light is projected onto the measuring object. The light reflected is captured by a light-sensitive receiver at a specific angle. Based on the angle between the send and receive direction, the position of the object is then triangulated (from the Latin "triangulum" = triangle).



### Distance range

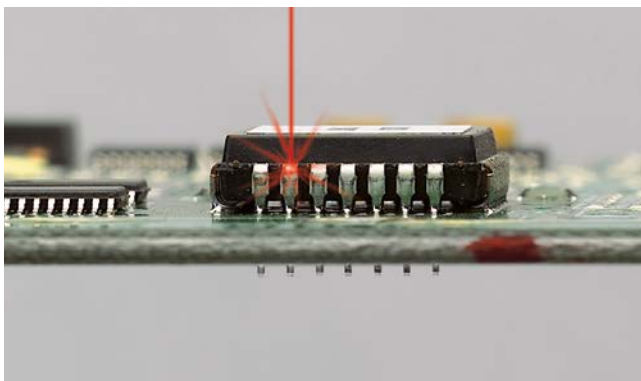
The devices in the latest generation of SICK laser triangulation sensors are able to blank certain distance ranges. This function is especially useful in cases where, for example, a protective screen is between the sensor and the object and needs to be blanked.

→ **OD1000** and → **OD5000**



### Light spot geometry

The light spot geometry describes the shape of the light spot generated by the sensor's transmission element. The geometry of the light spots in laser triangulation sensors varies in its shape and dimensions according to the measuring task for which the sensor is being used (for example, see → **OD Precision** and → **OD5000**).



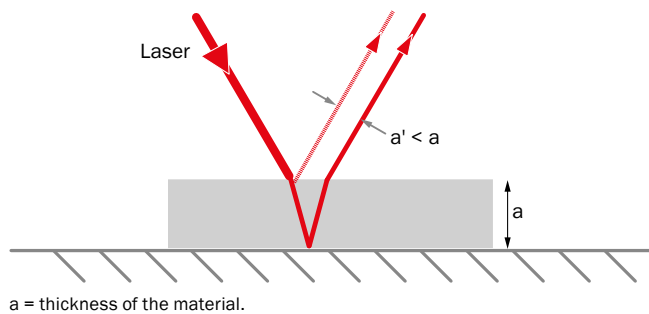
In the case of fine-structured or very small objects, a small and focused light spot size is advantageous (T-type).



If the surfaces of the object are rough or grooved, or if the surface area is very large, a sensor variant with a wide light spot is the best choice (W-type).

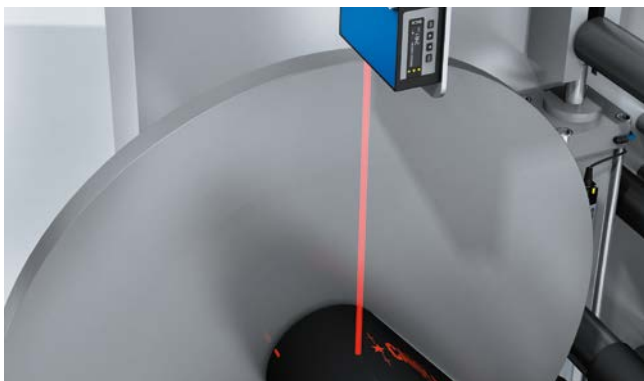
## Transparent material thickness measurement

SICK laser triangulation sensors are even able to measure the thickness of transparent material. Using just one sensor head, → **OD Precision** and → **OD5000** calculate this to an outstanding level of precision, with the laser beam of the sensor reflecting on both optical interfaces of the material. The difference between both signals received is calculated, thus reliably producing the desired measured value for the thickness of the transparent object ( $a$ ).



## Measured value filter

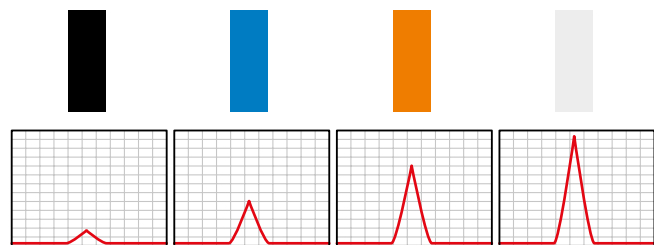
Various measured value filters optimize the evaluation of measurement results and thus enable smooth process control, in cases involving precise regulation of wrapping processes, for example.



## Responsiveness and reliability

The → **OD5000** is equipped with a new kind of receiver, in which each individual receiver element is adapted directly to the specific lighting conditions that exist at any given time. This removes the need to perform evaluation later on, allowing the sensor to adapt very quickly to changing object properties and the optical reflective properties associated with this. Challenging applications – such as the surface contrast of the measuring object changing suddenly from very dark to very bright – benefit especially from this feature:

- Very high measuring speed, since no external feedback process is required
- Minimal adjustment delays in the event of rapid changes in contrast or jumps in distance



## Evaluation functions

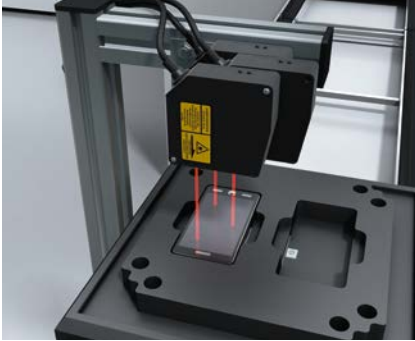
With an innovative method of evaluating measurements, laser triangulation sensors from SICK are able to simplify a whole range of applications. The height-jump function, for example, enables rapid measurement of measured value jumps in applications such as counting copies in the printing industry.



## HIGH FLEXIBILITY AT SHORT DISTANCES

Even where measuring distances are short, SICK's displacement measurement sensors are immensely versatile. They meet the very highest requirements placed on quality and precision in a wide range of measuring tasks and applications.

### Monitoring assembly processes



Thanks to a routine verifying whether components being installed are aligned correctly, it is possible to prevent connection errors, detachment of components, and other malfunctions.

#### Typical applications

- Checking the surface properties or dimensional stability
- Detecting misalignment and tilting

#### Typical industries

- Electronics
- Machine tools

#### Recommended products

OD Precision .....	50
OD5000.....	60

### Precise positioning



Approach the right position every time with a high level of accuracy. With displacement measurement sensors from SICK, grippers and other tools can be positioned exactly without any contact, and with maximum repeatability.

#### Typical applications

- Robot guidance for windshield installation
- High-accuracy positioning of carriages

#### Typical industries

- Robotics
- Handling and assembly
- Automotive and parts suppliers

#### Recommended products

OD Mini .....	36
OD Value .....	20

### Collision avoidance



When machining sheet metal, stress and heat in the material can lead to unevenness. A laser-based distance sensor continuously checks the distance between the cutting head and the sheet metal panels in order to avoid collisions.

#### Typical applications

- Height positioning and collision avoidance at the cutting head
- Positioning of grippers

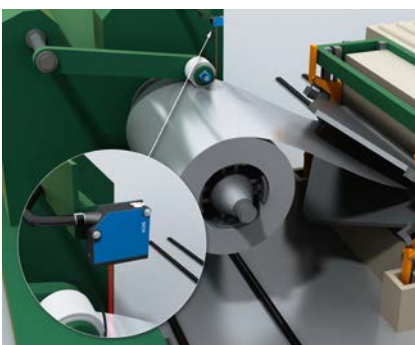
#### Typical industries

- Handling and assembly
- Machine tools

#### Recommended products

OD Max .....	44
OD Mini .....	36

### Process monitoring



Even with measuring ranges of up to 1,000 mm, process monitoring requires the highest levels of precision and measurement accuracy.

#### Typical applications

- Loop control in tire production
- Sheet coil uncoiling

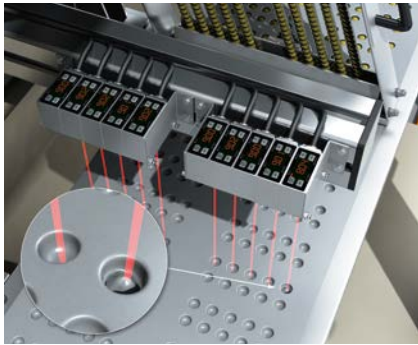
#### Typical industries

- Rubber and plastics
- Machine tools

#### Recommended products

DT20 Hi .....	14
OD1000.....	30

### Ensuring quality



When monitoring quality indicators in the manufacturing process, the displacement measurement sensors can process distances down to the micrometer level, in order to detect incorrectly pressed blister packaging, for example.

#### Typical applications

- Quality control for devices
- Checking the shape of blister packs

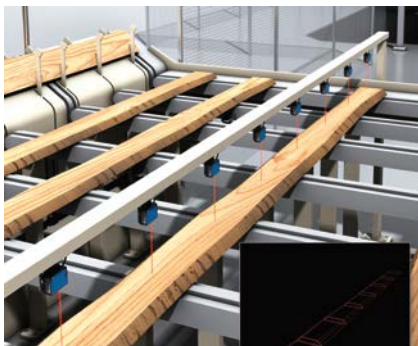
#### Typical industries

- Consumer goods
- Handling and assembly
- Pharma and cosmetics

#### Recommended products

OD Mini .....	36
OD Value .....	20

### Reducing scrap



Thanks to the latest CMOS receiver technology, the OD1000 displacement measurement sensor precisely measures the cross-section profile of the board, regardless of the brightness and color of the surfaces. This allows the position of the wane to be determined with precision.

#### Typical application

- Detection of wane, measurement of the board width and height

#### Typical industries

- Wood
- Robotics
- Handling and assembly
- Packaging

#### Recommended products

OD1000 .....	30
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### High-accuracy measurement



Rapidly spinning objects such as a fan propeller can be measured to a high level of precision with the OD5000 displacement measurement sensor. Thanks to the high measuring frequency of up to 80 kHz, vibrations can be reliably detected down to the level of single-digit micrometers.

#### Typical application

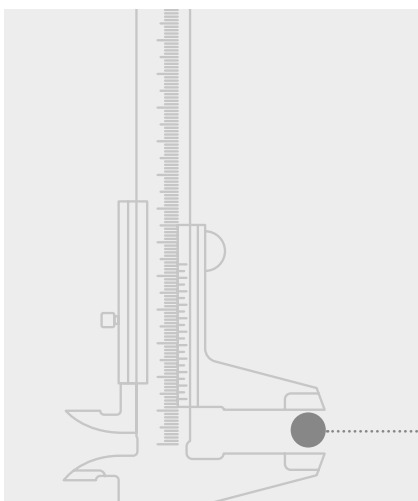
- Measurement of the vibration and true running of a fan propeller

#### Typical industries

- Electronics
- Automotive and parts suppliers
- Machine tools

#### Recommended products

OD5000 .....	60
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### The advantages of laser triangulation sensors at a glance:











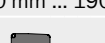
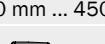





- Consistent, high product quality thanks to precise optical distance measurement
- High measurement accuracy down to the micrometer level
- Can deal with any surface
- Wide range of products for a whole host of applications
- Different housing materials for a range of applications
- Usually fitted with a class 1 laser, making them eye-safe

[Selection guide](#) → page 8

Product		Measuring range (in mm)	Evaluation unit	
			Included	Not included/stand-alone
		0 25 50 75 100 ... 250 ... 500 750 1,000		
<b>DT20 Hi</b>				
	DT20-x25	 50 mm ... 150 mm		<input checked="" type="checkbox"/>
	DT20-x24	 100 mm ... 300 mm		<input checked="" type="checkbox"/>
	DT20-x21	 100 mm ... 600 mm		<input checked="" type="checkbox"/>
	DT20-x22	 100 mm ... 1,000 mm		<input checked="" type="checkbox"/>
<b>OD Value</b>				
	OD2-x30	 26 mm ... 34 mm		<input checked="" type="checkbox"/>
	OD2-x50	 40 mm ... 60 mm		<input checked="" type="checkbox"/>
	OD2-x85	 65 mm ... 105 mm		<input checked="" type="checkbox"/>
	OD2-x120	 60 mm ... 180 mm		<input checked="" type="checkbox"/>
	OD2-x250	 100 mm ... 400 mm		<input checked="" type="checkbox"/>
	OD2-x300	 100 mm ... 500 mm		<input checked="" type="checkbox"/>
<b>OD1000</b>				
	OD1000-600	 200 mm ... 1,000 mm		<input checked="" type="checkbox"/>
<b>OD Mini</b>				
	OD1-B015	 10 mm ... 20 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	OD1-B035	 20 mm ... 50 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	OD1-B100	 50 mm ... 150 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	OD1-B150	 50 mm ... 250 mm		<input checked="" type="checkbox"/>






	Special tasks	Light spot size	Linearity	Repeatability	Response time, measuring frequency	Laser class		Interfaces	Dimensions	Page
	Thickness measurement of transparent material					1	2			
										→ 14
	-	2 mm x 4 mm	± 0.5 mm	0.13 mm	≥ 2.5 ms, ≤ 400 Hz		■	Analog (mA)	50.2 mm x 54.1 mm x 24.3 mm	
	-	3 mm x 6 mm	± 1 mm	0.25 mm	≥ 2.5 ms, ≤ 400 Hz	■	■	Analog (mA)	50.2 mm x 54.1 mm x 24.3 mm	
	-	3 mm x 6 mm	± 2 mm	0.5 mm	≥ 2.5 ms, ≤ 400 Hz	■	■	Analog (mA)	50.2 mm x 54.1 mm x 24.3 mm	
	-	6 mm x 12 mm	± 6 mm	2.5 mm	≥ 2.5 ms, ≤ 400 Hz		■	Analog (mA)	50.2 mm x 54.1 mm x 24.3 mm	
										→ 20
	-	0.1 mm x 0.1 mm	± 8 µm	2 µm	≥ 1 ms, ≤ 2 kHz		■	Analog (mA), analog (V), RS-422	60 mm x 50 mm x 20.4 mm	
	-	0.8 mm x 1.3 mm	± 20 µm	5 µm	≥ 1 ms, ≤ 2 kHz		■	Analog (mA), analog (V), RS-422	60 mm x 50 mm x 20.4 mm	
	-	0.5 mm x 1 mm	± 40 µm	10 µm	≥ 1 ms, ≤ 2 kHz		■	Analog (mA), analog (V), RS-422	60 mm x 50 mm x 20.4 mm	
	-	1 mm x 1.5 mm	± 120 µm	30 µm	≥ 1 ms, ≤ 2 kHz		■	Analog (mA), analog (V), RS-422	60 mm x 50 mm x 20.4 mm	
	-	1.8 mm x 3.5 mm	± 750 µm	75 µm	≥ 2 ms, ≤ 1.33 kHz		■	Analog (mA), analog (V), RS-422	60 mm x 50 mm x 20.4 mm	
	-	1.9 mm x 3.9 mm	± 1.2 mm	100 µm	≥ 2 ms, ≤ 1.33 kHz		■	Analog (mA), RS-422	60 mm x 50 mm x 20.4 mm	
										→ 30
	-	1.5 mm x 1.5 mm	± 1.5 mm	0.4 mm	≥ 1.5 ms, ≤ 3 kHz	■		IO-Link, analog (mA), analog (V)	71.5 mm x 53.2 mm x 25.9 mm	
										→ 36
	-	700 µm x 500 µm	± 10 µm	1 µm	≥ 2 ms, ≤ 2 kHz	■		Analog (mA), analog (V), RS-485	44.4 mm x 31 mm x 17 mm	
	-	800 µm x 450 µm	± 30 µm	6 µm	≥ 2 ms, ≤ 2 kHz	■		Analog (mA), analog (V), RS-485	44.4 mm x 31 mm x 17 mm	
	-	700 µm x 600 µm	± 100 µm	20 µm	≥ 2 ms, ≤ 2 kHz	■		Analog (mA), analog (V), RS-485	44.4 mm x 31 mm x 17 mm	
	-	2 mm x 1.3 mm	-	200 µm	≥ 2 ms, ≤ 2 kHz		■	-	44.4 mm x 31 mm x 17 mm	

Product		Measuring range (in mm)	Evaluation unit	
			Included	Not included/stand-alone
		0 25 50 75 100 ... 250 ... 500 750 1,000		
<b>OD Max</b>				
	OD25	 24 mm ... 26 mm	<input checked="" type="checkbox"/>	
	OD30	 25 mm ... 35 mm	<input checked="" type="checkbox"/>	
	OD85	 65 mm ... 105 mm	<input checked="" type="checkbox"/>	
	OD350	 250 mm ... 450 mm	<input checked="" type="checkbox"/>	
<b>OD Precision</b>				
	OD5-25	 24 mm ... 26 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	OD5-30	 25 mm ... 35 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	OD5-85	 65 mm ... 105 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	OD5-150	 110 mm ... 190 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	OD5-350	 250 mm ... 450 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	OD5-500	 300 mm ... 700 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>OD5000</b>				
	OD5000-C15	 14 mm ... 16 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	OD5000-C30	 25 mm ... 35 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	OD5000-C85	 65 mm ... 105 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	OD5000-C150	 110 mm ... 190 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

	Special tasks	Light spot size	Linearity	Repeatability	Response time, measuring frequency	Laser class		Interfaces	Dimensions	Page
	Thickness measurement of transparent material					1	2			
										→ 44
	-	25 µm x 35 µm	± 2 µm	0.1 µm	≥ 0.5 ms, ≤ 10 kHz	■		Analog (mA), analog (V), RS-232	78 mm x 76.5 mm x 25.6 mm	
	-	30 µm x 100 µm	± 10 µm	1 µm	≥ 0.5 ms, ≤ 10 kHz		■	Analog (mA), analog (V), RS-232	78 mm x 76.5 mm x 25.6 mm	
	-	70 µm x 290 µm	± 40 µm	5 µm	≥ 0.5 ms, ≤ 10 kHz		■	Analog (mA), analog (V), RS-232	78 mm x 76.5 mm x 25.6 mm	
	-	300 µm x 700 µm	± 200 µm	50 µm	≥ 0.5 ms, ≤ 10 kHz		■	Analog (mA), analog (V), RS-232	78 mm x 76.5 mm x 27 mm	
										→ 50
	Min. 0.2 mm	T: 25 µm x 35 µm, W: 100 µm x 700 µm	± 1.6 µm	0.02 µm	≥ 0.1 ms, ≤ 10 kHz	■		Analog (mA), analog (V), RS-232, RS-422	78 mm x 76.5 mm x 25.6 mm	
	Min. 0.7 mm	T: 30 µm x 100 µm, W: 260 µm x 1,000 µm	± 8 µm	0.2 µm	≥ 0.1 ms, ≤ 10 kHz		■	Analog (mA), analog (V), RS-232, RS-422	78 mm x 76.5 mm x 25.6 mm	
	Min. 2 mm	T: 70 µm x 290 µm, W: 260 µm x 1,200 µm	± 20 µm	1 µm	≥ 0.1 ms, ≤ 10 kHz		■	Analog (mA), analog (V), RS-232, RS-422	78 mm x 76.5 mm x 25.6 mm	
	-	T: Ø 180 µm, W: 330 µm x 1,600 µm	± 40 µm	2 µm	≥ 0.1 ms, ≤ 10 kHz		■	Analog (mA), analog (V), RS-232, RS-422	78 mm x 76.5 mm x 27 mm	
	-	W: 700 µm x 2,400 µm	± 160 µm	5 µm	≥ 1 ms, ≤ 10 kHz		■	Analog (mA), analog (V), RS-232, RS-422	78 mm x 76.5 mm x 27 mm	
	-	W: 1,000 µm x 3,700 µm	± 400 µm	10 µm	≥ 0.8 ms, ≤ 1.25 kHz		■	Analog (mA), analog (V), RS-232, RS-422	78 mm x 76.5 mm x 27 mm	
										→ 60
	Min. 0.06 mm	T: 30 µm, W: 30 µm x 1,000 µm	± 1 µm	0.01 µm	≥ 12.5 µs, ≤ 80 kHz	■		Ethernet TCP/IP, Ethernet UDP	78 mm x 75 mm x 29 mm	
	Min. 0.18 mm	T: 30 µm, W: 30 µm x 1,000 µm	± 4 µm	0.05 µm	≥ 12.5 µs, ≤ 80 kHz	■		Ethernet TCP/IP, Ethernet UDP	78 mm x 75 mm x 29 mm	
	Min. 0.5 mm	T: 70 µm, W: 70 µm x 2,000 µm	± 6 µm ... ± 12 µm	0.1 µm	≥ 12.5 µs, ≤ 80 kHz	■		Ethernet TCP/IP, Ethernet UDP	78 mm x 75 mm x 29 mm	
	-	T: 120 µm, W: 120 µm x 4,000 µm	± 12 µm ... ± 32 µm	0.2 µm	≥ 12.5 µs, ≤ 80 kHz	■		Ethernet TCP/IP, Ethernet UDP	78 mm x 75 mm x 29 mm	

## PRODUCT FAMILY OVERVIEW

		
<b>DT20 HI</b>	<b>OD Value</b>	<b>OD1000</b>
Reliable, accurate distance measurement up to 1 m	Simply accurate measurement	The solution for precise measurement over long distances

Technical data overview			
Measuring range	50 mm ... 1,000 mm	26 mm ... 500 mm	200 mm ... 1,000 mm
Linearity	± 0.5 mm ... ± 6 mm	± 8 µm ... ± 1,200 µm	± 1.5 mm
Repeatability	0.125 mm ... 10 mm	2 µm ... 100 µm	0.4 mm
Response time	≥ 2.5 ms	≥ 1 ms	≥ 1.5 ms
Measuring frequency	≤ 400 Hz	≤ 2 kHz	≤ 3 kHz
Switching output	1 x PNP 1 x NPN	1 x PNP 2 x PNP 1 x NPN 2 x NPN	2 x push-pull
Ethernet	-	-	-
Serial	-	✓, RS-422	-
PROFIBUS DP	-	-	-
IO-Link	-	-	✓, V1.1, V1.0 (process data, parameterization, diagnosis, data storage)
Analog output	1 x 4 mA ... 20 mA (≤ 300 Ω)	1 x 4 mA ... 20 mA (≤ 300 Ω) / 1 x 0 V ... 10 V (> 10 kΩ)	1 x 4 mA ... 20 mA (≤ 600 Ω), 1 x 0 V ... 10 V (> 20 kΩ)
Ambient temperature operation	-20 °C ... +55 °C	-10 °C ... +40 °C	-10 °C ... +50 °C
Ambient storage temperature	-40 °C ... +60 °C	-20 °C ... +60 °C	-20 °C ... +60 °C

At a glance			
	<ul style="list-style-type: none"> <li>• Very high linearity of up to ± 0.5 mm</li> <li>• CMOS receiving element enables accurate distance measurement independent of color or shininess</li> <li>• Red laser</li> <li>• Scaleable analog and switching output</li> <li>• Display with easy to use setup menu</li> <li>• Advanced settings (e.g., averaging function, external laser-off, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• CMOS receiving element for measurement independent of surface</li> <li>• Easy, LED-based user and teach-in concept</li> <li>• Wide range of models and a wide range of standard interfaces</li> <li>• Laser technology for precise measurement of very small objects</li> <li>• Compact stand-alone device</li> <li>• Excellent price-performance ratio</li> </ul>	<ul style="list-style-type: none"> <li>• Simple setting via OLED display or SOPAS configuration software</li> <li>• Standalone device without external amplifier unit</li> <li>• Rugged metal housing</li> <li>• Adjustable analog output (mA/V) and push-pull switching output with IO-Link</li> <li>• Precise measurement regardless of color or surface</li> <li>• Versatile mounting possibilities</li> </ul>
Detailed information	→ 14	→ 20	→ 30





**OD Mini**

Compact, lightweight sensor for precise measurement



**OD Max**

Two sensors in one evaluation unit: very accurate measuring and calculation



**OD Precision**

Measuring each dimension with high precision



**OD5000**

The expert for high performance measurement

10 mm ... 250 mm	24 mm ... 450 mm	24 mm ... 700 mm	14 mm ... 190 mm
± 10 µm ... ± 100 µm	± 2 µm ... ± 200 µm	± 1.6 µm ... ± 400 µm	± 1 µm ... ± 32 µm
1 µm ... 200 µm	0.1 µm ... 50 µm	0.02 µm ... 10 µm	0.01 µm ... 0.2 µm
≥ 2 ms	≥ 0.5 ms	≥ 0.1 ms	≥ 12.5 µs
≤ 2 kHz	≤ 10 kHz	≤ 10 kHz	≤ 80 kHz
1 x PNP/NPN, selectable 2 x PNP/NPN, selectable 3 x PNP/NPN, selectable	5 x PNP 5 x NPN	5 x PNP 5 x NPN	1 x PNP/NPN 2 x PNP/NPN 3 x PNP/NPN
-	-	-	✓, TCP, UDP/IP
✓, RS-485	✓, RS-232, over evaluation unit AOD	✓, RS-232, RS-422, Optional over evaluation unit AOD5	-
✓, optional, over external evaluation unit AOD1 and Gateway WI180C-PB	-	-	✓, optional, over external evaluation unit AOD1 and Gateway WI180C-PB
-	-	-	-
1 x 4 mA ... 20 mA (≤ 300 Ω) / 1 x 0 V ... 10 V (> 10 kΩ)	2 x 4 mA ... 20 mA (≤ 300 Ω)	3 x 4 mA ... 20 mA (≤ 300 Ω)	1 x 4 mA ... 20 mA (≤ 300 Ω)
-10 °C ... +40 °C	-10 °C ... +45 °C	-10 °C ... +50 °C	-10 °C ... +50 °C
-20 °C ... +60 °C	-20 °C ... +60 °C	-20 °C ... +60 °C	-20 °C ... +60 °C

- Compact, rugged housing
- Stand-alone use or in combination with the OD Mini evaluation unit
- Display and LEDs on device for visualization of current status
- Different interfaces available
- Simple teach-in using display or external teaching input
- CMOS receiver unit for precise, fast measurement in the µm range

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- Several measurement ranges from 24 ... 26 mm up to 250 mm ... 450 mm
- CMOS receiving element for measurement independent of surface
- High measurement frequency and high linearity
- Variety of selectable integrated calculations based on values from two sensors
- Laser technology for precise measurement or detection of very small objects
- Several output options

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- CMOS receiving element for measurement independent of surface
- Maximum measurement accuracy and frequency
- Glass thickness measurement with just one sensor head
- Various light spot sizes
- Integrated calculations for up to three sensors
- Stand-alone use via RS-422

→ 50

- Measuring frequency up to 80 kHz
- Ethernet interface with TCP/IP protocol directly in the sensor head
- Web server interface for configuration
- Innovative analysis algorithm
- Maximum repeatability for positioning tasks
- Detection and measurement of the smallest indentations or holes

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# RELIABLE, ACCURATE DISTANCE MEASUREMENT UP TO 1 M



## Product description

DT20 Hi distance sensor is the ideal choice for quality control tasks from a distance of up to 1 m. The reliable and precise distance measurement independent of any color, enables consistent check of any component. In addition, a

precise red laser makes it possible to accurately detect very small objects. The DT20 Hi's exceptional measurement performance and advanced settings are ideal for solving nearly any demanding measurement task.

## At a glance

- Four measuring ranges from 50 mm up to 1,000 mm
- Very high linearity of up to  $\pm 0.5$  mm
- CMOS receiving element enables accurate distance measurement independent of color or shininess
- Red laser
- Scaleable analog and switching output
- Display with easy to use setup menu
- Advanced settings (e.g., averaging function, external laser-off, etc.)

## Your benefits

- Reliable, precise measurement, independent of surface, increases production quality
- Reliable and consistent measurements, regardless of color, reduce changeover time
- Advanced settings provide increased application flexibility to easily solve customer-specific applications
- Fast commissioning via button, remote or numerical teach
- Easy, precise alignment and verification based on red laser light and LC display, decreasing commissioning time
- Tough metal housing permits operation in harsh environments



## Additional information

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→ [www.sick.com/DT20\\_Hi](http://www.sick.com/DT20_Hi)

For more information, simply enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.



## Detailed technical data

## Performance

<b>Repeatability</b> <sup>1) 2) 3)</sup>	
50 mm ... 150 mm	0.5 mm / 0.25 mm / 0.125 mm
100 mm ... 300 mm	1 mm / 0.5 mm / 0.25 mm
100 mm ... 600 mm	2 mm / 1 mm / 0.5 mm
100 mm ... 1,000 mm <sup>4)</sup>	10 mm / 5 mm / 2.5 mm
<b>Linearity</b> <sup>3) 5)</sup>	
50 mm ... 150 mm	± 0.5 mm
100 mm ... 300 mm	± 1 mm
100 mm ... 600 mm	± 2 mm
100 mm ... 1,000 mm <sup>4)</sup>	± 6 mm
<b>Response time</b> <sup>2)</sup>	≥ 2.5 ms
<b>Measuring frequency</b> <sup>1)</sup>	≤ 400 Hz
<b>Light source</b>	Laser, red
<b>Typ. light spot size (distance)</b>	
50 mm ... 150 mm	2 mm x 4 mm (150 mm)
100 mm ... 300 mm	3 mm x 6 mm (300 mm)
100 mm ... 600 mm	3 mm x 6 mm (600 mm)
100 mm ... 1,000 mm	6 mm x 12 mm (1000 mm)
<b>Additional function</b>	Set moving average fast/medium/slow, switching mode: distance to object (DtO), teach-in of switching output, Invertable switching output, teach-in of analog output, Invertable analog output, Multifunctional input: laser off / external teach-in / deactivated, switch-off display, lock user interface

<sup>1)</sup> 6 % ... 90 % remission.

<sup>2)</sup> Dependent on the set average or sensitivity.

<sup>3)</sup> When calibrated in the application regularly.

<sup>4)</sup> The models with measuring range of 100 mm ... 1,000 mm meets the specification of the models with measuring range of 100 mm ... 1,000 mm for distances < 600 mm.

<sup>5)</sup> 90 % remission.

## Interfaces

<b>Analog output</b>	1 x 4 mA ... 20 mA (≤ 300 Ω)
Resolution analog output	12 bit
<b>Multifunctional input (MF)</b> <sup>1)</sup>	1 x MF

<sup>1)</sup> MF can be used as laser-off, external teach-in or deactivated.

## Mechanics/electronics

<b>Supply voltage</b> $V_s$ <sup>1)</sup>	DC 10 V ... 30 V
<b>Ripple</b> <sup>2)</sup>	≤ 5 $V_{pp}$
<b>Power consumption</b> <sup>3)</sup>	≤ 1.8 W
<b>Warm-up time</b>	≤ 10 min
<b>Housing material</b>	Metal
<b>Window material</b>	PMMA
<b>Connection type</b>	Male connector, M12, 5-pin, swivel connector unit
<b>Indication</b>	LC display, 2 x LED
<b>Weight</b>	135 g

<sup>1)</sup> Limit values, reverse-polarity protected, operation in short-circuit protected network: max. 8 A.

<sup>2)</sup> May not fall short of or exceed  $V_s$  tolerances.

<sup>3)</sup> Without load.

<b>Enclosure rating</b>	IP65
<b>Protection class</b>	II

<sup>1)</sup> Limit values, reverse-polarity protected, operation in short-circuit protected network: max. 8 A.

<sup>2)</sup> May not fall short of or exceed  $V_s$  tolerances.

<sup>3)</sup> Without load.

## Ambient data

<b>Ambient temperature operation</b>	-20 °C ... +55 °C, Operating temperature at $V_s = 24$ V
<b>Ambient storage temperature</b>	-40 °C ... +60 °C
<b>Temperature drift <sup>1)</sup></b>	0.25 mm/K
<b>Typ. Ambient light immunity</b>	Artificial light: $\leq 3,000$ lx Sunlight: $\leq 10,000$ lx
<b>Vibration resistance</b>	EN 60068-2-6, EN 60068-2-64
<b>Shock resistance</b>	EN 60068-2-27

<sup>1)</sup> 0.5 mm/K: for distances > 600 mm.

## Ordering information

Other models → [www.sick.com/DT20\\_Hi](http://www.sick.com/DT20_Hi)

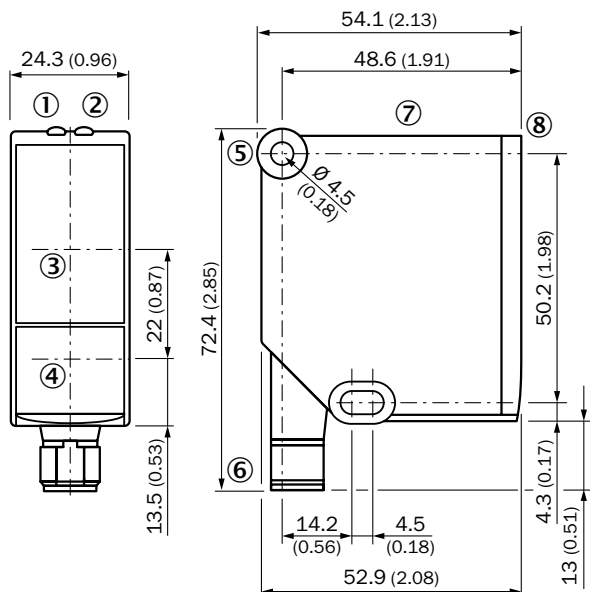
Measuring range <sup>1)</sup>	Laser class	Switching output <sup>2)</sup>	Type	Part no.
50 mm ... 150 mm	2 (IEC 60825-1:2014, EN 60825-1:2014)	1 x PNP (100 mA)	DT20-P254B	1041278
		1 x NPN (100 mA)	DT20-N254B	1041279
100 mm ... 300 mm	2 (IEC 60825-1:2014, EN 60825-1:2014)	1 x PNP (100 mA)	DT20-P244B	1040406
		1 x NPN (100 mA)	DT20-N244B	1040713
	1 (IEC 60825-1:2014, EN 60825-1:2014)	1 x PNP (100 mA)	DT20-P244BS04	1052829
100 mm ... 600 mm	2 (IEC 60825-1:2014, EN 60825-1:2014)	1 x PNP (100 mA)	DT20-P214B	1040012
		1 x NPN (100 mA)	DT20-N214B	1040140
	1 (IEC 60825-1:2014, EN 60825-1:2014)	1 x PNP (100 mA)	DT20-P214BS03	1051547
100 mm ... 1,000 mm	2 (IEC 60825-1:2014, EN 60825-1:2014)	1 x PNP (100 mA)	DT20-P224B	1040405
		1 x NPN (100 mA)	DT20-N224B	1044216

<sup>1)</sup> 6 % ... 90 % remission.

<sup>2)</sup> PNP: HIGH =  $V_s - (< 2$  V) / LOW =  $< 2$  V; NPN: HIGH =  $< 2$  V / LOW =  $V_s$ .



**Dimensional drawing** (Dimensions in mm (inch))





- ① Status indicator operating voltage active (green)
- ② Status indicator switching output (orange)
- ③ Optical axis, receiver
- ④ Optical axis, sender
- ⑤ Fixing hole
- ⑥ Connector M12, 5-pin, turnable
- ⑦ Operating keys and display
- ⑧ Reference surface = 0 mm


**Recommended accessories**

**Mounting systems**

Mounting brackets and plates



	Brief description	Part no.
	Mounting bracket, stainless steel, without mounting material, for DT20 Hi	4043524
 Illustration may differ	Stainless-steel mounting bracket	4089813

Terminal and alignment brackets

	Brief description	Part no.
 Illustration may differ	Galvanized steel alignment bracket with mounting accessories	2087355

## Connection systems

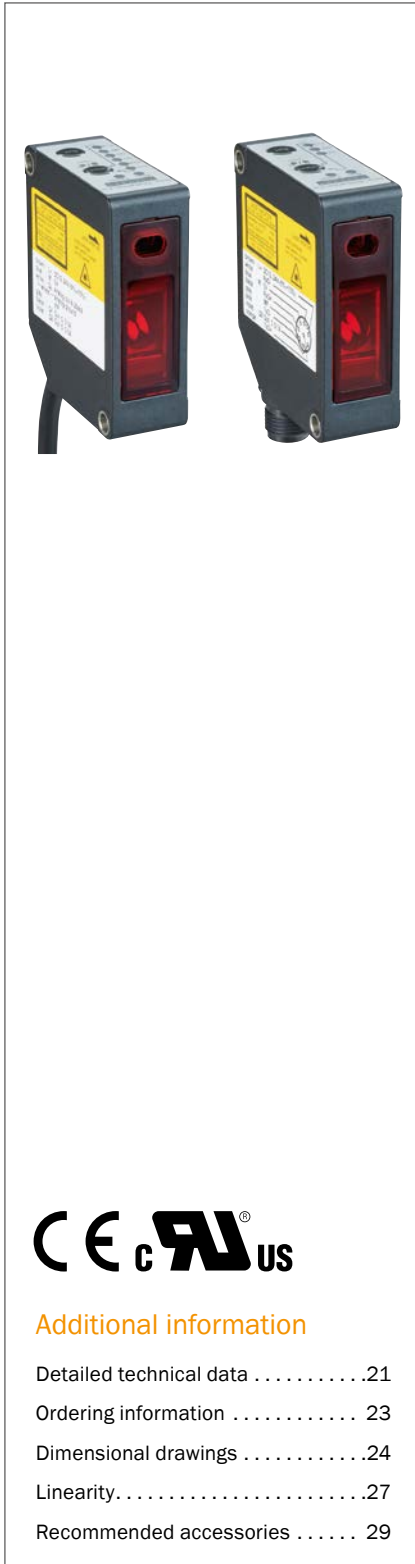
### Plug connectors and cables

	Connection type head A	Connection type head B	Cable	Cable length	Part no.
	Female connector, M12, 5-pin, straight, A-coded	Open cable ends	PVC, Sensor/actuator cable, unshielded	2 m	2096239
				5 m	2096240
	Female connector, M12, 5-pin, angled, A-coded	Open cable ends	PVC, Sensor/actuator cable, unshielded	2 m	2096215
				5 m	2096216

For more accessories, see → [www.sick.com/DT20\\_Hi](http://www.sick.com/DT20_Hi)



## SIMPLY ACCURATE MEASUREMENT



### Additional information

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### Product description

The OD Value allows for an easy, precise and economical solution of measuring tasks. It detects even small deviations in dimension, shape, position or excentricity directly in the machine, contactless, precise and during running operation.

### At a glance

- Several measurement ranges from 26 mm ... 34 mm to 100 mm ... 500 mm
- CMOS receiving element for measurement independent of surface
- Easy, LED-based user and teach-in concept

### Your benefits

- Reliable measurement independent of surface, minimizes machine downtime
- Extremely simple sensor teach-in makes setup faster and more cost-effective
- Minimal space requirements and less wiring due to its compact, standalone design
- Many measurement ranges and output interfaces make it ideal for cost-effective integration into any production environment

OD Value convinces with its main features: reliable, user-friendly, effective, universal and efficient. The ideal solution for everyone, who needs to check and verify quality regularly and directly in the process.

- Wide range of models and a wide range of standard interfaces
- Laser technology for precise measurement of very small objects
- Compact stand-alone device
- Excellent price-performance ratio

- Low investment costs make consistent, regular quality inspection possible
- Non-contact measurement technology from a safe distance allows the inspection to be carried out directly during the production process
- Wear and damage-free inspection, due to non-contact measurement

→ [www.sick.com/OD\\_Value](http://www.sick.com/OD_Value)

For more information, simply enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.





## Detailed technical data

## Performance

<b>Repeatability</b> <sup>1) 2) 3) 4)</sup>		
	26 mm ... 34 mm	2 µm
	40 mm ... 60 mm	5 µm
	65 mm ... 105 mm	10 µm
	60 mm ... 180 mm	30 µm
	60 mm ... 210 mm	60 µm
	100 mm ... 400 mm	75 µm
	100 mm ... 500 mm	100 µm
<b>Linearity</b> <sup>2) 4) 5) 6)</sup>		
	26 mm ... 34 mm	± 8 µm
	40 mm ... 60 mm	± 20 µm
	65 mm ... 105 mm	± 40 µm
	60 mm ... 180 mm	± 120 µm
	60 mm ... 210 mm	± 375 µm
	100 mm ... 400 mm	± 750 µm
	100 mm ... 500 mm	± 1,200 µm
<b>Response time</b>		≥ 1 ms
<b>Measuring frequency</b> <sup>1)</sup>		
	26 mm ... 34 mm	≤ 2 kHz
	40 mm ... 60 mm	≤ 2 kHz
	65 mm ... 105 mm	≤ 2 kHz
	60 mm ... 180 mm	≤ 2 kHz
	60 mm ... 210 mm	≤ 2 kHz
	100 mm ... 400 mm	≤ 1.33 kHz
	100 mm ... 500 mm	≤ 1.33 kHz
<b>Light source</b>		Laser, red
<b>Laser class</b> <sup>7)</sup>		2 (IEC 60825-1:2014, EN 60825-1:2014)
<b>Typ. light spot size (distance)</b>		
	26 mm ... 34 mm	0.1 mm x 0.1 mm (30 mm)
	40 mm ... 60 mm	0.5 mm x 1 mm (50 mm)
	65 mm ... 105 mm	0.8 mm x 1.3 mm (85 mm)
	60 mm ... 180 mm	1 mm x 1.5 mm (120 mm)
	60 mm ... 210 mm	1 mm x 1.4 mm (135 mm)
	100 mm ... 400 mm	1.8 mm x 3.5 mm (250 mm)
	100 mm ... 500 mm	1.9 mm x 3.9 mm (300 mm)
<b>Additional function</b>		Mean-value setting 1 ... 64x / automatic sensitivity adjustment / Analog outputs can be taught in / Invertable analog output / Teach-in of switching output / Invertable switching output / multifunctional input: laser-off / external teach-in / trigger / switching mode: distance to object (DtO) / switching mode: window (Wnd) / Mean-value setting 1 ... 64x / automatic sensitivity adjustment / Teach-in of switching output / Invertable switching output / multifunctional input: laser-off / external teach-in / trigger / switching mode: distance to object (DtO) / switching mode: window (Wnd) (depending on type)

<sup>1)</sup> 6 % ... 90 % remission.

<sup>2)</sup> At averaging function medium.

<sup>3)</sup> Constant ambient conditions.

<sup>4)</sup> For best performance consider warm up time ≤ 5 minutes.

<sup>5)</sup> Measurement on 90 % remission (ceramic, white).

<sup>6)</sup> When calibrated in the application regularly.

<sup>7)</sup> Wavelength: 655 nm, max. output: 1 mW.

## Interfaces

<b>Serial</b>	✓, RS-422
<b>Analog output</b>	1 x 4 mA ... 20 mA ( $\leq 300 \Omega$ ) / 1 x 0 V ... 10 V ( $> 10 \text{ k}\Omega$ )
Resolution analog output	16 bit
<b>Multifunctional input (MF) <sup>1)</sup></b>	1 x MF

<sup>1)</sup> MF can be used as laser-off, trigger, external teach-in, or deactivated; response time  $\leq 3 \text{ ms}$ .

## Mechanics/electronics

<b>Supply voltage <math>V_s</math> <sup>1)</sup></b>	DC 12 V ... 24 V
<b>Power consumption <sup>2)</sup></b>	$\leq 2.88 \text{ W}$
<b>Warm-up time</b>	$\leq 30 \text{ min}$
<b>Housing material</b>	PBT
<b>Window material</b>	PMMA
<b>Indication</b>	Distance bar graph, up to 8 status LEDs
<b>Weight</b>	70 g
<b>Enclosure rating</b>	IP67
<b>Protection class</b>	III

<sup>1)</sup> DC 12 V (-5 %) ... 24 V (+10 %); DC 18 V (-5 %) ... DC 24 V (+10 %) when using analog voltage output.

<sup>2)</sup> Without load, with current output.

## Ambient data

<b>Ambient temperature operation</b>	-10 °C ... +40 °C
<b>Ambient storage temperature</b>	-20 °C ... +60 °C
<b>Relative air humidity (non-condensing)</b>	35 % ... 95 %
<b>Temperature drift</b>	$\pm 0.08 \text{ \% FS/K}$ (FS = Full Scale = Measuring range of sensor)
<b>Typ. Ambient light immunity</b>	Artificial light: $\leq 3,000 \text{ lx}$ Sunlight: $\leq 10,000 \text{ lx}$
<b>Vibration resistance</b>	10 Hz ... 55 Hz (amplitude 1.5 mm, x-, y-, z-axis 2 hours each)
<b>Shock resistance</b>	50 G (x, y, z axis 3 times each)

## Ordering information

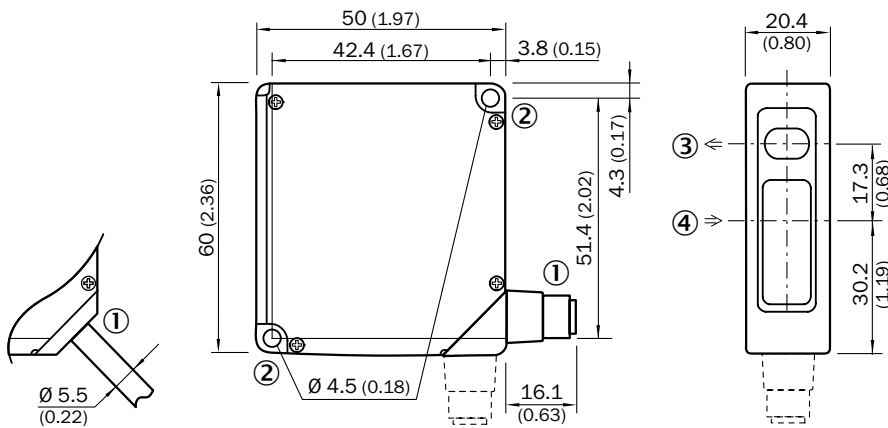
Other models → [www.sick.com/OD\\_Value](http://www.sick.com/OD_Value)

Measuring range <sup>1)</sup>	Communication interface	Analog output	Connection type	Switching output <sup>2)</sup>	Type	Part no.	
26 mm ... 34 mm	-	1 x 4 mA ... 20 mA ( $\leq 300 \Omega$ )	Cable 2 m	2 x NPN (100 mA)	OD2-N30W04I2	6036568	
			Male connector M12, 8-pin swivel connector unit	2 x PNP (100 mA)	OD2-P30W04I0	6036580	
		-	-	2 x PNP (100 mA)	OD2-P30W04U0	6036581	
	Serial, RS-422	-	-	Cable 2 m	1 x NPN (100 mA)	OD2-N30W04A2	6036571
				Male connector M12, 8-pin swivel connector unit	1 x PNP (100 mA)	OD2-P30W04A0	6036583
			-	-	-	-	-
40 mm ... 60 mm	-	1 x 4 mA ... 20 mA ( $\leq 300 \Omega$ )	Cable 2 m	2 x NPN (100 mA)	OD2-N50W10I2	6036584	
			Male connector M12, 8-pin swivel connector unit	2 x PNP (100 mA)	OD2-P50W10I0	6036597	
		-	-	2 x PNP (100 mA)	OD2-P50W10U0	6036598	
	Serial, RS-422	-	-	Cable 2 m	1 x NPN (100 mA)	OD2-N50W10A2	6036587
				Male connector M12, 8-pin swivel connector unit	1 x PNP (100 mA)	OD2-P50W10A0	6036600
			-	-	-	-	-
60 mm ... 180 mm	-	1 x 4 mA ... 20 mA ( $\leq 300 \Omega$ )	Cable 2 m	2 x NPN (100 mA)	OD2-N120W60I2	6036617	
				2 x PNP (100 mA)	OD2-P120W60I2	6036625	
		-	-	Male connector M12, 8-pin swivel connector unit	2 x PNP (100 mA)	OD2-P120W60I0	6036629
	Serial, RS-422	-	-	Cable 2 m	1 x NPN (100 mA)	OD2-N120W60A2	6036620
					1 x PNP (100 mA)	OD2-P120W60A0	6036632
			-	-	-	-	-
60 mm ... 210 mm	-	1 x 4 mA ... 20 mA ( $\leq 300 \Omega$ )	Male connector M12, 8-pin swivel connector unit	2 x PNP (100 mA)	OD2-P135W75I0	6048894	
65 mm ... 105 mm	-	1 x 4 mA ... 20 mA ( $\leq 300 \Omega$ )	Cable 2 m	2 x NPN (100 mA)	OD2-N85W20I2	6036601	
			Male connector M12, 8-pin swivel connector unit	2 x PNP (100 mA)	OD2-P85W20I0	6036613	
		-	-	2 x PNP (100 mA)	OD2-P85W20U0	6036630	
	Serial, RS-422	-	-	Cable 2 m	1 x NPN (100 mA)	OD2-N85W20A2	6036604
				Male connector M12, 8-pin swivel connector unit	1 x PNP (100 mA)	OD2-P85W20A0	6036616
			-	-	-	-	-
100 mm ... 400 mm	-	1 x 4 mA ... 20 mA ( $\leq 300 \Omega$ )	Cable 2 m	2 x NPN (100 mA)	OD2-N250W150I2	6036633	
				2 x PNP (100 mA)	OD2-P250W150I2	6036641	
		-	-	Cable 2 m	2 x PNP (100 mA)	OD2-P250W150U2	6036642
		1 x 4 mA ... 20 mA ( $\leq 300 \Omega$ )	Male connector M12, 8-pin swivel connector unit	2 x NPN (100 mA)	OD2-N250W150I0	6036637	
				2 x PNP (100 mA)	OD2-P250W150C0	6036647	
		1 x 4 mA ... 20 mA ( $\leq 300 \Omega$ )	Male connector M12, 8-pin swivel connector unit	2 x PNP (100 mA)	OD2-P250W150I0	6036645	
	2 x PNP (100 mA)			OD2-P250W150U0	6036646		
	Serial, RS-422	-	-	Cable 2 m	1 x NPN (100 mA)	OD2-N250W150A2	6036636
				Male connector M12, 8-pin swivel connector unit	1 x PNP (100 mA)	OD2-P250W150A0	6036648
			-	-	-	-	-
-			-	-	-	-	-
100 mm ... 500 mm	-	1 x 4 mA ... 20 mA ( $\leq 300 \Omega$ )	Male connector M12, 8-pin swivel connector unit	2 x PNP (100 mA)	OD2-P300W200I0	6048912	

<sup>1)</sup> 6 % ... 90 % remission.<sup>2)</sup> PNP: HIGH =  $V_s$  - (< 2 V) / LOW = < 2 V; NPN: HIGH = < 2 V / LOW =  $V_s$ .

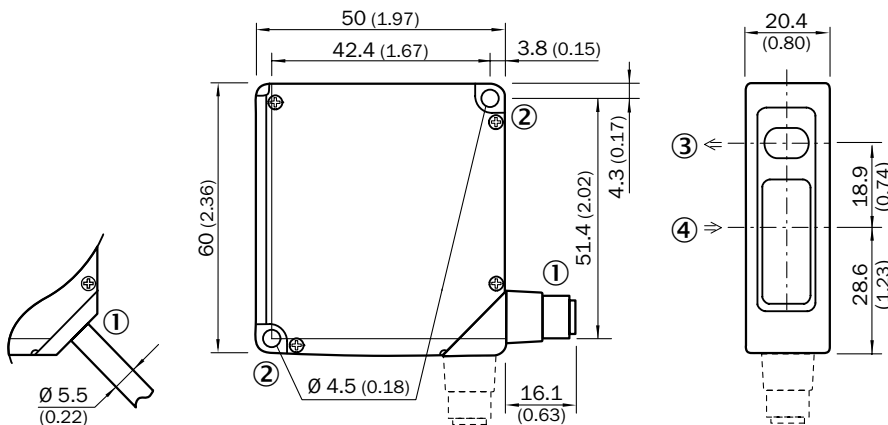
Dimensional drawings (Dimensions in mm (inch))

OD2-x30W04xx



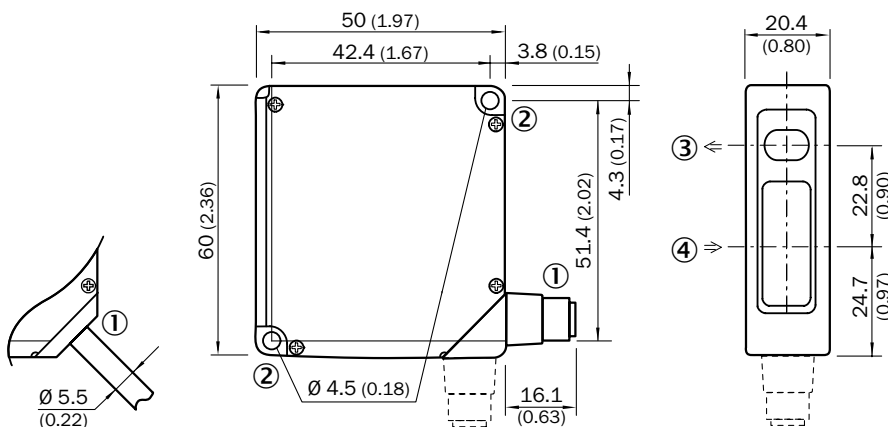
- ① 2 m cable or M12 connector; 90° rotatable
- ② Mounting hole, Ø 4.5 mm
- ③ Optical axis sender
- ④ Optical axis receiver

OD2-x50W10xx



- ① 2 m cable or M12 connector; 90° rotatable
- ② Mounting hole, Ø 4.5 mm
- ③ Optical axis sender
- ④ Optical axis receiver

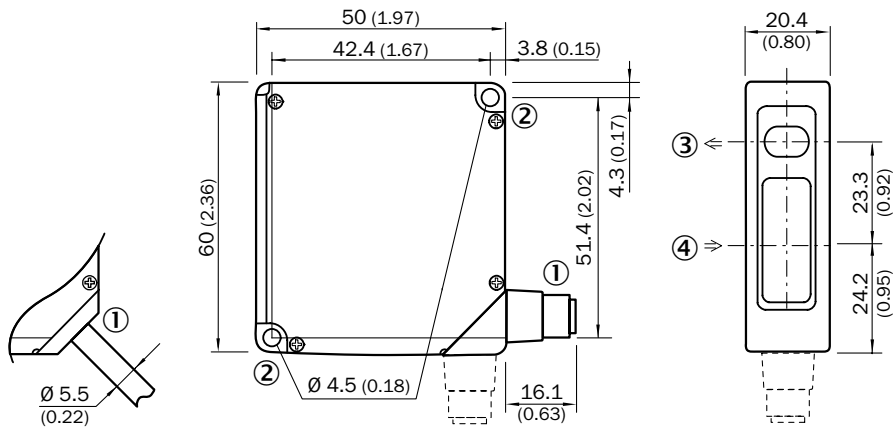
OD2-x85W20xx



- ① 2 m cable or M12 connector; 90° rotatable
- ② Mounting hole, Ø 4.5 mm
- ③ Optical axis sender
- ④ Optical axis receiver

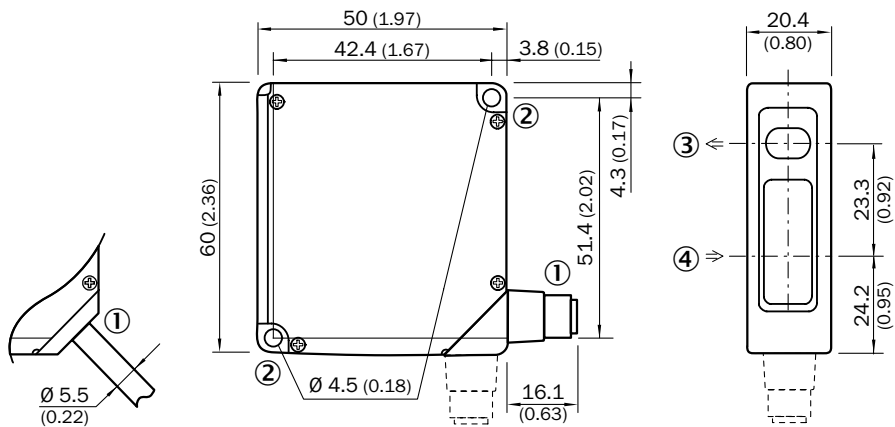


OD2-x120W60xx



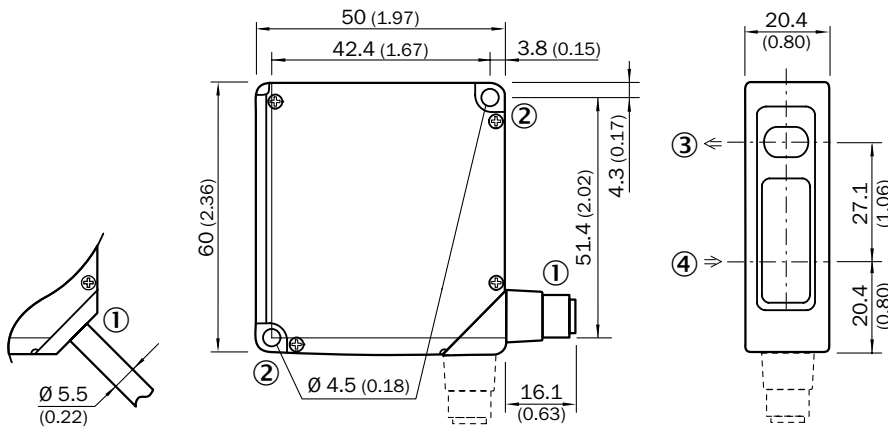
- ① 2 m cable or M12 connector; 90° rotatable
- ② Mounting hole,  $\varnothing 4.5$  mm
- ③ Optical axis sender
- ④ Optical axis receiver

OD2-x135W75xx



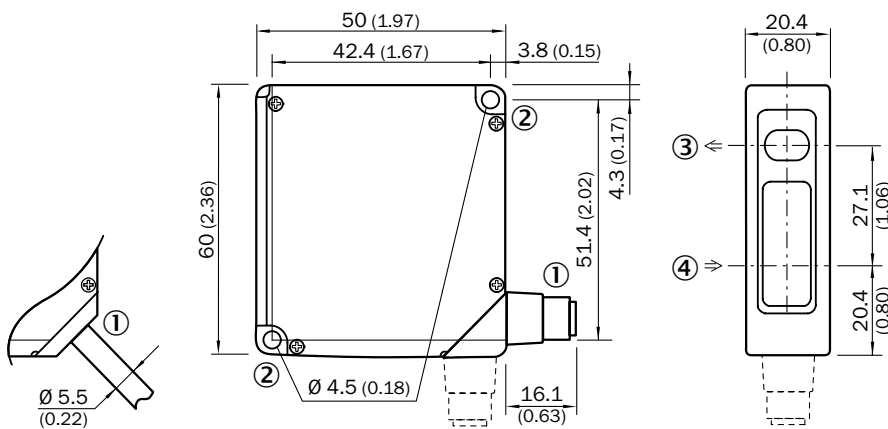
- ① 2 m cable or M12 connector; 90° rotatable
- ② Mounting hole,  $\varnothing 4.5$  mm
- ③ Optical axis sender
- ④ Optical axis receiver

OD2-x250W150xx



- ① 2 m cable or M12 connector; 90° rotatable
- ② Mounting hole, Ø 4.5 mm
- ③ Optical axis sender
- ④ Optical axis receiver

OD2-x300W200xx

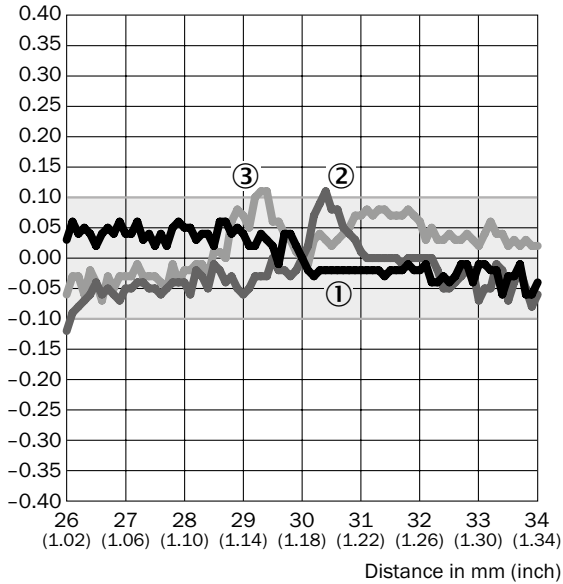


- ① 2 m cable or M12 connector; 90° rotatable
- ② Mounting hole, Ø 4.5 mm
- ③ Optical axis sender
- ④ Optical axis receiver

Linearity

OD2-x30xxxxx

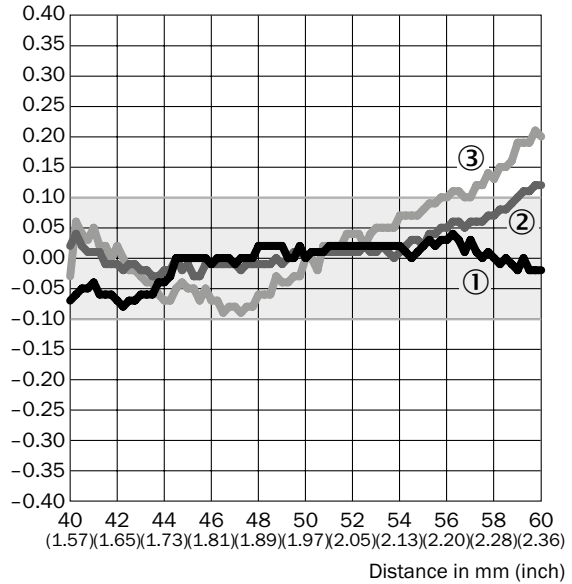
Linearity [%FS]



- ① White ceramic
- ② Black paper
- ③ Stainless steel

OD2-x50xxxxx

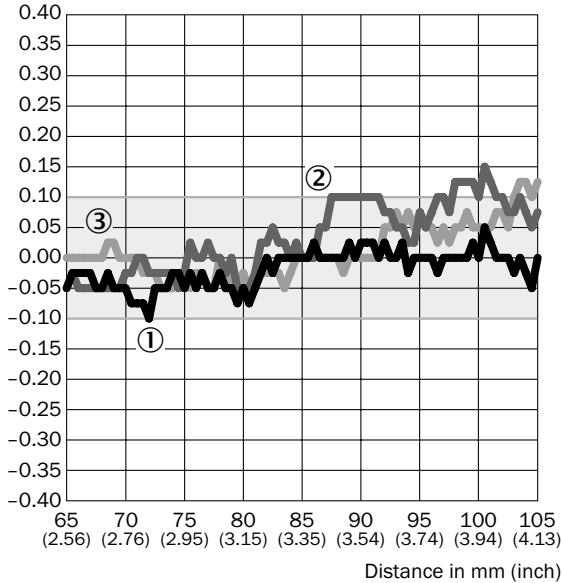
Linearity [%FS]



- ① White ceramic
- ② Black paper
- ③ Stainless steel

OD2-x85xxxxx

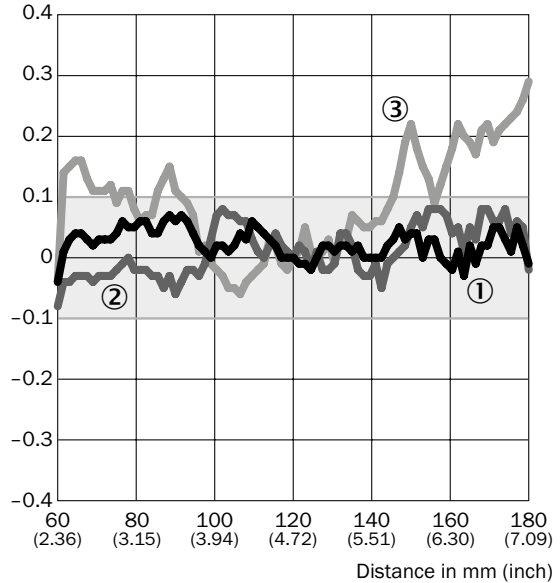
Linearity [%FS]



- ① White ceramic
- ② Black paper
- ③ Stainless steel

OD2-x120xxxxx

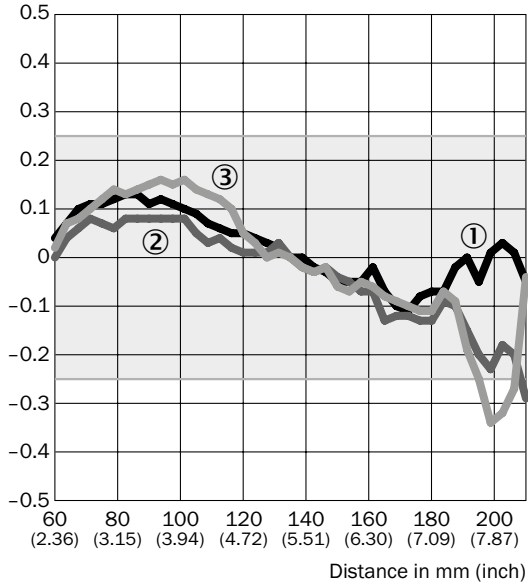
Linearity [%FS]



- ① White ceramic
- ② Black paper
- ③ Stainless steel

OD2-x135xxxx

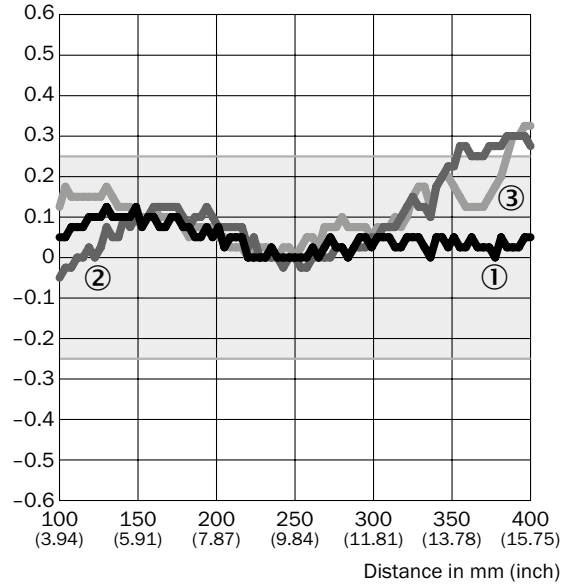
Linearity [%FS]



- ① White ceramic
- ② Black paper
- ③ Stainless steel

OD2-x250xxxx

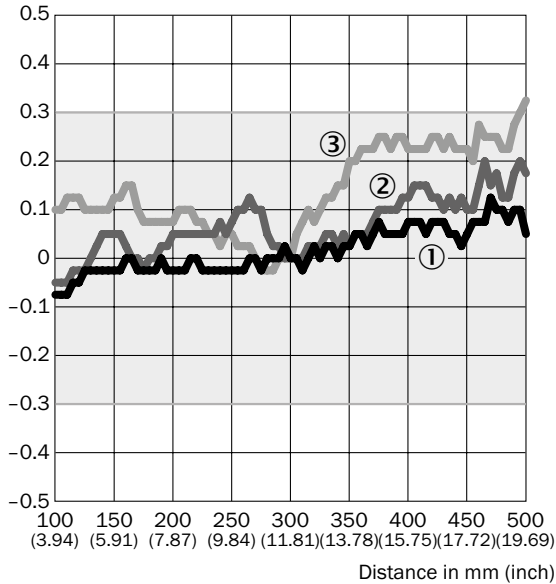
Linearity [%FS]



- ① White ceramic
- ② Black paper
- ③ Stainless steel

OD2-x300xxxx

Linearity [%FS]



- ① White ceramic
- ② Black paper
- ③ Stainless steel


## Recommended accessories

### Mounting systems

#### Mounting brackets and plates


	Brief description	Part no.
 Illustration may differ	Stainless-steel mounting bracket	4089813

#### Terminal and alignment brackets

	Brief description	Part no.
 Illustration may differ	Galvanized steel alignment bracket with mounting accessories	2087355

### Connection systems

#### Plug connectors and cables

	Connection type head A	Connection type head B	Cable	Cable length	Part no.
 Illustration may differ	Female connector, M12, 8-pin, straight	Open cable ends	PVC, special color code, shielded	2 m	6020663
				5 m	6020664

For more accessories, see → [www.sick.com/OD\\_Value](http://www.sick.com/OD_Value)



# THE SOLUTION FOR PRECISE MEASUREMENT OVER LONG DISTANCES



## Product description

With its sensing range of up to 1 m, the OD1000 displacement measurement sensor sets new standards in precise distance measurement with triangulation. Its high performance data ensures a smooth production process and allows a high level of productivity in a wide range of applications, almost regardless of the surface quality, color, or object

structure. The clear OLED display with four operating keys simplifies commissioning and optimizes the machine availability. As a standalone device with integrated evaluation, IO-Link interface, and additional functions, the OD1000 simplifies machine integration, saves additional evaluation effort, and paves the way for sustainable production.

## At a glance

- Large measuring range of up to 1 m
- Simple setting via OLED display or SOPAS configuration software
- Standalone device without external amplifier unit
- Rugged metal housing
- Adjustable analog output (mA/V) and push-pull switching output with IO-Link
- Precise measurement regardless of color or surface
- Versatile mounting possibilities

## Your benefits

- Optimization of the process quality due to high precision and linearity over the entire measuring range
- Quick commissioning due to variable mounting and innovative operating concept
- Simple and cost-saving integration via OLED display and IO-Link interface
- Suitable for harsh ambient condition due to rugged metal housing
- High machine availability thanks to reliable, quick, and precise measurement results on a wide range of surfaces
- Intelligent measured value filter and analysis algorithm for safe and stable measurement in every application



## Additional information

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Linearity . . . . .	34
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→ [www.sick.com/OD1000](http://www.sick.com/OD1000)

For more information, simply enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.



## Detailed technical data

## Performance

Measuring range <sup>1)</sup>	200 mm ... 1,000 mm
Repeatability <sup>2) 3)</sup>	0.4 mm
Linearity <sup>2) 4)</sup>	± 1.5 mm
Response time <sup>5)</sup>	≥ 1.5 ms
Measuring frequency	≤ 3 kHz
Light source	Laser, red
Laser class <sup>6)</sup>	1 (IEC 60825-1:2014, EN 60825-1:2014)
Typ. light spot size (distance)	1.5 mm x 1.5 mm (200 mm ... 1,000 mm)
Additional function	Adjustable average value or media filter, Switching mode: Distance to Object (DtO) / switching window / object between sensor and background (ObSB), teach-in of switching output, Invertable switching output, teach-in of analog output, Invertable analog output, Switchable analog output (mA / V), Multifunctional input: laser off / external teach-in / deactivated, switch-off display, lock user interface, Display can be rotated by 180°, Alarm function, Edge height change, Time functions (ON/OFF delay, 1 shot)

<sup>1)</sup> 6 % ... 90 % remission; at default settings.

<sup>2)</sup> With 90% remission (white), with constant ambient conditions.

<sup>3)</sup> Statistical error 3  $\sigma$ .

<sup>4)</sup> For optimum performance observe min. warm-up time of 10 minutes.

<sup>5)</sup> With measuring frequency of 3 kHz, target change white 90%/white 90%.

<sup>6)</sup> Wavelength 655 nm, max. pulse output 0.78 mW, max. average power 0.39 mW, max. pulse duration 1.8 ms.

## Interfaces

IO-Link	✓, V1.1, V1.0
Function	Process data, parameterization, diagnosis, data storage
Data transmission rate	230,4 kbit/s (COM3) / 38,4 kbit/s (COM2)
Digital inputs	In1 Can be used as laser off, external teach-in, or deactivated
Analog output	1 x 4 mA ... 20 mA (≤ 600 $\Omega$ ), 1 x 0 V ... 10 V (> 20 k $\Omega$ )
Resolution analog output	16 bit

## Mechanics/electronics

Supply voltage $V_s$ <sup>1)</sup>	DC 18 V ... 30 V
Ripple <sup>2)</sup>	≤ 5 $V_{pp}$
Power consumption <sup>3)</sup>	≤ 2.5 W
Warm-up time	< 10 min
Housing material	Zinc diecast
Window material	Acrylic glass (PMMA)
Indication	OLED display, status LEDs
Operating elements	4 buttons
Weight	280 g
Dimensions	71.5 mm x 53.2 mm x 25.9 mm
Enclosure rating	IP65 IP67
Protection class	III (EN 50178)

<sup>1)</sup> Limit values, reverse-polarity protected, operation in short-circuit protected network: max. 8 A.

<sup>2)</sup> May not fall short of or exceed  $V_s$  tolerances.

<sup>3)</sup> Without load, at +20 °C.

## Ambient data

<b>Ambient temperature operation</b>	-10 °C ... +50 °C, Operating temperature at $V_s = 24\text{ V}$
<b>Ambient storage temperature</b>	-20 °C ... +60 °C
<b>Temperature drift</b>	0.15 mm/K
<b>Typ. Ambient light immunity</b>	Artificial light: $\leq 3,000\text{ lx}$ <sup>1)</sup> Sunlight: $\leq 10,000\text{ lx}$
<b>Vibration resistance</b>	EN 60068-2-6, EN 60068-2-64
<b>Shock resistance</b>	EN 60068-2-27

<sup>1)</sup> With constant object movement in the measuring range.

## Ordering information

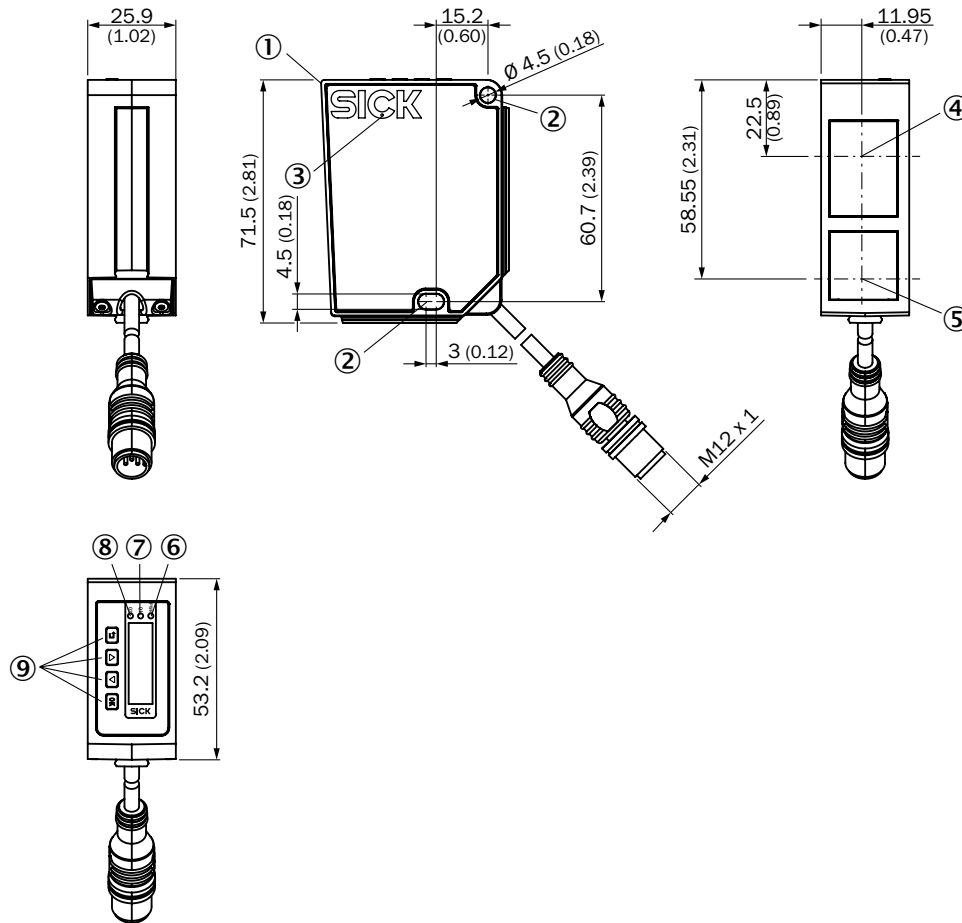
Other models → [www.sick.com/OD1000](http://www.sick.com/OD1000)

Measuring range <sup>1)</sup>	Communication interface	Connection type	Switching output <sup>2)</sup>	Type	Part no.
200 mm ... 1,000 mm	IO-Link, V1.1, V1.0	Cable with male connector M12, 5-pin, A-coded 20 cm	2 x push-pull	OD1000-6001R15	1075638

<sup>1)</sup> 6 % ... 90 % remission; at default settings.

<sup>2)</sup> PNP: HIGH =  $U_v - (< 3\text{ V})$  / LOW =  $< 3\text{ V}$ ; NPN: HIGH =  $< 3\text{ V}$  / LOW =  $U_v$ .

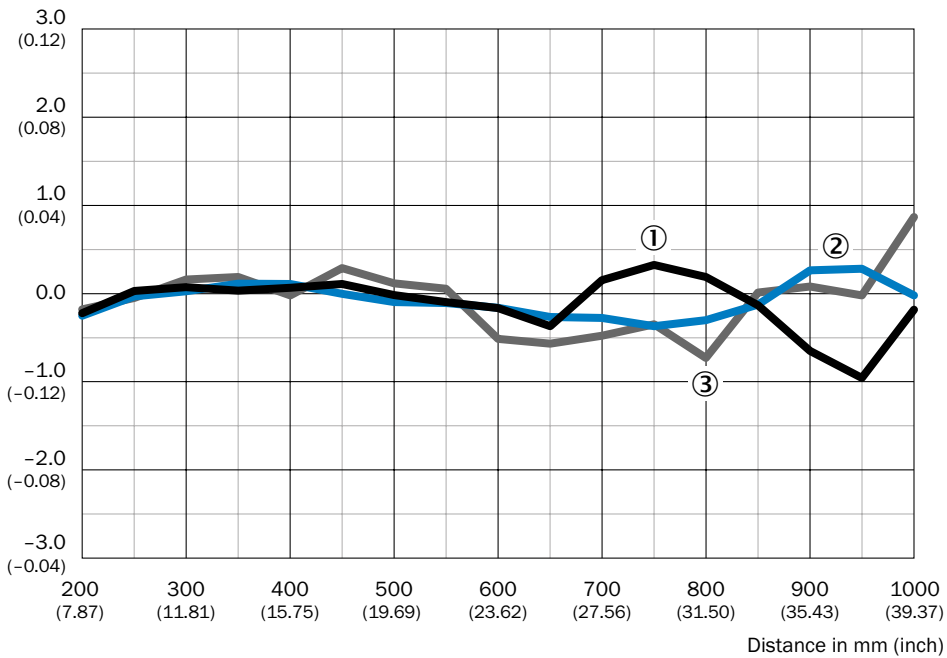
Dimensional drawing (Dimensions in mm (inch))



- ① Zero level
- ② Mounting hole M4
- ③ Ventilation opening (do not cover)
- ④ Center of optical axis, receiver
- ⑤ Center of optical axis, sender
- ⑥ PWR LED green
- ⑦ LED Q1, yellow
- ⑧ LED Q2, yellow
- ⑨ Operating elements

Linearity

Typical linearity deviation in mm (inch)




- ① Black 6 % remission
- ② White 90 % remission
- ③ Stainless steel




Recommended accessories

Mounting systems

Mounting brackets and plates


	Brief description	Part no.
 Illustration may differ	Stainless-steel mounting bracket	4089813

Terminal and alignment brackets




	Brief description	Part no.
 Illustration may differ	Galvanized steel alignment bracket with mounting accessories	2087355
	Double clamp bracket for dovetail mounting	2013947
	Clamping block for dovetail mounting	2013285

## Connection systems

### Modules and gateways

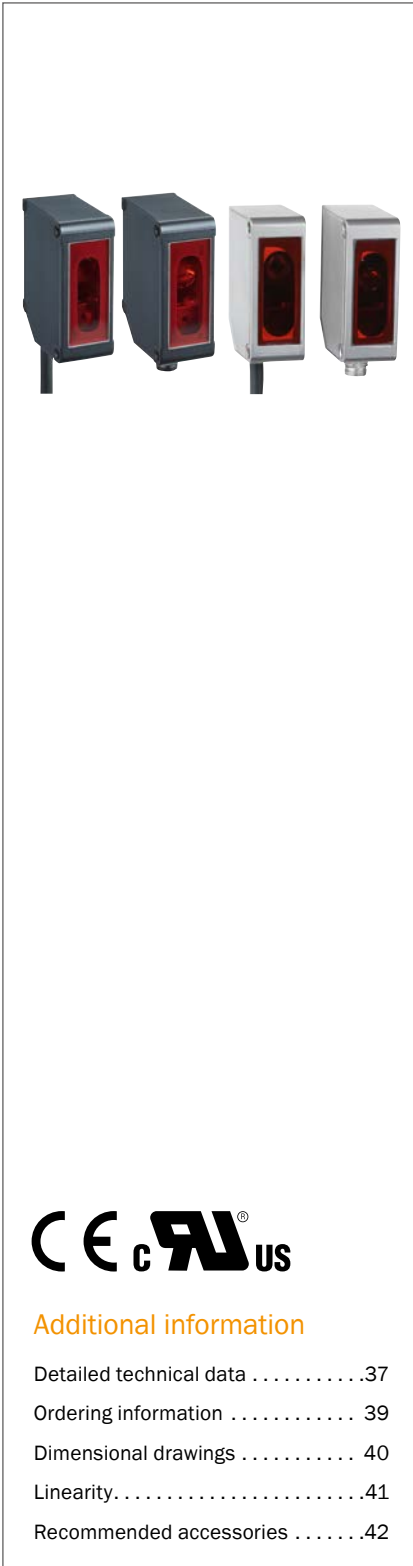
	Type	Part no.
	IOLA2US-01101 (SiLink2 Master)	1061790

### Plug connectors and cables

	Connection type head A	Connection type head B	Cable	Cable length	Part no.
	Female connector, M12, 5-pin, straight, A-coded	Open cable ends	PVC, Sensor/actuator cable, unshielded	2 m	2096239
				5 m	2096240
	Female connector, M12, 5-pin, straight, A-coded	Open cable ends	PUR, halogen-free, Sensor/actuator cable, shielded	1.5 m	2095833
				3 m	2095834
	Female connector, M12, 5-pin, straight, A-coded	Male connector, M12, 5-pin, straight, A-coded	PUR, halogen-free, Sensor/actuator cable, unshielded	0.6 m	2096006

For more accessories, see → [www.sick.com/OD1000](http://www.sick.com/OD1000)

# COMPACT, LIGHTWEIGHT SENSOR FOR PRECISE MEASUREMENT



## Product description

Simple, precise, and economic solutions for measuring tasks; the OD Mini displacement measurement sensors are impressive with their compact and rugged housing, which is available in a lightweight aluminum or a rugged stainless steel. These sensors are equipped with the latest CMOS receiver technology for precise measurement, regardless of the brightness and color of the surface material. The integrated amplifier unit enables the OD Mini to work on a stand-alone basis. For complex measurement

tasks up to two OD Mini Pro sensor heads can be connected to one OD Mini evaluation unit and calculate together. The OD Mini is simple to configure due to its intuitive design and display with four status LEDs. The OD Mini can also be remotely programmed via the external teaching input. The large number of available interfaces also simplifies integration into industrial networks. This ensures the highest possible reliability and precision when solving a wide range of measurement tasks.

## At a glance

- Compact, rugged housing
- Stand-alone use or in combination with the OD Mini evaluation unit
- Display and LEDs on device for visualization of current status
- Different interfaces available
- Simple teach-in using display or external teaching input
- CMOS receiver unit for precise, fast measurement in the  $\mu\text{m}$  range
- Various measuring ranges: Measuring from 10 mm to 250 mm possible

## Your benefits

- Cost-saving commissioning through simple operating concept and display
- Small installation size and low weight also allow use in highly dynamic applications
- Calculation of two sensorheads - easy possible over the external evaluation unit
- High machine throughput thanks to reliable measurement, regardless of brightness and color of surface
- The wide range of available interfaces enables simple integration into industrial networks
- Optimum performance even at high production speeds

→ [www.sick.com/OD\\_Mini](http://www.sick.com/OD_Mini)

For more information, simply enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.





Detailed technical data

Performance

	OD Mini Core	OD Mini Prime	OD Mini Pro
<b>Repeatability</b> <sup>1) 3)</sup>			
10 mm ... 20 mm	–	1 µm	
20 mm ... 50 mm	20 µm <sup>2)</sup>	6 µm	
50 mm ... 150 mm	–	20 µm	
50 mm ... 250 mm	200 µm <sup>4)</sup>	–	
<b>Linearity</b> <sup>5) 6)</sup>			
10 mm ... 20 mm	–	± 10 µm	
20 mm ... 50 mm	–	± 30 µm	
50 mm ... 150 mm	–	± 100 µm	
<b>Response time</b> <sup>7)</sup>	≥ 2 ms		
<b>Measuring frequency</b>	≤ 2 kHz		
<b>Light source</b>	Laser, red		
<b>Laser class</b> <sup>8)</sup>			
10 mm ... 20 mm	–	1 (IEC 60825-1:2014, EN 60825-1:2014)	
20 mm ... 50 mm	1 (IEC 60825-1:2014, EN 60825-1:2014)		
50 mm ... 150 mm	–	1 (IEC 60825-1:2014, EN 60825-1:2014)	
50 mm ... 250 mm	2 (IEC 60825-1:2014, EN 60825-1:2014)		
<b>Typ. light spot size (distance)</b>			
10 mm ... 20 mm	–	700 µm x 500 µm (15 mm)	
20 mm ... 50 mm	1.6 mm x 1 mm (35 mm)		800 µm x 450 µm (35 mm)
50 mm ... 150 mm	–	700 µm x 600 µm (100 mm)	
50 mm ... 250 mm	2 mm x 1.3 mm (150 mm)		
<b>Additional function</b>	Averaging 1 ... 512x, automatic or manual sensitivity adjustment, Switching outputs can be taught in, Invertable switching output, switching mode: window (Wnd), switching mode: distance to object (DtO), switching mode: object between sensor and background (ObSB), multifunctional input: laser-off / external teach-in / trigger	Averaging 1 ... 512x, automatic or manual sensitivity adjustment, Analog outputs can be taught in, Switching outputs can be taught in, Invertable switching output, switching mode: window (Wnd), switching mode: distance to object (DtO), switching mode: object between sensor and background (ObSB), multifunctional input: laser-off / external teach-in / trigger	Averaging 1 ... 512x, automatic or manual sensitivity adjustment, switching mode: window (Wnd), switching mode: distance to object (DtO), switching mode: object between sensor and background (ObSB), multifunctional input: laser-off / external teach-in / trigger

<sup>1)</sup> Averaging function set to: 512.

<sup>2)</sup> Hysteresis 0.08 mm.

<sup>3)</sup> Constant ambient conditions.

<sup>4)</sup> Hysteresis 0.8 mm.

<sup>5)</sup> Measurement on 90 % remission (ceramic, white).

<sup>6)</sup> For best performance consider warm up time ≤ 5 minutes.

<sup>7)</sup> With fixed sensitivity adjustment and averaging setting = 1. With automatic sensitivity and measuring rate 500 µs: 2 ... 7.5 ms response time/measuring rate 1,000 µs: 4 ... 15 ms response time.

<sup>8)</sup> Wavelength: 655 nm, max. output: 390 µW (laser class 1) / < 1 mW (laser class 2).

Interfaces

	OD Mini Core	OD Mini Prime	OD Mini Pro
Serial			✓, RS-485
PROFIBUS DP Type of fieldbus integration	-		✓ Optional, over external evaluation unit AOD1 and Gateway WI180C-PB
Analog output		1 x 4 mA ... 20 mA (≤ 300 Ω) / 1 x 0 V ... 10 V (> 10 kΩ) (depending on type)	1 x 4 mA ... 20 mA (≤ 300 Ω) <sup>1)</sup>

<sup>1)</sup> Optional over evaluation unit AOD1.

Mechanics/electronics

	OD Mini Core	OD Mini Prime	OD Mini Pro
Supply voltage $V_s$	DC 12 V (-5 %) ... DC 24 V (+10 %)		
Power consumption <sup>1)</sup>	≤ 1.92 W		
Warm-up time	≤ 5 min		
Window material	PPSU		
Indication	4-digit 7-segment display (plus 4 LEDs for status display)		
Operating elements	4 buttons		
Weight	Aluminum 40 g		-
	Stainless steel -	70 g	
Dimensions	44.4 mm x 31 mm x 17 mm		
Enclosure rating	IP67		
Protection class	III		

<sup>1)</sup> Without load, with current output.

Ambient data

Ambient temperature operation	-10 °C ... +40 °C
Ambient storage temperature	-20 °C ... +60 °C
Min. rel. humidity (not condensing)	35 %
Max. rel. humidity (not condensing)	95 %
Temperature drift	± 0.08 % FS/K (FS = Full Scale = Measuring range of sensor)
Typ. Ambient light immunity	Artificial light: ≤ 3,000 lx Sunlight: ≤ 10,000 lx
Vibration resistance	10 Hz ... 55 Hz (amplitude 1.5 mm, x-, y-, z-axis 2 hours each)
Shock resistance	50 G (x, y, z axis 3 times each)

General notes

	OD Mini Core	OD Mini Prime	OD Mini Pro
Note on use	-		The sensor head can be used with evaluation unit AOD1 or stand-alone via RS-485
Note	Not free of paint wetting impairment substances.		

## Ordering information

Other models → [www.sick.com/OD\\_Mini](http://www.sick.com/OD_Mini)

- **Sub product family:** OD Mini Core
- **Housing material:** Aluminum
- **Multifunctional input (MF):** 1 x (MF can be used as laser-off, trigger, external teach-in or deactivated.)
- **Switching output:** 1 x PNP/NPN, selectable

Measuring range	Connection type	Type	Part no.
20 mm ... 50 mm	Cable with male connector M12, 5-pin 30 cm	OD1-B035C15Q15	6052309
	Male connector M8, 4-pin	OD1-B035C15Q14	6052308
50 mm ... 250 mm	Cable with male connector M12, 5-pin 30 cm	OD1-B150FOAQ15	6052327
	Male connector M8, 4-pin	OD1-B150FOAQ14	6052326

- **Sub product family:** OD Mini Prime
- **Multifunctional input (MF):** 1 x (MF can be used as laser-off, trigger, external teach-in or deactivated.)

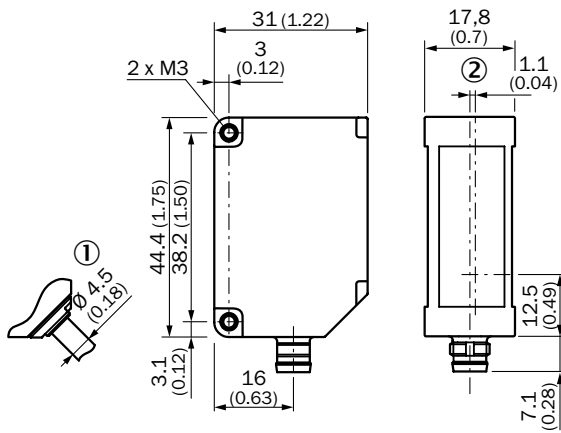
Housing material	Measuring range	Analog output	Connection type	Switching output	Type	Part no.
Aluminum	10 mm ... 20 mm	1 x 4 mA ... 20 mA ( $\leq 300 \Omega$ )	Cable with male connector M12, 5-pin 30 cm	1 x PNP/NPN, selectable	OD1-B015C05I25	6050520
			Male connector M8, 4-pin	-	OD1-B015C05I14	6050519
	20 mm ... 50 mm	1 x 4 mA ... 20 mA ( $\leq 300 \Omega$ )	Cable with male connector M12, 5-pin 30 cm	1 x PNP/NPN, selectable	OD1-B035C15I25	6050524
			Male connector M8, 4-pin	-	OD1-B035C15I14	6050523
	50 mm ... 150 mm	1 x 4 mA ... 20 mA ( $\leq 300 \Omega$ )	Cable with male connector M12, 5-pin 30 cm	1 x PNP/NPN, selectable	OD1-B100C50I25	6050528
			Male connector M8, 4-pin	-	OD1-B100C50I14	6050527
Stainless steel	10 mm ... 20 mm	1 x 4 mA ... 20 mA ( $\leq 300 \Omega$ )	Cable with male connector M12, 5-pin 30 cm	1 x PNP/NPN, selectable	OD1-B015H05I25	6050496
	20 mm ... 50 mm	1 x 0 V ... 10 V ( $> 10 \text{ k}\Omega$ )		1 x PNP/NPN, selectable	OD1-B035H15I25	6050506
		1 x 4 mA ... 20 mA ( $\leq 300 \Omega$ )		1 x PNP/NPN, selectable	OD1-B035H15I25	6050504
	50 mm ... 150 mm	1 x 0 V ... 10 V ( $> 10 \text{ k}\Omega$ )		1 x PNP/NPN, selectable	OD1-B100H50I25	6050514
			Male connector M8, 4-pin	-	OD1-B100H50I14	6050513
		1 x 4 mA ... 20 mA ( $\leq 300 \Omega$ )	Cable with male connector M12, 5-pin 30 cm	1 x PNP/NPN, selectable	OD1-B100H50I25	6050512
			Male connector M8, 4-pin	-	OD1-B100H50I14	6050511

- **Sub product family:** OD Mini Pro
- **Housing material:** stainless steel
- **Communication interface:** Serial (RS-485), PROFIBUS DP
- **Analog output:** 1 x 4 mA ... 20 mA ( $\leq 300 \Omega$ ) (Optional over evaluation unit AOD1)
- **Connection type:** cable with male connector M12, 5-pin 30 cm
- **Switching output:** 1 x PNP/NPN, selectable (Optional over evaluation unit AOD1),  
2 x PNP/NPN, selectable (Optional over evaluation unit AOD1),  
3 x PNP/NPN, selectable (Optional over evaluation unit AOD1)

Measuring range	Type	Part no.
10 mm ... 20 mm	OD1-B015H05A15	6054082
20 mm ... 50 mm	OD1-B035H15A15	6054083
50 mm ... 150 mm	OD1-B100H50A15	6054084

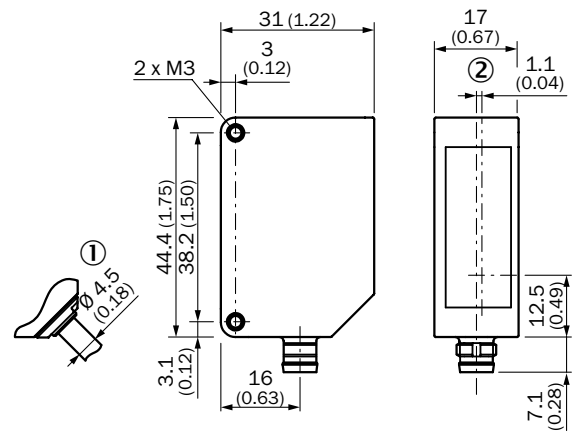
## Dimensional drawings (Dimensions in mm (inch))

### Aluminum housing



- ① Variant with 30 cm cable with M12, 5-pin connector
- ② Optical axis

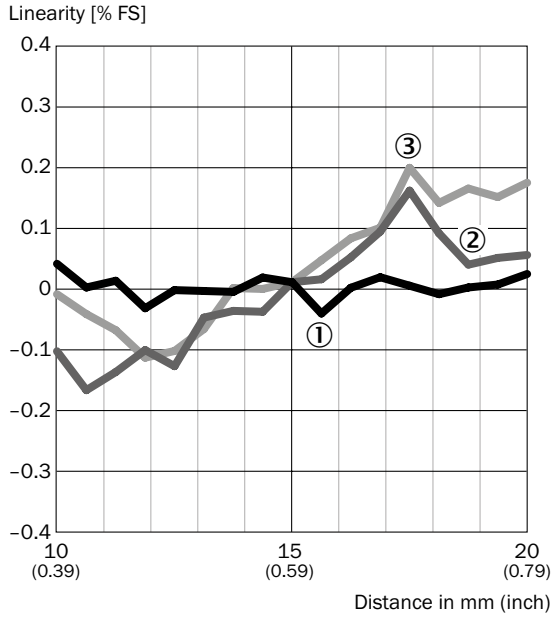
### Stainless steel housing



- ① Variant with 30 cm cable with M12, 5-pin connector
- ② Optical axis

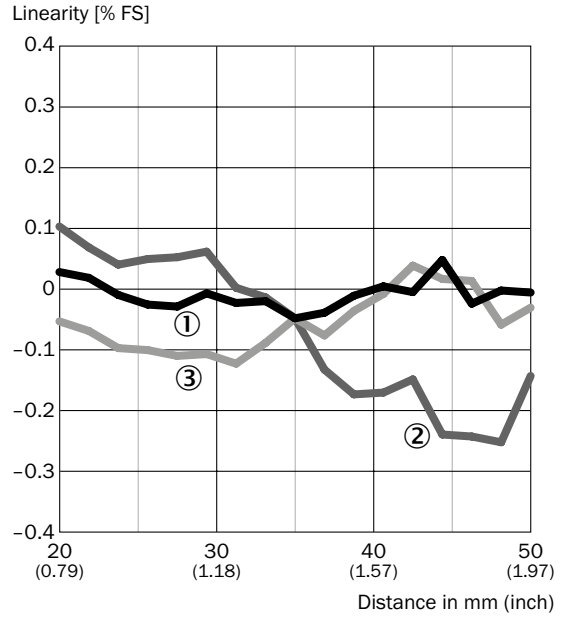
**Linearity**

OD Mini Prime 10 mm ... 20 mm



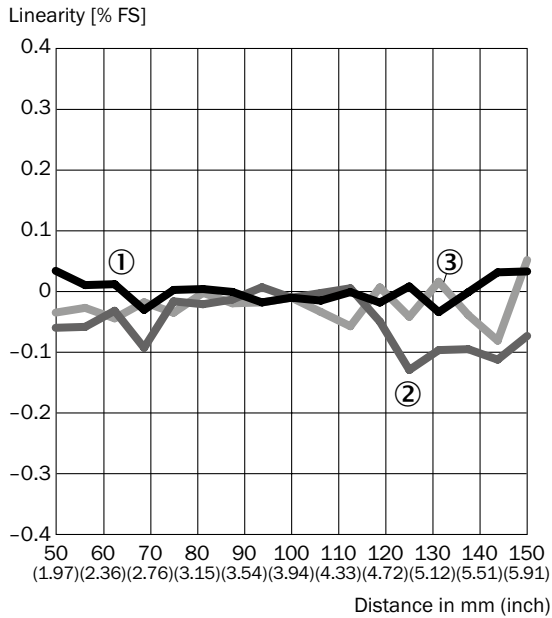
- ① White ceramic
- ② Stainless steel
- ③ Black rubber

OD Mini Prime 20 mm ... 50 mm



- ① White ceramic
- ② Stainless steel
- ③ Black rubber

OD Mini Prime 50 mm ... 150 mm





- ① White ceramic
- ② Stainless steel
- ③ Black rubber

Recommended accessories


Mounting systems

Mounting brackets and plates








	Brief description	Part no.	OD Mini Core male connector	OD Mini Core cable with male connector	OD Mini Prime cable with male connector	OD Mini Prime male connector	OD Mini Pro cable with male connector
	Mounting bracket, for wall installation, no alignment bracket	5328343	-	●	●	-	-
	Mounting bracket, no alignment bracket	5328344	●	●	●	●	●

Connection systems

Modules and gateways

	Switching output	Analog output	System part	Connection type	Type	Part no.	OD Mini Core male connector	OD Mini Core cable with male connector	OD Mini Prime cable with male connector	OD Mini Prime male connector	OD Mini Pro cable with male connector
	1 x PNP/NPN, selectable	-	Master	Male connector, M8, 4-pin	AOD1-MR24Q1	6054270	-	-	-	-	●
	2 x PNP/NPN, selectable	-	Master	Male connector, M12, 5-pin	AOD1-MR25Q2	6054272	-	-	-	-	●
	3 x PNP/NPN, selectable	1 x 4 mA ... 20 mA ( $\leq$ 300 $\Omega$ )	Master	Flying leads	AOD1-MR27C4	6058195	-	-	-	-	●
	1 x PNP/NPN, selectable	-	Slave	Male connector, M8, 4-pin	AOD1-SR24Q1	6054271	-	-	-	-	●
	2 x PNP/NPN, selectable	-	Slave	Male connector, M12, 5-pin	AOD1-SR25Q2	6054273	-	-	-	-	●
	3 x PNP/NPN, selectable	1 x 4 mA ... 20 mA ( $\leq$ 300 $\Omega$ )	Slave	Flying leads	AOD1-SR27C4	6058196	-	-	-	-	●

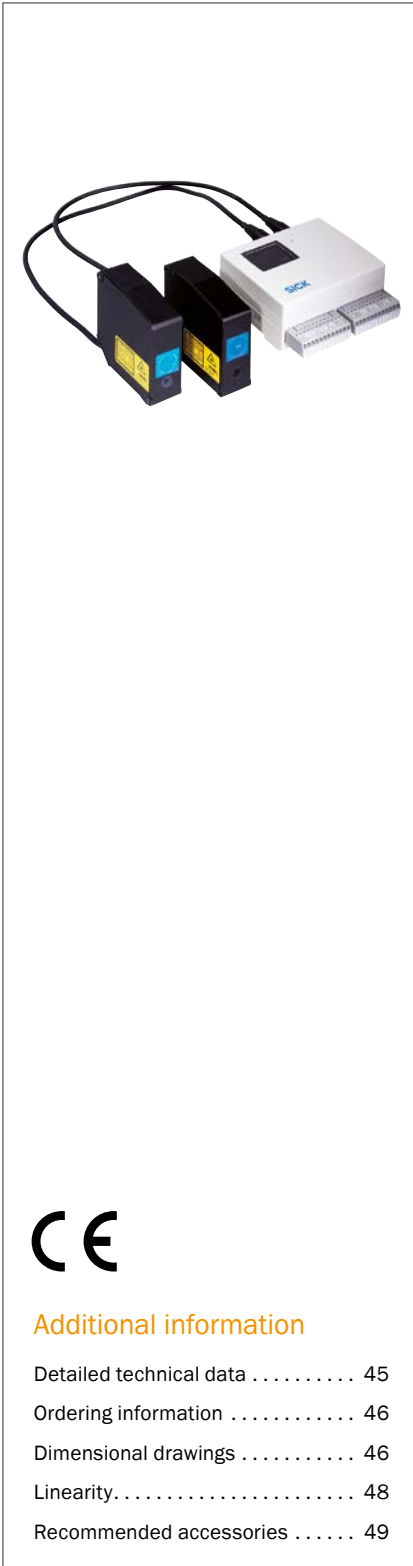
Plug connectors and cables

	Connection type head A	Connection type head B	Cable	Cable length	Part no.	OD Mini Core male connector	OD Mini Core cable with male connector	OD Mini Prime cable with male connector	OD Mini Prime male connector	OD Mini Pro cable with male connector
	Female connector, M8, 4-pin, straight	Male connector, M8, 4-pin, straight	PUR	2 m	6059742	●	-	-	●	-
	Female connector, M12, 4-pin, straight	Male connector, M8, 4-pin	PUR, Highly flexible	2 m	6059743	-	●	●	-	●
	Female connector, M12, 4-pin, straight, A-coded	Male connector, M8, 4-pin, straight, A-coded	PUR, halogen-free, Sensor/actuator cable, unshielded	2 m	2096112	-	●	●	-	●
	Female connector, M12, 5-pin, straight, A-coded	Open cable ends	PUR, halogen-free, Sensor/actuator cable, unshielded	2 m	2095617	-	●	●	-	●
	Female connector, M8, 4-pin, straight, A-coded	Male connector, M8, 4-pin, straight, A-coded	PUR, halogen-free, Sensor/actuator cable, unshielded	2 m	2096347	●	-	-	●	-
		Open cable ends		2 m	2094791	●	-	-	●	-
	Female connector, M8, 4-pin, angled, A-coded	Open cable ends	PUR, halogen-free, Sensor/actuator cable, unshielded	2 m	2095589	●	-	-	●	-

For more accessories, see → [www.sick.com/OD\\_Mini](http://www.sick.com/OD_Mini)



## TWO SENSORS IN ONE EVALUATION UNIT: VERY ACCURATE MEASURING AND CALCULATION



### Product description

The OD Max is a highly accurate optical measuring system that is able to connect two separate sensors into one common controller. This sensing solution makes it possible to easily calculate two measurement results. Different measurements can be used to deter-

mine properties, such as the thickness or height difference of an object, even if its absolute position is fluctuating. With its high precision and speed, the OD Max is the ideal solution for challenging measurement applications.

### At a glance

- Several measurement ranges from 24 ... 26 mm up to 250 mm ... 450 mm
- CMOS receiving element for measurement independent of surface
- High measurement frequency and high linearity
- Variety of selectable integrated calculations based on values from two sensors
- Laser technology for precise measurement or detection of very small objects
- Several output options

### Your benefits

- Minimum machine downtimes due to the impressive reliability of the measuring system on any surface
- Highly accurate measurement, even during the production process, ensures high product quality
- High measuring frequency of 10 kHz increases processing speeds and reduces cycle times
- Reference measurement helps negate the need for cost-intensive adjustments to the production process
- Comparatively low investment costs for challenging measuring tasks
- Easy and cost-effective commissioning and servicing due to clear LCD display
- Reduced material costs due to the use of distance sensors to control production processes that have an impact on costs



### Additional information

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→ [www.sick.com/OD\\_Max](http://www.sick.com/OD_Max)

For more information, simply enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.



## Detailed technical data

## Performance

<b>Repeatability</b> <sup>1)</sup>	24 mm ... 26 mm	0.1 µm
	25 mm ... 35 mm	1 µm
	65 mm ... 105 mm	5 µm
	250 mm ... 450 mm	50 µm
<b>Linearity</b> <sup>1)</sup>	24 mm ... 26 mm	± 2 µm
	25 mm ... 35 mm	± 10 µm
	65 mm ... 105 mm	± 40 µm
	250 mm ... 450 mm	± 200 µm
<b>Response time</b> <sup>2)</sup>		≥ 0.5 ms
<b>Measuring frequency</b>		≤ 10 kHz
<b>Light source</b>		Laser, red
<b>Typ. light spot size (distance)</b>	24 mm ... 26 mm	25 µm x 35 µm (25 mm)
	25 mm ... 35 mm	30 µm x 100 µm (30 mm)
	65 mm ... 105 mm	70 µm x 290 µm (85 mm)
	250 mm ... 450 mm	300 µm x 700 µm (350 mm)

<sup>1)</sup> Measurement on 90 % remission (ceramic, white), for OD25-x measurement on mirror; averaging set to: 256; constant ambient conditions.

<sup>2)</sup> Dependent on the set average or sensitivity.

## Interfaces

<b>Serial</b>	✓, RS-232
Type of fieldbus integration	Over evaluation unit AOD
<b>Analog output</b> <sup>1)</sup>	2 x 4 mA ... 20 mA (≤ 300 Ω)
<b>Switching output</b> <sup>1)</sup>	5 x PNP (100 mA)
	5 x NPN (100 mA)

<sup>1)</sup> Over evaluation unit AOD.

## Mechanics/electronics

<b>Warm-up time</b>	≤ 5 min
<b>Housing material</b>	Aluminum
<b>Window material</b>	Glass
<b>Connection type</b> <sup>1) 2)</sup>	0.5 m cable with connector
<b>Indication</b>	LEDs, 1.4" color display on evaluation unit
<b>Weight</b> <sup>3)</sup>	250 g
<b>Enclosure rating</b>	IP67
<b>Protection class</b>	III

<sup>1)</sup> Can be extended to up to 10 m with extension cable.

<sup>2)</sup> Sensor must be connected to controller unit.

<sup>3)</sup> Includes 0.5 m cable.

## Ambient data

<b>Ambient temperature operation</b>	-10 °C ... +45 °C
<b>Ambient storage temperature</b>	-20 °C ... +60 °C
<b>Relative air humidity (non-condensing)</b>	35 % ... 85 %

<b>Temperature drift</b>	± 0.01 % FS/K (FS = Full Scale = Measuring range of sensor)
<b>Typ. Ambient light immunity</b>	Artificial light: ≤ 3,000 lx Sunlight: ≤ 10,000 lx
<b>Vibration resistance</b>	10 Hz ... 55 Hz (amplitude 1.5 mm, x-, y-, z-axis 2 hours each)
<b>Shock resistance</b>	50 G (x, y, z axis 3 times each)

## General notes

<b>Note on use</b>	OD Max sensor head OD25-x is only to be used with AODG-P/N1; All other types (OD350-x, OD85-x, OD30-x) are to be used with AOD-P/N1
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## Ordering information

Other models → [www.sick.com/OD\\_Max](http://www.sick.com/OD_Max)

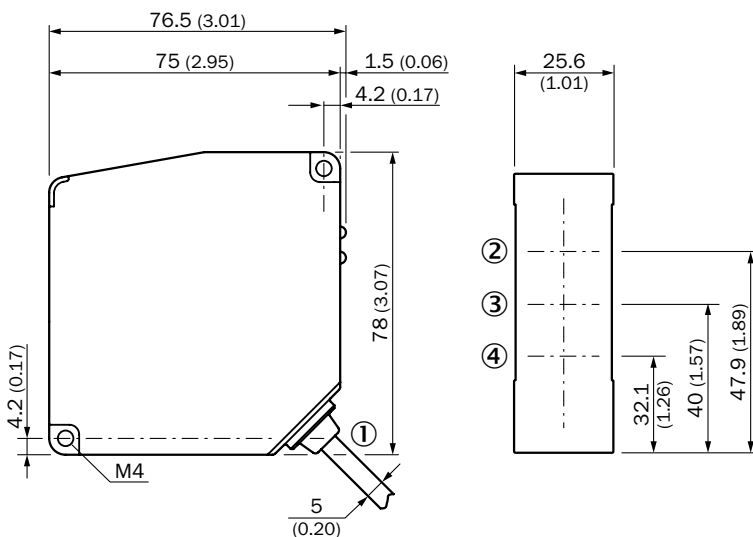
Measuring range <sup>1)</sup>	Laser class <sup>2)</sup>	Type	Part no.
24 mm ... 26 mm	1 (IEC 60825-1:2014, EN 60825-1:2014)	OD-25-01T1	6030977
25 mm ... 35 mm	2 (IEC 60825-1:2014, EN 60825-1:2014)	OD30-05T1	6028959
65 mm ... 105 mm	2 (IEC 60825-1:2014, EN 60825-1:2014)	OD85-20T1	6028958
250 mm ... 450 mm	2 (IEC 60825-1:2014, EN 60825-1:2014)	OD350-100T1	6028957

<sup>1)</sup> 6 % ... 90 % remission.

<sup>2)</sup> Wavelength: 650 nm, max. output: 390 µW (laser class 1) / 1 mW (laser class 2).

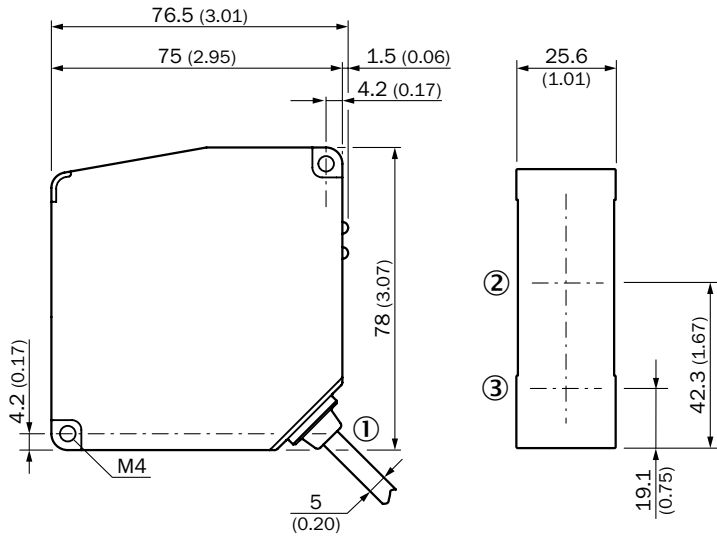
## Dimensional drawings (Dimensions in mm (inch))

### OD25-01T1



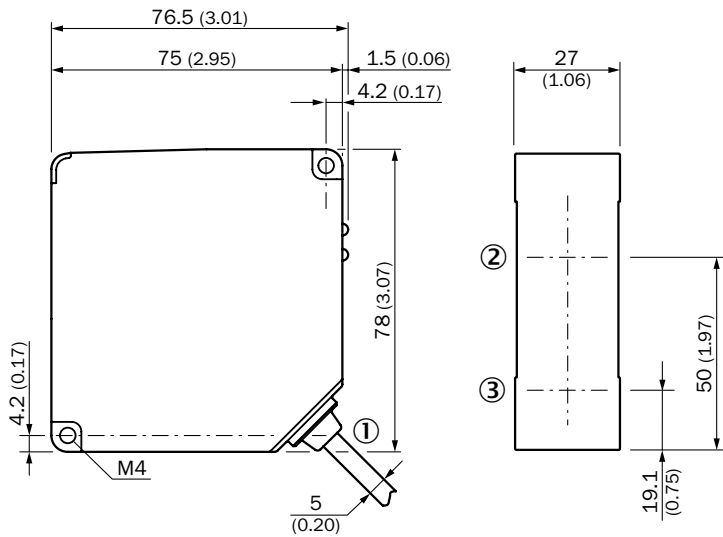
- ① Cable Ø 5 mm, 0.5 m with connector, 10-pin
- ② Optical axis, light spot (at 25 mm due to V-Optics with 17.5°)
- ③ Optical axis sender
- ④ Optical axis receiver

OD30-05T1, OD85-20T1



- ① Cable  $\varnothing$  5 mm, 0.5 m with connector, 10-pin
- ② Optical axis receiver
- ③ Optical axis sender

OD350-100T1

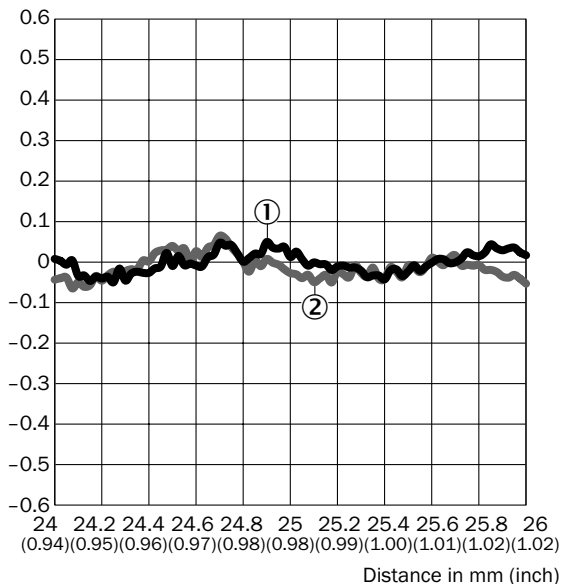


- ① Cable  $\varnothing$  5 mm, 0.5 m with connector, 10-pin
- ② Optical axis receiver
- ③ Optical axis sender

Linearity

OD25-01T1

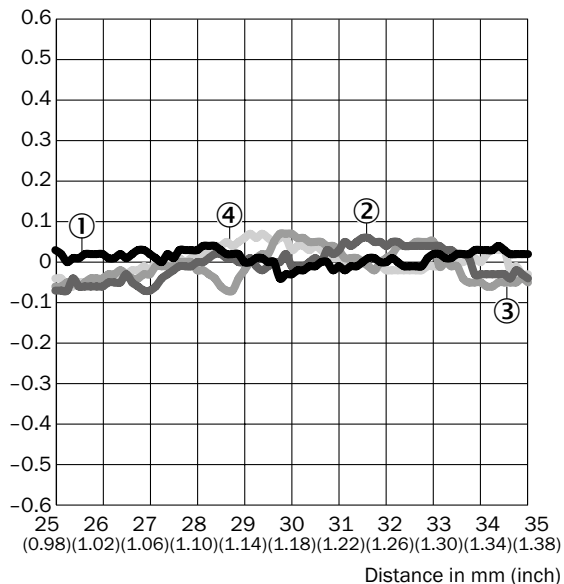
Linearity [% FS]



- ① Mirror (SENS = min)
- ② Glass (SENS = 8)

OD30-05T1

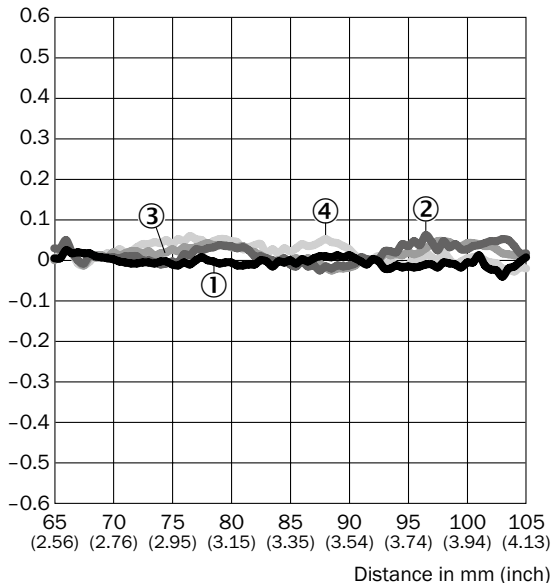
Linearity [% FS]



- ① White ceramic
- ② Gray ceramic
- ③ Aluminum
- ④ Black rubber

OD85-20T1

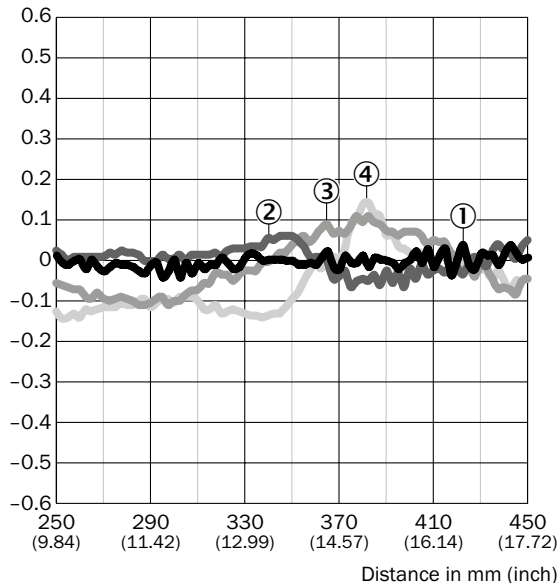
Linearity [% FS]



- ① White ceramic
- ② Gray ceramic
- ③ Aluminum
- ④ Black rubber

OD350-100T1

Linearity [% FS]




- ① White ceramic
- ② Gray ceramic
- ③ Aluminum
- ④ Black rubber


## Recommended accessories

### Connection systems

#### Adapters and distributors

	Cable	Part no.	OD25-01T1	OD30-05T1	OD85-20T1	OD350-100T1
	Terminal block for AOD (1x R-coded & 1x L-coded)	6033129	●	●	●	●


#### Modules and gateways

	Switching output <sup>1)</sup>	Analog output <sup>2)</sup>	Connection type	Type	Part no.	OD25-01T1	OD30-05T1	OD85-20T1	OD350-100T1
	5 x NPN (100 mA)	2 x 4 mA ... 20 mA (≤ 300 Ω)	Terminal board	AOD-N1	6028961	-	●	●	●
	5 x PNP (100 mA)	2 x 4 mA ... 20 mA (≤ 300 Ω)	Terminal board	AOD-P1	6028960	-	●	●	●
	5 x NPN (100 mA)	2 x 4 mA ... 20 mA (≤ 300 Ω)	Terminal board	AODG-N1	6030979	●	-	-	-
	5 x PNP (100 mA)	2 x 4 mA ... 20 mA (≤ 300 Ω)	Terminal board	AODG-P1	6030978	●	-	-	-

<sup>1)</sup> PNP: HIGH = V<sub>s</sub> - (< 2 V) / LOW = < 2 V; NPN: HIGH = < 2 V / LOW = V<sub>s</sub>.

<sup>2)</sup> Source of analog output is either sensor heads, or calculation result.

#### Plug connectors and cables

	Connection type head A	Connection type head B	Cable	Cable length	Part no.	OD25-01T1	OD30-05T1	OD85-20T1	OD350-100T1
	Female connector, M12, 10-pin, straight	Male connector, M12, 10-pin, straight	Unshielded	2 m	6028943	●	●	●	●
				5 m	6028944	●	●	●	●

For more accessories, see → [www.sick.com/OD\\_Max](http://www.sick.com/OD_Max)

# MEASURING EACH DIMENSION WITH HIGH PRECISION



## Product description

The OD Precision is a high accuracy, optical measuring system for measuring difficult object surfaces. In addition to glossy and dark black surfaces, it can also measure transparent and semi-transparent materials. The OD Precision is the only displacement measurement sensor that can connect three

sensors to one controller, which reduces the amount of hardware required and makes it easier to measure the x-, y- and z-axes., e.g. for measuring the evenness of surfaces. In order to reduce investment costs, the sensor can also be operated via RS-422, thus eliminating the need for a controller unit.

## At a glance

- Numerous measuring ranges from 24 mm ... 26 mm to 300 mm ... 700 mm
- CMOS receiving element for measurement independent of surface
- Maximum measurement accuracy and frequency
- Glass thickness measurement with just one sensor head
- Various light spot sizes
- Integrated calculations for up to three sensors
- Stand-alone use via RS-422

## Your benefits

- Non-contact measurement improves quality inspection during production
- Surface-independent measurement algorithms ensure minimum machine downtime, regardless of surface gloss or color
- Reduced processing times as a result of the high measuring frequency of up to 10 kHz
- Simple, cost-effective solution for challenging measuring tasks due to a variety of sensor models
- Optional stand-alone operation via RS-422 means the OD Precision offers maximum performance at lower investment costs
- High visibility LC display enables simple, cost-effective setup
- Many interfaces for simple integration into an existing production environment



## Additional information

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→ [www.sick.com/OD\\_Precision](http://www.sick.com/OD_Precision)

For more information, simply enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.





Detailed technical data

Performance

<b>Repeatability <sup>1)</sup></b>		
	24 mm ... 26 mm	0.02 µm
	25 mm ... 35 mm	0.2 µm
	65 mm ... 105 mm	1 µm
	110 mm ... 190 mm	2 µm
	250 mm ... 450 mm	5 µm
	300 mm ... 700 mm	10 µm
<b>Linearity <sup>1)</sup></b>		
	24 mm ... 26 mm	± 1.6 µm
	25 mm ... 35 mm	Diffuse ± 8 µm Reflective ± 4 µm
	65 mm ... 105 mm	Diffuse ± 20 µm Reflective ± 16 µm
	110 mm ... 190 mm	± 40 µm
	250 mm ... 450 mm	± 160 µm
	300 mm ... 700 mm	± 400 µm
<b>Response time <sup>2) 3)</sup></b>		≥ 0.1 ms
<b>Measuring frequency <sup>3) 4)</sup></b>		
	24 mm ... 26 mm	≤ 10 kHz
	25 mm ... 35 mm <sup>5)</sup>	≤ 10 kHz
	65 mm ... 105 mm <sup>6)</sup>	≤ 10 kHz
	110 mm ... 190 mm	≤ 10 kHz
	250 mm ... 450 mm	≤ 10 kHz
	300 mm ... 700 mm	≤ 1.25 kHz
<b>Light source</b>		Laser, red
<b>Special task</b>		Thickness measurement of transparent material
<b>Additional function</b>		Mean-value setting 1 ... 4,096x, selectable measuring frequency (automatic / 0.1 ms ... 3.2 ms), automatic sensitivity adjustment, manual sensitivity adjustment, Mutual interference, Glass thickness measurement

<sup>1)</sup> Measurement at 90% remission (ceramic, white), or mirror for OD5-25x; averaging set to: 256 or 4096 for OD5-25x; constant ambient conditions.

<sup>2)</sup> Time needed for automatic sensitivity adjustment is calculated as: sampling period x 20. At default setting 100 µs (10kHz) this is ≤ 2ms.

<sup>3)</sup> Default setting for OD5-350x100 and OD5-500x200 = 0.8 ms, or 1.25 kHz, all others = 0.1 ms/10 kHz.

<sup>4)</sup> 6 % ... 90 % remission; at default settings.

<sup>5)</sup> If there are reflections, the measuring range is reduced to 23.6 mm ... 28.6 mm.

<sup>6)</sup> If there are reflections, the measuring range is reduced to 72.3 mm ... 92.3 mm.

Interfaces

<b>Serial</b>		✓, RS-232, RS-422
	Type of fieldbus integration	Optional over evaluation unit AOD5
<b>Analog output <sup>1)</sup></b>		3 x 4 mA ... 20 mA (≤ 300 Ω)
<b>Switching output <sup>1)</sup></b>		5 x PNP (100 mA) 5 x NPN (100 mA)
<b>Laser-off input</b>		1 x laser-off

<sup>1)</sup> Optional over evaluation unit AOD5.

Mechanics/electronics

Supply voltage $V_s$ <sup>1)</sup>	DC 12 V ... 24 V
Warm-up time	≤ 5 min
Housing material	Aluminum
Window material	Glass
Connection type <sup>2)</sup>	0.5 m cable with connector
Indication	LEDs, 4" color display on optional evaluation unit
Weight <sup>3)</sup>	250 g
Enclosure rating	IP67
Protection class	III

<sup>1)</sup> DC 12 V (-5 %) ... DC 24 V (+10 %).

<sup>2)</sup> Can be extended to up to 50 m with extension cable.

<sup>3)</sup> Includes 0.5 m cable.

Ambient data

Ambient temperature operation	-10 °C ... +50 °C
Ambient storage temperature	-20 °C ... +60 °C
Relative air humidity (non-condensing)	35 % ... 85 %
Temperature drift	± 0.01 % FS/K (FS = Full Scale = Measuring range of sensor)
Typ. Ambient light immunity	Artificial light: ≤ 3,000 lx Sunlight: ≤ 10,000 lx
Vibration resistance	10 Hz ... 55 Hz (amplitude 1.5 mm, x-, y-, z-axis 2 hours each)
Shock resistance	50 G (x, y, z axis 3 times each)

General notes

Note on use	OD Precision sensor head can be used in combination with AOD5-P/N1 or stand-alone via RS-422 / OD Precision sensor head can be used in combination with AOD5-P/N1 or stand-alone via RS-422 / OD5-150xxx is compatible with AOD5 hardware version 1.7. and software version 4.3 (correspond with production date from Lot 1338) (depending on type)
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Ordering information

Other models → [www.sick.com/OD\\_Precision](http://www.sick.com/OD_Precision)

Measuring range <sup>1)</sup>	Laser class	Thickness measurement of transparent material	Typ. light spot size (distance)	Type	Part no.
24 mm ... 26 mm	1 (IEC 60825-1:2014, EN 60825-1:2014) <sup>2)</sup>	0.2 mm ... 2 mm	25 µm x 35 µm (25 mm)	OD5-25T01	6035975
		0.3 mm ... 2 mm	100 µm x 700 µm (25 mm)	OD5-25W01	6035976
25 mm ... 35 mm <sup>3)</sup>	2 (IEC 60825-1:2014, EN 60825-1:2014) <sup>4)</sup>	0.7 mm ... 5 mm	30 µm x 100 µm (30 mm)	OD5-30T05	6035977
		0.9 mm ... 5 mm	260 µm x 1,000 µm (30 mm)	OD5-30W05	6035978
65 mm ... 105 mm <sup>5)</sup>	2 (IEC 60825-1:2014, EN 60825-1:2014) <sup>4)</sup>	2 mm ... 20 mm	70 µm x 290 µm (85 mm)	OD5-85T20	6035979
			260 µm x 1,200 µm (85 mm)	OD5-85W20	6035980
110 mm ... 190 mm	2 (IEC 60825-1:2014, EN 60825-1:2014) <sup>4)</sup>	-	∅ 180 µm (150 mm)	OD5-150T40	6049579
			0.33 mm x 1.6 mm (150 mm)	OD5-150W40	6049580

<sup>1)</sup> 6 % ... 90 % remission; at default settings.

<sup>2)</sup> Wavelength: 650 nm, max. output: 390 µW.

<sup>3)</sup> If there are reflections, the measuring range is reduced to 23.6 mm ... 28.6 mm.

<sup>4)</sup> Wavelength: 658 nm, max. output: 1 mW.

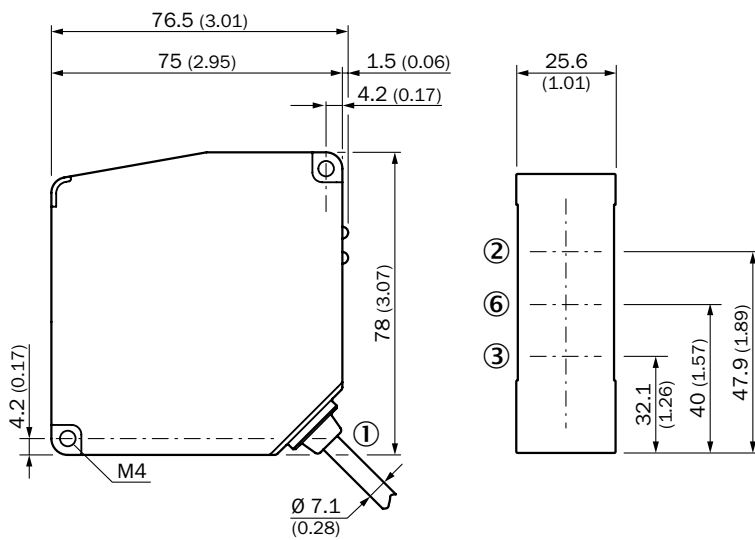
<sup>5)</sup> If there are reflections, the measuring range is reduced to 72.3 mm ... 92.3 mm.

Measuring range <sup>1)</sup>	Laser class	Thickness measurement of transparent material	Typ. light spot size (distance)	Type	Part no.
250 mm ... 450 mm	2 (IEC 60825-1:2014, EN 60825-1:2014) <sup>4)</sup>	-	700 µm x 2,400 µm (350 mm)	OD5-350W100	6035981
300 mm ... 700 mm	2 (IEC 60825-1:2014, EN 60825-1:2014) <sup>4)</sup>	-	1,000 µm x 3,700 µm (500 mm)	OD5-500W200	6035982

- <sup>1)</sup> 6 % ... 90 % remission; at default settings.
- <sup>2)</sup> Wavelength: 650 nm, max. output: 390 µW.
- <sup>3)</sup> If there are reflections, the measuring range is reduced to 23.6 mm ... 28.6 mm.
- <sup>4)</sup> Wavelength: 658 nm, max. output: 1 mW.
- <sup>5)</sup> If there are reflections, the measuring range is reduced to 72.3 mm ... 92.3 mm.

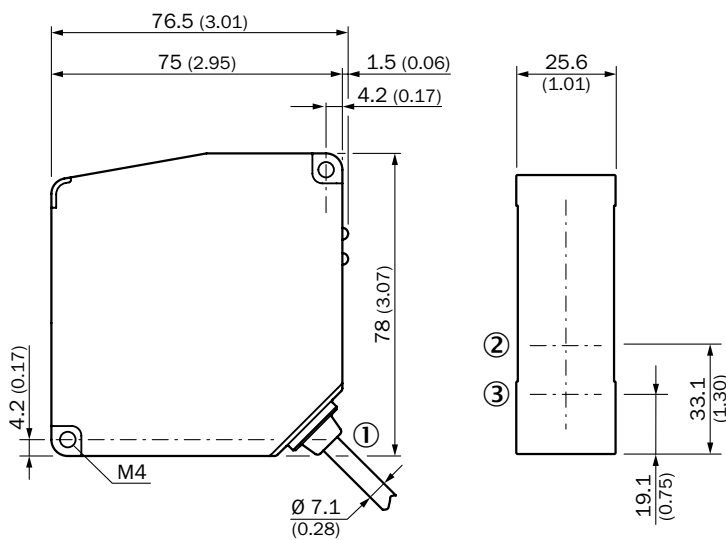
**Dimensional drawings** (Dimensions in mm (inch))

**OD5-25xxx**



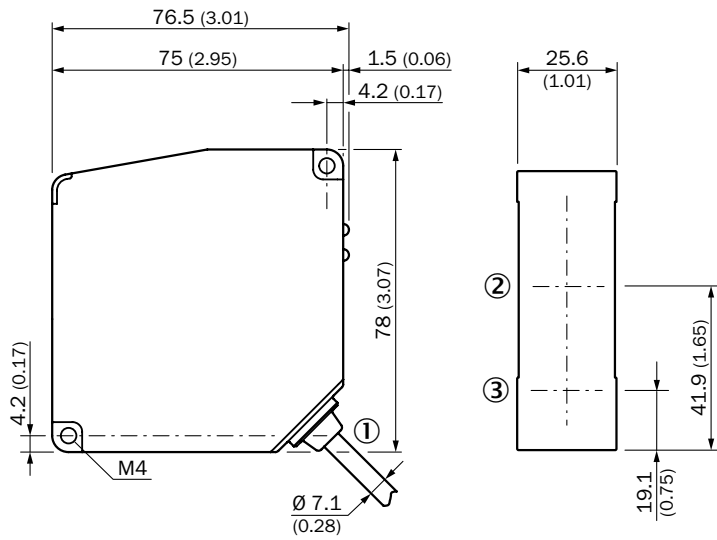
- ① Cable Ø 7.1 mm, 0.5 m with connector, 12-pin
- ② Optical axis receiver
- ③ Optical axis sender
- ⑥ Optical axis, light spot (at 25 mm due to V-Optics with 17.5°)

**OD5-30xxx**



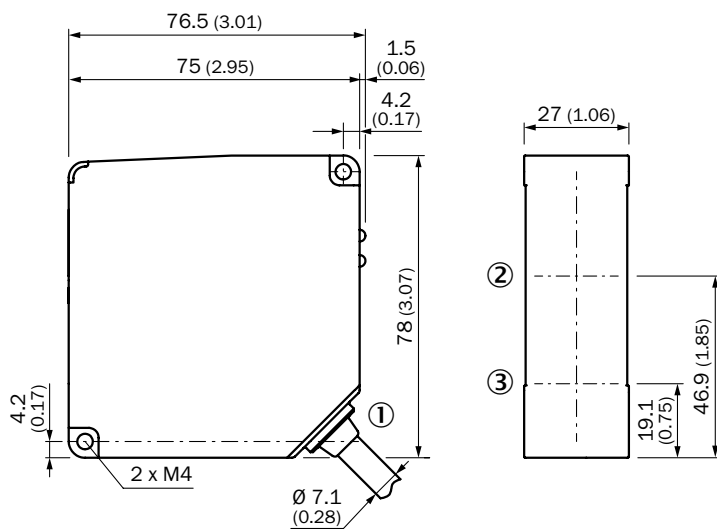
- ① Cable Ø 7.1 mm, 0.5 m with connector, 12-pin
- ② Optical axis receiver
- ③ Optical axis sender

OD5-85xxx



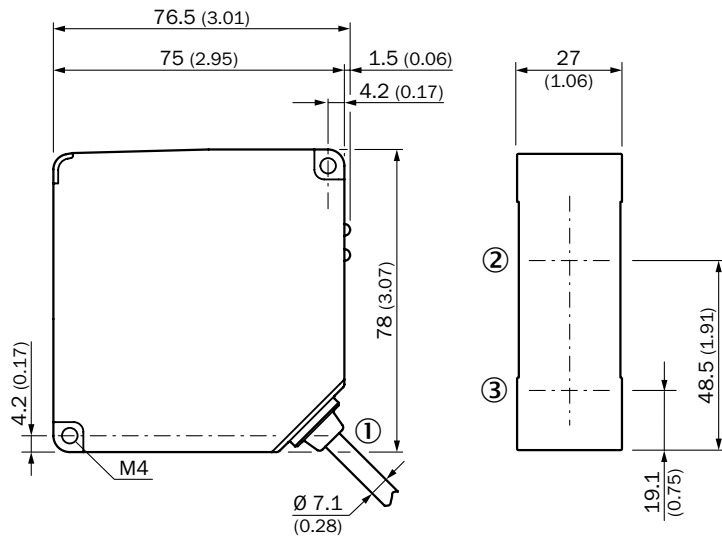
- ① Cable  $\varnothing 7.1$  mm, 0.5 m with connector, 12-pin
- ② Optical axis receiver
- ③ Optical axis sender

OD5-150xx



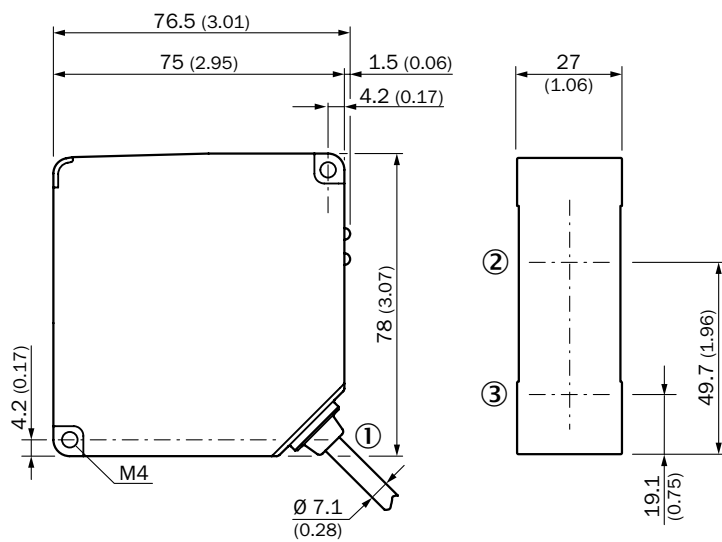
- ① Cable  $\varnothing 7.1$  mm, 0.5 m with connector, 12-pin
- ② Optical axis receiver
- ③ Optical axis sender

OD5-350xxxx



- ① Cable  $\varnothing 7.1$  mm, 0.5 m with connector, 12-pin
- ② Optical axis receiver
- ③ Optical axis sender

OD5-500xxxx

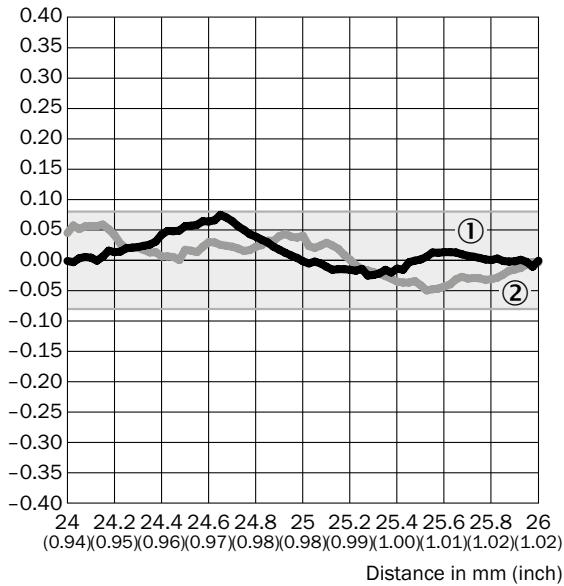


- ① Cable  $\varnothing 7.1$  mm, 0.5 m with connector, 12-pin
- ② Optical axis receiver
- ③ Optical axis sender

Linearity

OD5-25T01

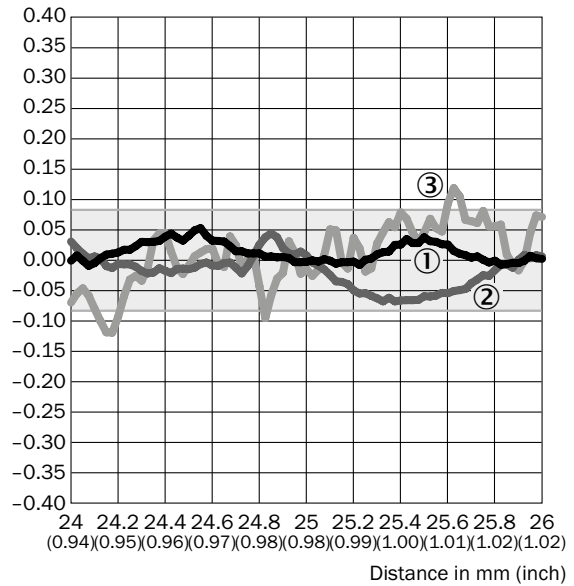
Linearity [%FS]



- ① Mirror
- ② Stone, ceramic, glass

OD5-25W01

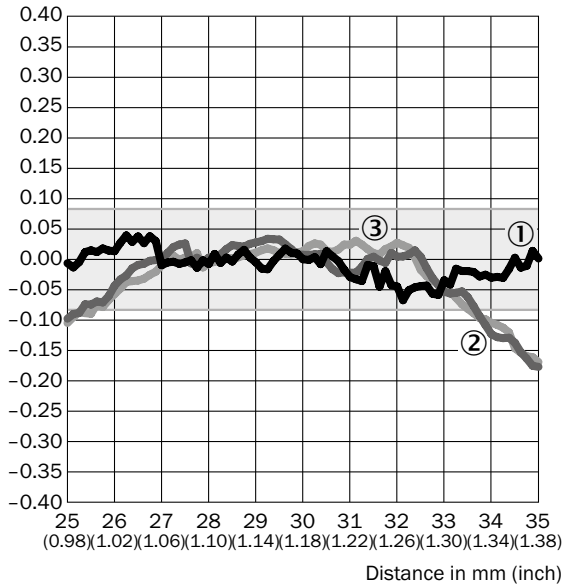
Linearity [%FS]



- ① Mirror
- ② Stone, ceramic, glass
- ③ Stainless steel

OD5-30T05

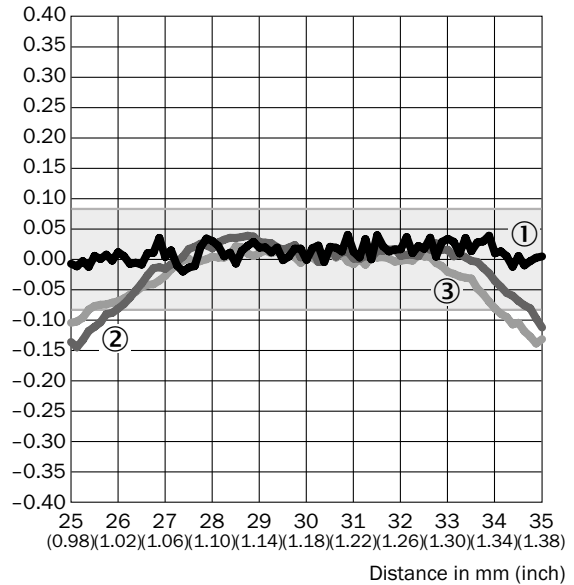
Linearity [%FS]



- ① White ceramic
- ② Stainless steel
- ③ Black rubber

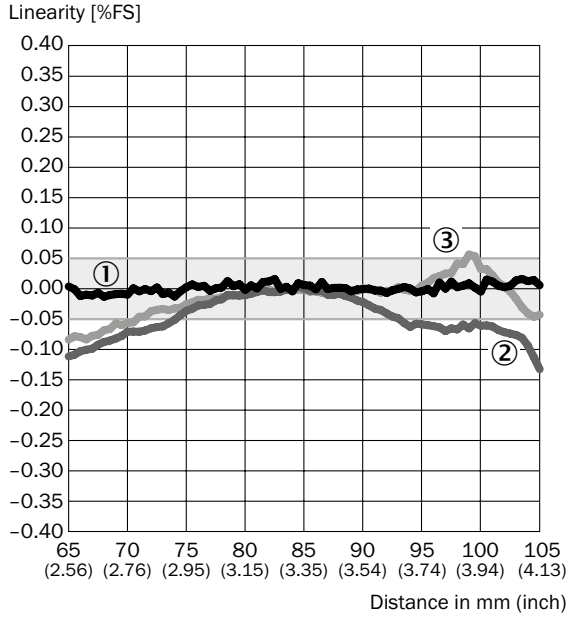
OD5-30W05

Linearity [%FS]



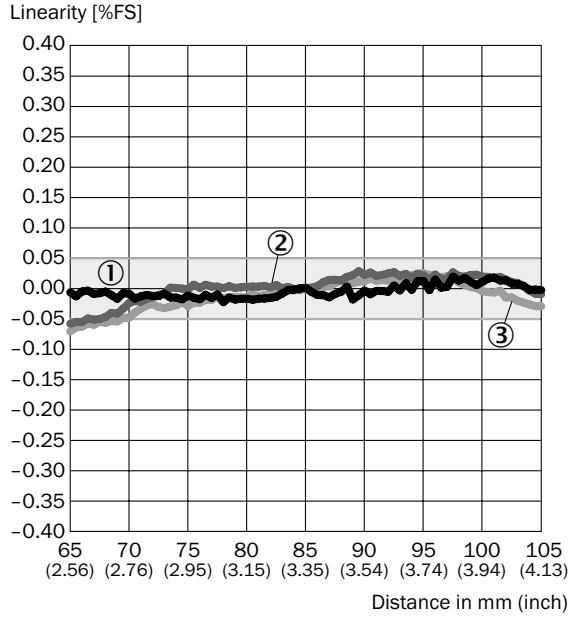
- ① White ceramic
- ② Stainless steel
- ③ Black rubber

**OD5-85T20**



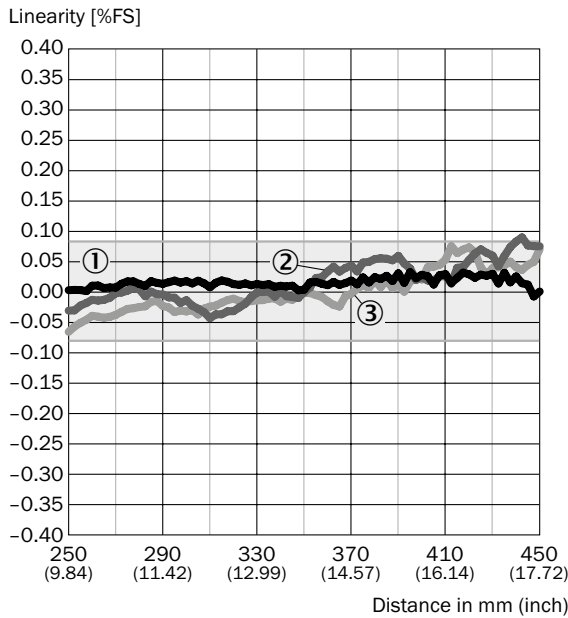
- ① White ceramic
- ② Stainless steel
- ③ Black rubber

**OD5-85W20**



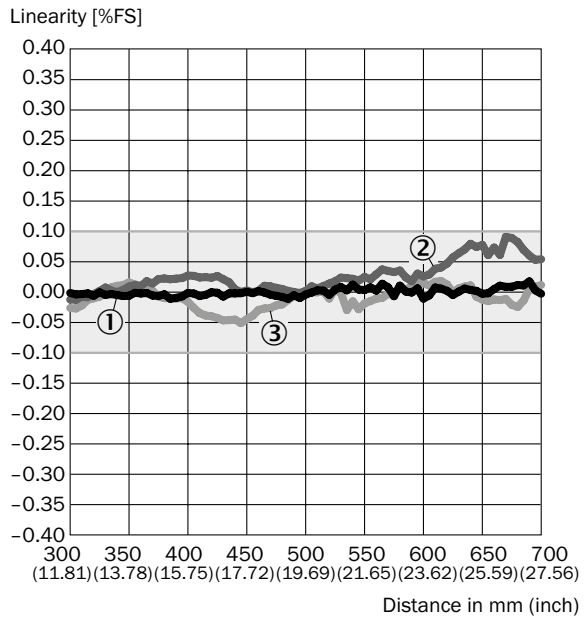
- ① White ceramic
- ② Stainless steel
- ③ Black rubber

**OD5-350W100**



- ① White ceramic
- ② Stainless steel
- ③ Black rubber

**OD5-500W200**




- ① White ceramic
- ② Stainless steel
- ③ Black rubber

Recommended accessories

Connection systems




Modules and gateways

	Switching output <sup>1) 2)</sup>	Analog output	Connection type	Type	Part no.
	5 x NPN (100 mA)	3 x 4 mA ... 20 mA (≤ 300 Ω)	-	AOD5-N1	6035984
	5 x PNP (100 mA)	3 x 4 mA ... 20 mA (≤ 300 Ω)	Terminal board	AOD5-P1	6035985

<sup>1)</sup> PNP: HIGH =  $V_s - (< 2 V)$  / LOW =  $< 2 V$ ; NPN: HIGH =  $< 2 V$  / LOW =  $V_s$ .

<sup>2)</sup> With use of 50-pin I/O extension terminal (accessory).

Plug connectors and cables

	Connection type head A	Connection type head B	Cable	Cable length	Part no.
	Female connector, M12, 12-pin, straight	Open cable ends	PVC, shielded	5 m	6035988
		Male connector, M12, 12-pin, straight	PVC, RS-422, shielded	2 m	6035986
				5 m	6035987
	Male connector, 50-pin, straight	Open cable ends	PVC, shielded	3 m	6035990
	Male connector, 12-pin	Terminal connector, 12-pin	Unshielded	-	6035989

For more accessories, see → [www.sick.com/OD\\_Precision](http://www.sick.com/OD_Precision)





# THE EXPERT FOR HIGH PERFORMANCE MEASUREMENT



## Product description

The OD5000 displacement measurement sensor specializes in high-precision measuring tasks, offering solutions in a wide range of applications. With a measuring frequency of up to 80 kHz, the OD5000 also measures quick and rotating measuring objects with  $\mu\text{m}$ -precision. The innovative analysis algorithm allows stable measurements

with the highest level of repeatability on a wide range of surfaces. What's more, the OD5000 measures the thickness of transparent material with minimal effort with just a sensor head. The Ethernet interface integrated directly in the sensor head ensures quick communication and therefore maximum productivity.

## At a glance

- Measuring frequency up to 80 kHz
- Ethernet interface with TCP/IP protocol directly in the sensor head
- Web server interface for configuration
- Innovative analysis algorithm
- Maximum repeatability for positioning tasks
- Detection and measurement of the smallest indentations or holes

## Your benefits

- Very good measurement performance, even with quick or rotating objects thanks to high measuring frequency
- Simple and cost-effective solution with Ethernet interface and evaluation unit integrated directly in the sensor head
- Sensor is easy to configure via a web server interface
- Reliable edge detection thanks to innovative analysis algorithm
- Increase in product quality due to maximum repeatability
- Reliable detection, even of very small indentations, thanks to precise light spot



## Additional information

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→ [www.sick.com/OD5000](http://www.sick.com/OD5000)

For more information, simply enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.



## Detailed technical data

## Performance

<b>Repeatability</b> <sup>1) 2)</sup>	14 mm ... 16 mm	0.01 µm
	25 mm ... 35 mm	0.05 µm
	65 mm ... 105 mm	0.1 µm
	110 mm ... 190 mm	0.2 µm
<b>Response time</b> <sup>3) 4)</sup>	≥ 12.5 µs	
<b>Measuring frequency</b> <sup>5)</sup>	≤ 80 kHz	
<b>Light source</b>	Laser, red	
<b>Laser class</b> <sup>6)</sup>	1 (IEC 60825-1:2014, EN 60825-1:2014)	
<b>Special task</b>	Thickness measurement of transparent material	

<sup>1)</sup> Measurement on 60 % remission (ceramic, white).

<sup>2)</sup> Set average: 65536, median: 31, response time: 50 µs, constant application parameters.

<sup>3)</sup> At 0.0125 ms, measurement is only possible in a sub-area.

<sup>4)</sup> Dependent on the set average or sensitivity.

<sup>5)</sup> At 80 kHz, measurement is only possible in a sub-area.

<sup>6)</sup> Visible, wavelength: 655 nm, max. power: 0.39 mW.

## Interfaces

<b>Ethernet</b>	✓, TCP, UDP/IP
<b>PROFIBUS DP</b>	✓
Type of fieldbus integration	Optional, over external evaluation unit AOD1 and Gateway WI180C-PB
<b>Digital inputs</b>	In1 Can be used as laser off, external teach-in, or deactivated
<b>Analog output</b> <sup>1)</sup>	1 x 4 mA ... 20 mA (≤ 300 Ω)
<b>Switching output</b> <sup>1)</sup>	1 x PNP/NPN 2 x PNP/NPN 3 x PNP/NPN

<sup>1)</sup> Optional over evaluation unit AOD1.

## Mechanics/electronics

<b>Supply voltage V<sub>s</sub></b>	DC 12 V ... 24 V, ± 10%, including residual ripple
<b>Power consumption</b>	At 24 V (180 mA)
<b>Warm-up time</b>	< 10 min
<b>Housing material</b>	Aluminum die cast
<b>Window material</b>	Acrylic glass (PMMA)
<b>Connection type</b>	Cable with male connector, M12, 8-pin, A-coded, 50 cm
<b>Indication</b>	Status LEDs
<b>Weight</b>	280 g
<b>Dimensions</b>	78 mm x 75 mm x 29 mm
<b>Enclosure rating</b>	IP67
<b>Protection class</b>	III (EN 50178)

## Ambient data

<b>Ambient temperature operation</b>	-10 °C ... +50 °C, Operating temperature at V <sub>s</sub> = 24 V
<b>Ambient storage temperature</b>	-20 °C ... +60 °C
<b>Relative air humidity (non-condensing)</b>	35 % ... 85 %

<sup>1)</sup> With constant object movement in the measuring range.

<b>Temperature drift</b>	± 0.01 % FS/K at -10 °C ... +40 °C (FS = Full Scale = sensor measuring range) ± 0.03 % FS/K at +40 °C ... +50 °C (FS = Full Scale = sensor measuring range)
<b>Typ. Ambient light immunity</b>	Artificial light: ≤ 3,000 lx <sup>1)</sup> Sunlight: ≤ 10,000 lx
<b>Vibration resistance</b>	EN 60068-2-6, EN 60068-2-64
<b>Shock resistance</b>	EN 60068-2-27

<sup>1)</sup> With constant object movement in the measuring range.

## Ordering information

Other models → [www.sick.com/OD5000](http://www.sick.com/OD5000)

Measuring range	Linearity	Thickness measurement of transparent material	Typ. light spot size (distance)	Type	Part no.
14 mm ... 16 mm	Reflective ± 1 µm Diffuse not supported	≥ 0.06 mm	Ø 30 µm	OD5000-C15T01	6063619
			30 µm x 1,000 µm	OD5000-C15W01	6063620
25 mm ... 35 mm <sup>1)</sup>	Diffuse ± 3 µm Reflective ± 4 µm	≥ 0.18 mm	Ø 30 µm	OD5000-C30T05	6063621
	Diffuse ± 1.5 µm Reflective ± 4 µm	≥ 0.18 mm	30 µm x 1,000 µm	OD5000-C30W05	6063622
65 mm ... 105 mm <sup>2)</sup>	Diffuse ± 7.2 µm, near side <sup>3)</sup> Diffuse ± 12 µm, far side <sup>3)</sup> Reflective ± 6 µm, near side Reflective ± 6 µm, far side	≥ 0.5 mm	Ø 70 µm	OD5000-C85T20	6063623
	Diffuse ± 6 µm <sup>3)</sup> Reflective ± 6 µm	≥ 0.5 mm	70 µm x 2,000 µm	OD5000-C85W20	6063624
110 mm ... 190 mm	Diffuse ± 24 µm, near side <sup>3)</sup> Diffuse ± 32 µm, far side <sup>3)</sup> Reflective not supported	Not supported	Ø 120 µm	OD5000-C150T40	6063625
	Diffuse ± 12 µm <sup>3)</sup> Reflective not supported	Not supported	120 µm x 4,000 µm	OD5000-C150W40	6063626

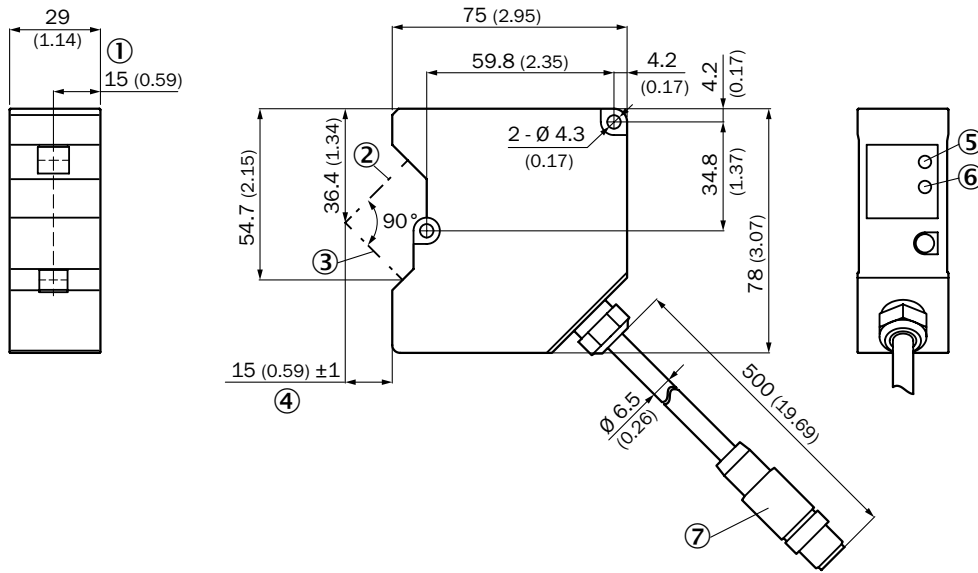
<sup>1)</sup> If there are reflections, the measuring range is reduced to 22.5 mm ... 28.5 mm.

<sup>2)</sup> If there are reflections, the measuring range is reduced to 71.5 ... 91.5 mm.

<sup>3)</sup> Measurement on 60 % remission (ceramic, white).

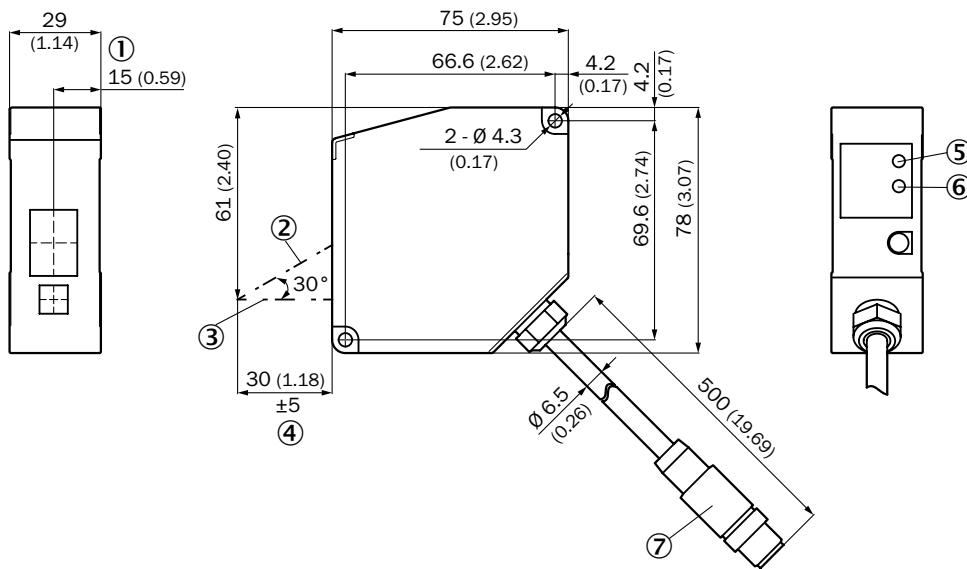
Dimensional drawings (Dimensions in mm (inch))

OD5000-C15x01



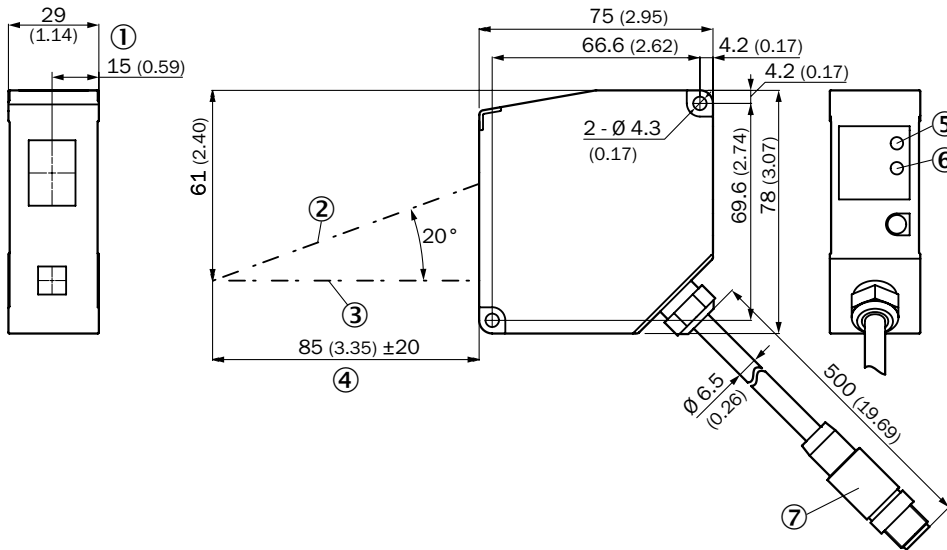
- ① Reference edge
- ② Optical axis receiver
- ③ Optical axis sender
- ④ Measuring range
- ⑤ Link LED
- ⑥ Status LED
- ⑦ Male connector M12, 8-pin

OD5000-C30x05



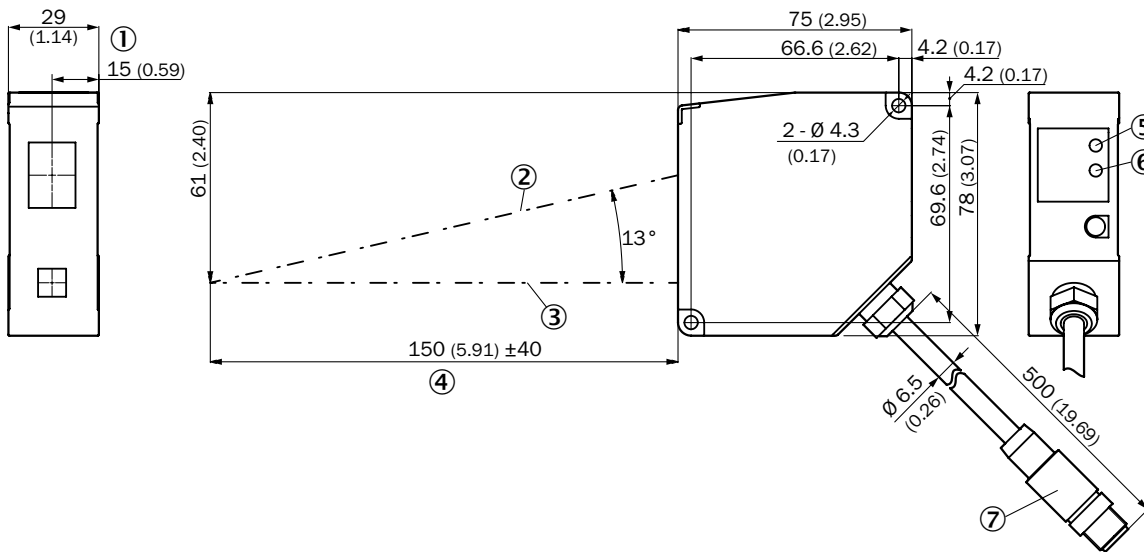
- ① Reference edge
- ② Optical axis receiver
- ③ Optical axis sender
- ④ Measuring range
- ⑤ Link LED
- ⑥ Status LED
- ⑦ Male connector M12, 8-pin

## OD5000-C85x20



- ① Reference edge
- ② Optical axis receiver
- ③ Optical axis sender
- ④ Measuring range
- ⑤ Link LED
- ⑥ Status LED
- ⑦ Male connector M12, 8-pin

## OD5000-C150x40

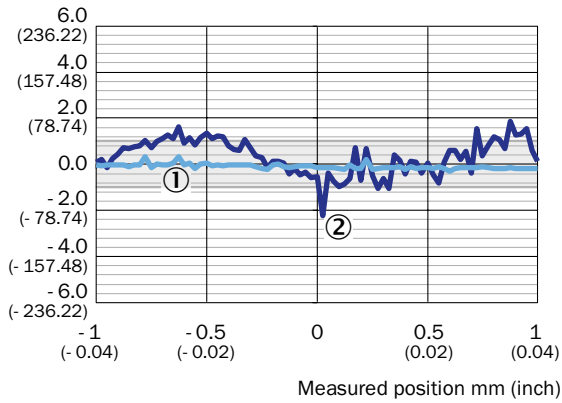


- ① Reference edge
- ② Optical axis receiver
- ③ Optical axis sender
- ④ Measuring range
- ⑤ Link LED
- ⑥ Status LED
- ⑦ Male connector M12, 8-pin

**Linearity**

OD5000-C15T01 (specular)

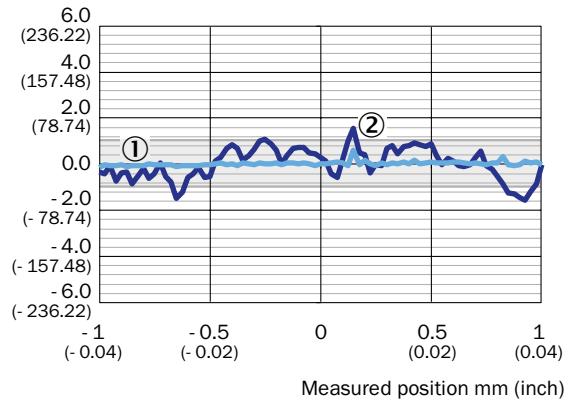
Linearity  $\mu\text{m}$  ( $\mu\text{in}$ )



- ① Mirror
- ② Glass

OD5000-C15W01 (specular)

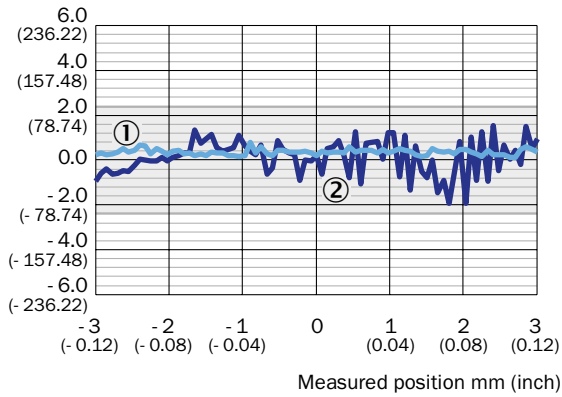
Linearity  $\mu\text{m}$  ( $\mu\text{in}$ )



- ① Mirror
- ② Glass

OD5000-C30T05 (specular)

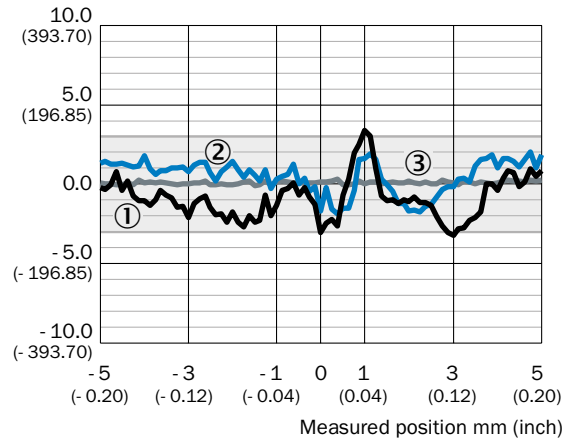
Linearity  $\mu\text{m}$  ( $\mu\text{in}$ )



- ① Mirror
- ② Glass

OD5000-C30T05 (diffuse)

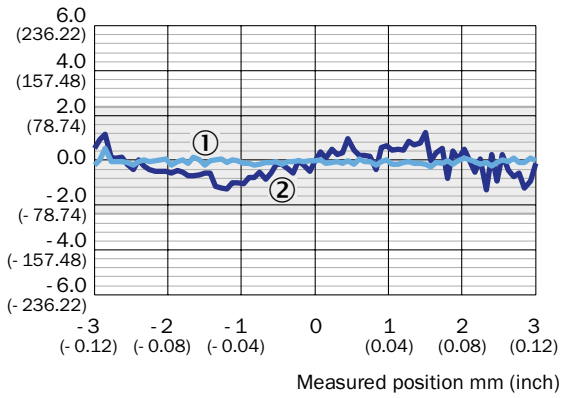
Linearity  $\mu\text{m}$  ( $\mu\text{in}$ )



- ① White, 60% remission
- ② Black, 9.5% remission
- ③ Stainless steel

OD5000-C30W05 (specular)

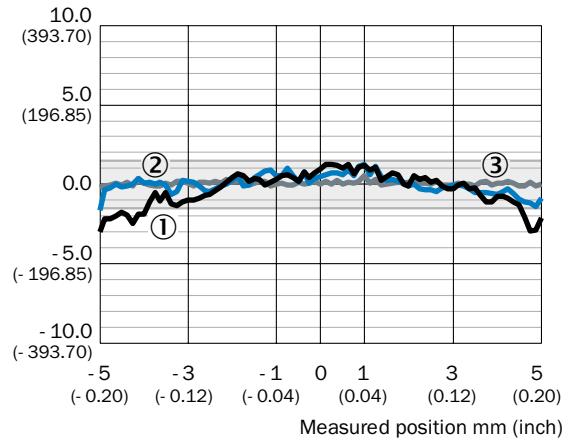
Linearity  $\mu\text{m}$  ( $\mu\text{in}$ )



- ① Mirror
- ② Glass

OD5000-C30W05 (diffuse)

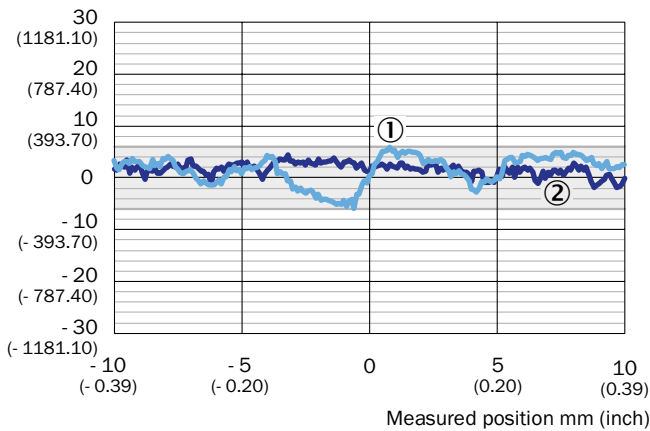
Linearity  $\mu\text{m}$  ( $\mu\text{in}$ )



- ① White, 60% remission
- ② Black, 9.5% remission
- ③ Stainless steel

OD5000-C85T20 (reflective)

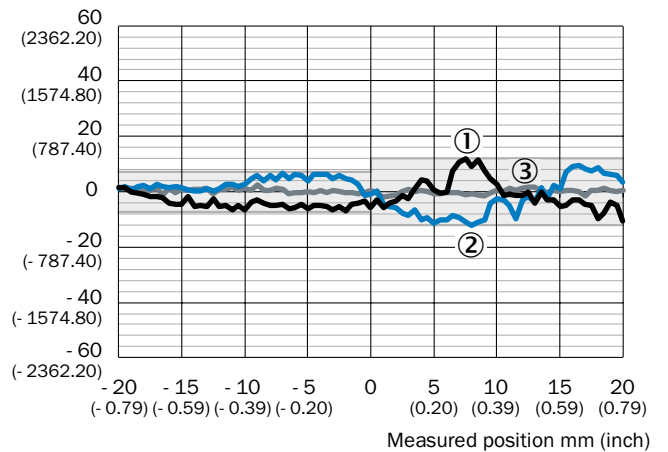
Linearity  $\mu\text{m}$  ( $\mu\text{in}$ )



- ① Mirror
- ② Glass

OD5000-C85T20 (diffuse)

Linearity  $\mu\text{m}$  ( $\mu\text{in}$ )

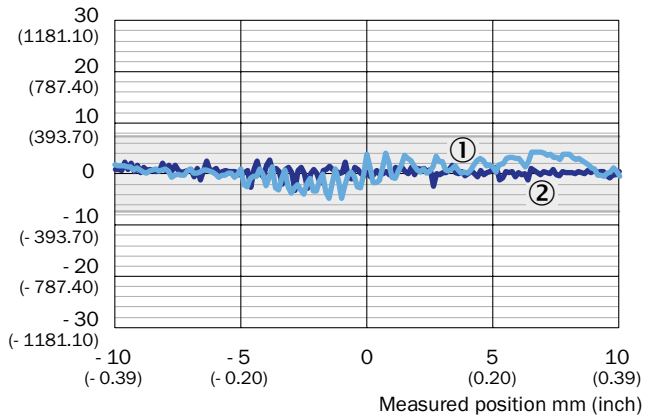


- ① White, 60% remission
- ② Black, 9.5% remission
- ③ Stainless steel



**OD5000-C85W20 (reflective)**

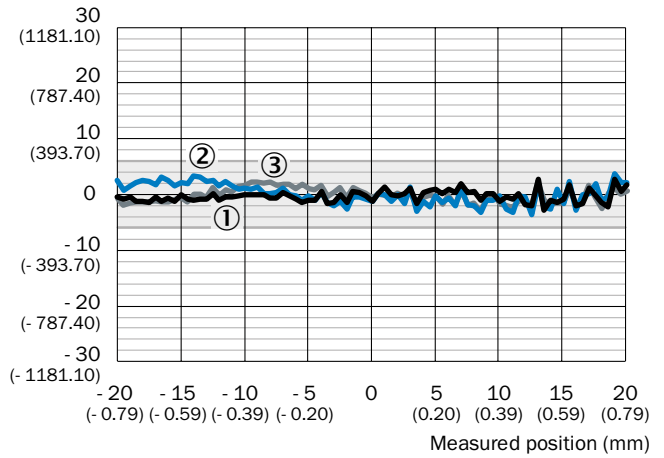
Linearity  $\mu\text{m}$  ( $\mu\text{in}$ )



- ① Mirror
- ② Glass

**OD5000-C85W20 (diffuse)**

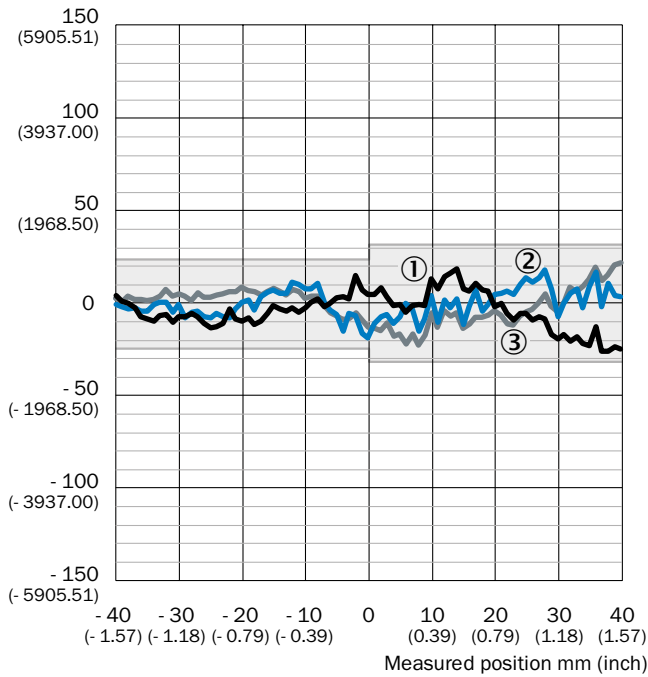
Linearity ( $\mu\text{m}$ )



- ① White, 60% remission
- ② Black, 9.5% remission
- ③ Stainless steel

**OD5000-C150T40 (diffuse)**

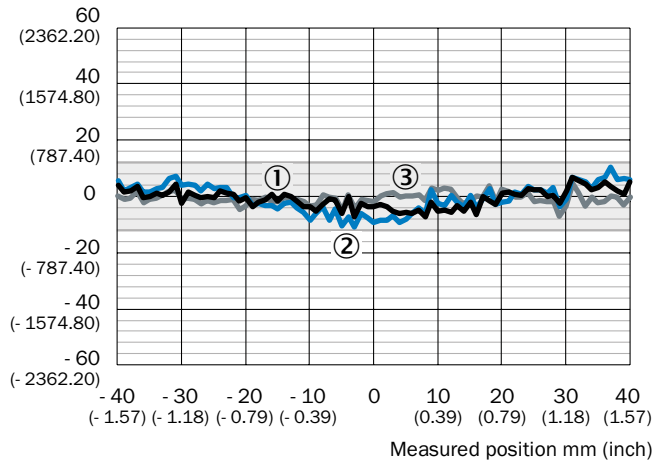
Linearity  $\mu\text{m}$  ( $\mu\text{in}$ )



- ① White, 60% remission
- ② Black, 9.5% remission
- ③ Stainless steel

**OD5000-C150W40 (diffuse)**

Linearity  $\mu\text{m}$  ( $\mu\text{in}$ )




- ① White, 60% remission
- ② Black, 9.5% remission
- ③ Stainless steel




Recommended accessories

Connection systems

Modules and gateways

	Switching output	Analog output	System part	Connection type	Type	Part no.
	1 x PNP/NPN, selectable	-	Master	Male connector, M8, 4-pin	AOD1-MR24Q1	6054270
	2 x PNP/NPN, selectable	-	Master	Male connector, M12, 5-pin	AOD1-MR25Q2	6054272
	3 x PNP/NPN, selectable	1 x 4 mA ... 20 mA (≤ 300 Ω)	Master	Flying leads	AOD1-MR27C4	6058195
	1 x PNP/NPN, selectable	-	Slave	Male connector, M8, 4-pin	AOD1-SR24Q1	6054271
	2 x PNP/NPN, selectable	-	Slave	Male connector, M12, 5-pin	AOD1-SR25Q2	6054273
	3 x PNP/NPN, selectable	1 x 4 mA ... 20 mA (≤ 300 Ω)	Slave	Flying leads	AOD1-SR27C4	6058196

Plug connectors and cables

	Connection type head A	Connection type head B	Cable	Cable length	Part no.
	Male connector, M12, 8-pin, straight	Female connector, M12, 8-pin, straight	PUR	2 m	6064004
	Male connector, M12, 4-pin, straight, D-coded	Male connector, RJ45, 8-pin, straight	PUR, halogen-free, twisted pair, Ethernet, shielded	2 m	6034414
	Female connector, M12, 4-pin, straight, A-coded	Open cable ends	PUR, halogen-free, Sensor/actuator cable, unshielded	2 m	2095607

For more accessories, see → [www.sick.com/OD5000](http://www.sick.com/OD5000)



## A

**Accuracy**

The measurement accuracy describes the maximum expected measurement error between the recorded and real measured values (see “Resolution” in the figure). It takes into account all deviations from the real value, such as linearity, offset, and pitch errors affecting linearity. It should also be noted that the measured values are infinitely averaged and that there are constant temperature conditions. In the case of optical systems, the object’s reflective properties can affect the measurement. In order to obtain the best possible measurement accuracy in every application, optical distance sensors from SICK are generally calibrated and specified for materials with 6 to 90% remission.

An example application is the reliable measurement of objects with different optical properties. Values typically range from micrometers to a few millimeters. In many applications, such as the repeated positioning of an object, measurement accuracy is only of secondary importance. In these cases, repeatability is much more significant.

→ See “Repeatability” on page 71

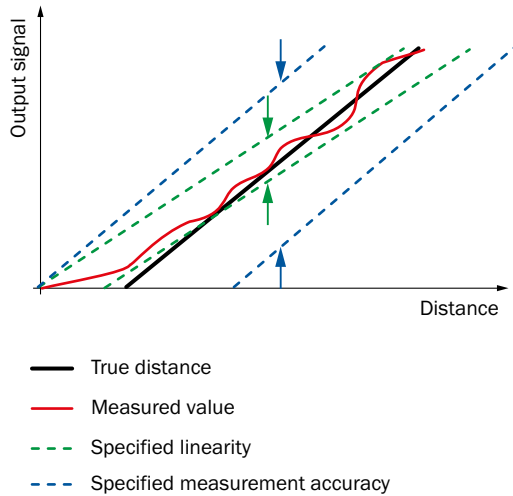


Fig. Accuracy

## H

**Hysteresis**

Hysteresis is the difference in distance between the switch-on and switch-off points. This is necessary for stable switching when the measured distance fluctuates around the switching point that has been set. Hysteresis can be configured freely with most distance sensors and is stated in millimeters. Because it can be configured freely, it is possible to strike a balance between precise and stable switching behavior.

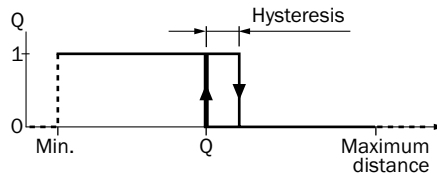


Fig. Hysteresis

## L

**Linearity**

Linearity refers to the maximum deviation between the output signal and an ideal, straight characteristic line. Even when the output signal behaves in an absolutely linear fashion, there may still be offset and pitch errors relative to the real measured value (see also “Accuracy” in the figure). Scaling of the output signal by means of a reference measurement is normally recommended.

→ See “Accuracy” on page 70

## M

**Measurement of glass thicknesses**

Due to the reflections from the first and second interfaces of a transparent material (transition from air to glass, for example, and back to air or floor), some displacement measurement sensors from SICK, such as OD Precision, can measure the difference with just one sensor head. After referencing the measured transparent material, this difference corresponds to the thickness of the material or glass.

**Measuring range**

The measuring range describes the distance range from the device in which the sensor operates and measures in accordance with specifications.

In practice, the smallest and largest expected measuring objects should be within the measuring range.

# N

## Note the preferred direction!

Triangulation requires that the laser beam itself and the receiver are always reaching/facing the same plane. This is not guaranteed in every direction on an edge. Displacement measurement sensors operate according to the triangulation principle.

The following preferred directions should be used:

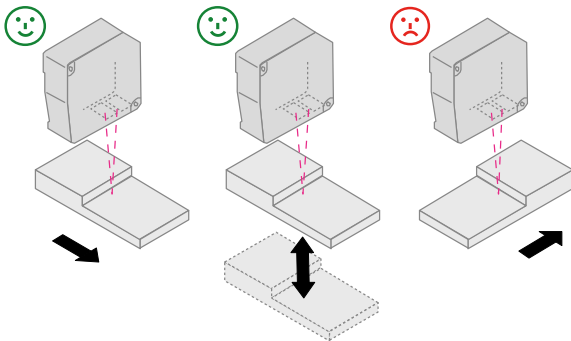


Fig. Preferred directions for laser triangulation sensors

# R

## Repeatability

Repeatability refers to the deviation between multiple measurements that are conducted under the same conditions (see “Resolution” in the figure).

An example application is the repeated measurement or positioning of identical parts, where repeatability is usually more important than measurement accuracy.

→ See “Accuracy” on page 70

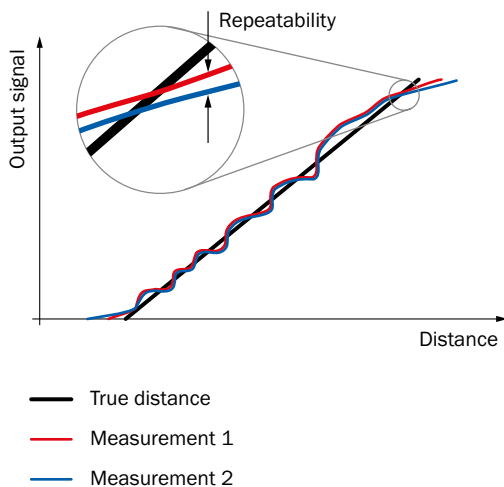


Fig. Repeatability

## Resolution

The resolution is the smallest detectable change in an object’s distance. This can relate either to the measured data noise or to the size of the increment in the output of measured values. An example application is the detection of vibrations.

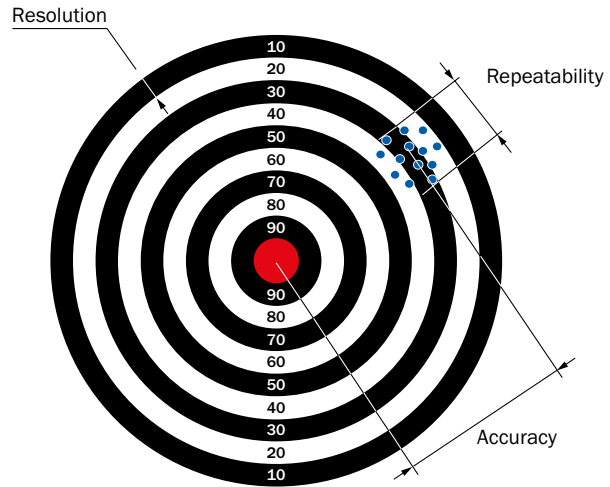


Fig. Resolution

## Response time

The response time is the maximum time between the occurrence of an abrupt change in distance and the response of the switching output or the complete update of the analog output. The response time is directly proportional to the adjustable averaging, so an increase in averaging or response time has a positive impact on repeatability.

An example application is the measurement of objects with an abrupt distance change.

→ See “Repeatability” on page 71

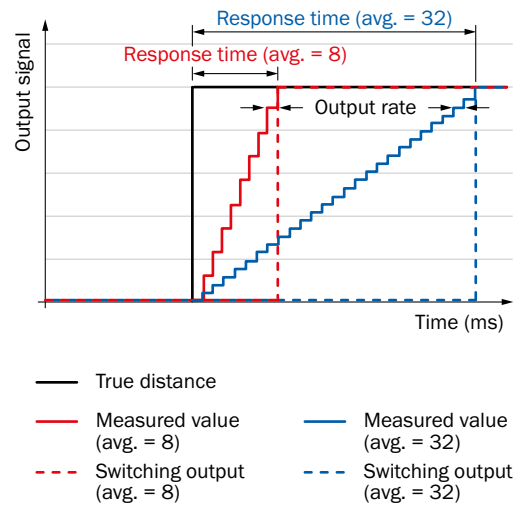


Fig. Response time

# S

## Switching modes

SICK distance sensors offer various switching modes:

### DtO (1 point)

This refers to the classic “Distance to Object” operating mode. In this mode, the detection of the object is output as a switching signal as soon as the object is nearer to the sensor than the defined switching threshold is. In some distance sensors, this switching mode is also referred to as “sensor on object” or as a simple switching point.

### OBSB

**Object Between Sensor and Background.** In this mode, any background can be taught in as a reference. If an object obscures the background or the distance to the background changes significantly, this causes the sensor to switch. This switching mode is primarily suited to the reliable detection of high-gloss or extremely dark materials. This makes it possible to detect even painted vehicle parts with large approach angles, for example. In some cases, this mode is referred to as the reflection barrier mode or “sensor on background”.

### Window (2 points)

Window mode. An upper and a lower switching threshold are set for the switching output. A switching signal is output when the measured value is between the two switching thresholds. In some sensors, this switching mode is also referred to as “2-point teach-in”.

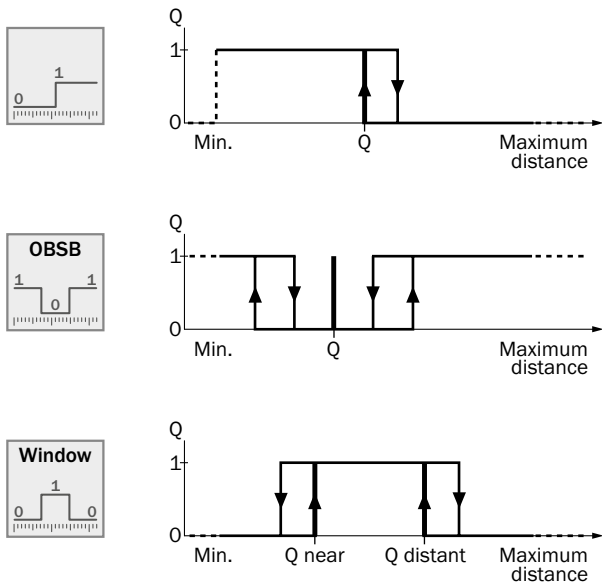


Fig. Switching modes

# T

## Time functions

One of the following time functions may be useful for improving how received signals are passed on to other connected devices.

### Switch-on delay

Rapid signals (bursts) are suppressed.

### Switch-off delay

The signal is extended by the defined period of time to enable subsequent evaluation even if the controller is slow.

### One-shot delay

The signal that is passed on has a fixed signal length, regardless of the length of the input signal.

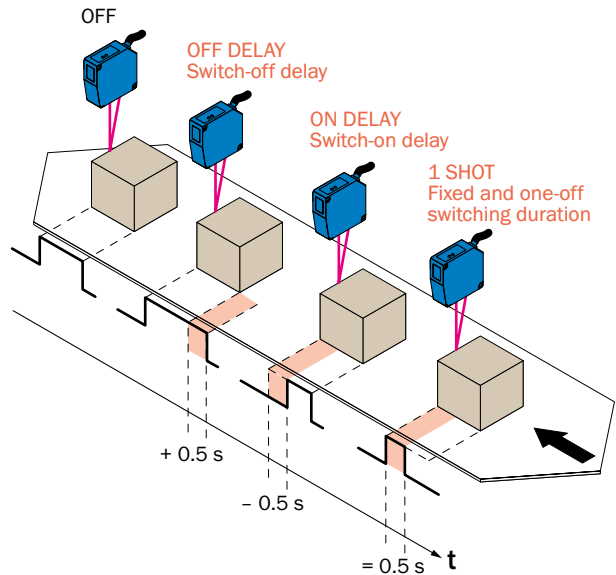


Fig. Time functions

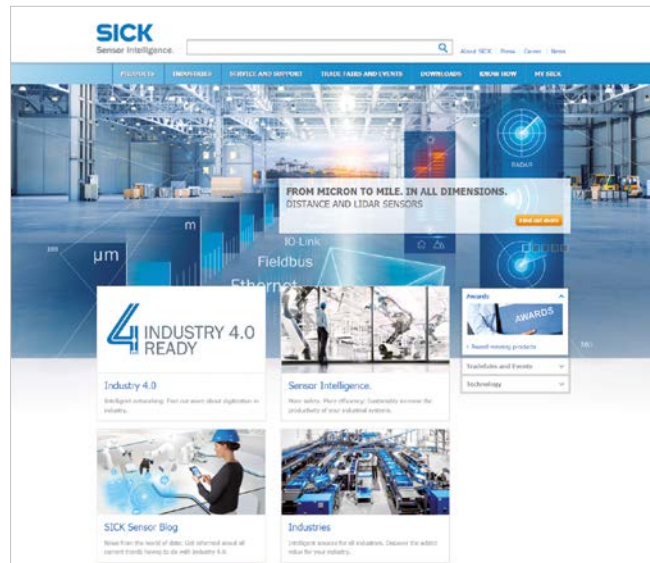






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SICK has extensive experience in various industries and understands their processes and requirements. With intelligent sensors, SICK delivers exactly what the customers need. In application centers in Europe, Asia, and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes SICK a reliable supplier and development partner.

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