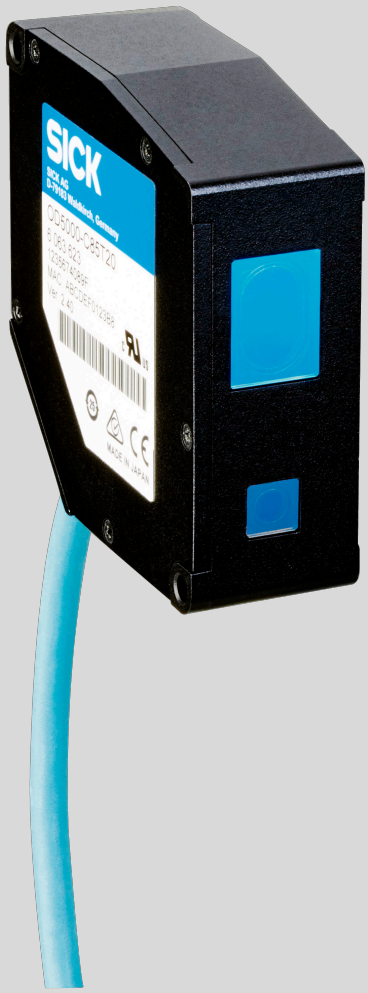
OPERATING INSTRUCTIONS

OD5000

Displacement measurement sensor

SICK
Sensor Intelligence.



Product described

OD5000

Manufacturer

SICK AG
Erwin-Sick-Str. 1
79183 Waldkirch
Germany

Legal information

Original document

This document is an original document of SICK AG.

Contents

1 About this document

1.1 Information on the operating instructions

These operating instructions provide important information on how to use devices from SICK AG.

Prerequisites for safe work are:

- Compliance with all safety notes and handling instructions supplied.
- Compliance with local work safety regulations and general safety regulations for device applications

The operating instructions are intended to be used by qualified personnel and electrical specialists.

NOTE
Read these operating instructions carefully to familiarize yourself with the device and its functions before commencing any work.

The operating instructions are an integral part of the product. Store the instructions in the immediate vicinity of the device so they remain accessible to staff at all times. Should the device be passed on to a third party, these operating instructions should be handed over with it.

These operating instructions do not provide information on operating the machine or system in which the device is integrated. For information about this, refer to the operating instructions of the specific machine.

1.2 Explanation of symbols

Warnings and important information in this document are labeled with symbols. Signal words introduce the instructions and indicate the extent of the hazard. To avoid accidents, damage, and personal injury, always comply with the instructions and act carefully.

DANGER
... indicates a situation of imminent danger, which will lead to a fatality or serious injuries if not prevented.

WARNING
... indicates a potentially dangerous situation, which may lead to a fatality or serious injuries if not prevented.

CAUTION
... indicates a potentially dangerous situation, which may lead to minor/slight injuries if not prevented.

NOTICE
... indicates a potentially harmful situation, which may lead to material damage if not prevented.

NOTE
... highlights useful tips and recommendations as well as information for efficient and trouble-free operation.

1.3 Further information

NOTE
Further documentation for the device can be found on the online product page at:

- www.sick.com/OD5000

There, additional information has been provided depending on the product, such as:

- Model-specific online data sheets for device types, containing technical data, dimensional drawing, and specification diagrams
- EU declarations of conformity for the product family
- Dimensional drawings and 3D CAD dimension models of the device types in various electronic formats
- Other publications related to the devices described here
- Publications dealing with accessories

1.4 SICK service

If you require any technical information, our SICK Service will be happy to help. To find your agency, see the final page of this document.

NOTE
Before calling, make a note of all type label data such as type code, serial number, etc., to ensure faster processing.

2 Safety information

2.1 Intended use

The displacement measurement sensor is an opto-electronic measuring device and is used for optical, non-contact distance measurement of objects.

The required optical properties of the object that will be detected are specified in the technical data section of this document.

SICK AG assumes no liability for losses or damage arising from the use of the product, either directly or indirectly. This applies in particular to use of the product that does not conform to its intended purpose and is not described in this documentation.

2.2 Improper use

Any use outside of the stated areas, in particular use outside of the technical specifications and the requirements for intended use, will be deemed to be incorrect use.

- The device does not constitute a safety component in accordance with the respective applicable safety standards for machines.
- The device must not be used in explosion-hazardous areas, in corrosive environments or under extreme environmental conditions.
- Any use of accessories not specifically approved by SICK AG is at your own risk.

WARNING
Danger due to improper use!

Any improper use can result in dangerous situations.

Therefore, observe the following information:

- Product should be used only in accordance with its intended use.
- All information in these operating instructions must be strictly observed.
- Shut down the product immediately in case of damage.

2.3 Internet protocol (IP) technology

NOTE

SICK uses standard IP technology in its products. The emphasis is placed on availability of products and services.

SICK always assumes the following prerequisites:

- The customer ensures the integrity and confidentiality of the data and rights affected by its own use of the aforementioned products.
- In all cases, the customer implements the appropriate security measures, such as network separation, firewalls, virus protection, and patch management.

2.4 Limitation of liability

Relevant standards and regulations, the latest technological developments, and our many years of knowledge and experience have all been taken into account when compiling the data and information contained in these operating instructions. The manufacturer accepts no liability for damage caused by:

- Non-adherence to the product documentation (e.g., operating instructions)
- Incorrect use
- Use of untrained staff
- Unauthorized conversions or repair

- Technical modifications
- Use of unauthorized spare parts, consumables, and accessories

With special variants, where optional extras have been ordered, or owing to the latest technical changes, the actual scope of delivery may vary from the features and illustrations shown here.

2.5 Modifications and conversions

NOTICE
Modifications and conversions to the device may result in unforeseeable dangers.

Interrupting or modifying the device or SICK software will invalidate any warranty claims against SICK AG. This applies in particular to opening the housing, even as part of mounting and electrical installation.

2.6 Requirements for skilled persons and operating personnel

WARNING
Risk of injury due to insufficient training.
Improper handling of the device may result in considerable personal injury and material damage.

- All work must only ever be carried out by the stipulated persons.

This product documentation refers to the following qualification requirements for the various activities associated with the device:

- **Instructed personnel** have been briefed by the operator about the tasks assigned to them and about potential dangers arising from improper action.
- **Skilled personnel** have the specialist training, skills, and experience, as well as knowledge of the relevant regulations, to be able to perform tasks delegated to them and to detect and avoid any potential dangers independently.
- **Electricians** have the specialist training, skills, and experience, as well as knowledge of the relevant standards and provisions, to be able to carry out work on electrical systems and to detect and avoid any potential dangers independently. The electrician must comply with the provisions of the locally applicable work safety regulation.

The following qualifications are required for various activities:

Table 1: Activities and technical requirements

Activities	Qualification
Mounting, maintenance	■ Basic practical technical training ■ Knowledge of the current safety regulations in the workplace
Electrical installation, device replacement	■ Practical electrical training ■ Knowledge of current electrical safety regulations ■ Knowledge of the operation and control of the devices in their particular application
Commissioning, configuration	■ Basic knowledge of the Windows™ operating system in use ■ Basic knowledge of the design and setup of the described connections and interfaces ■ Basic knowledge of data transmission

Activities	Qualification
Operation of the device for the particular application	■ Knowledge of the operation and control of the devices in their particular application ■ Knowledge of the software and hardware environment for the particular application

2.7 Operational safety and particular hazards

Please observe the safety notes and the warnings listed here and in other chapters of this product documentation to reduce the possibility of risks to health and avoid dangerous situations.

CAUTION
Optical radiation: Laser class 1

The accessible radiation does not pose a danger when viewed directly for up to 100 seconds. It may pose a danger to the eyes and skin in the event of incorrect use.

- Do not open the housing. Opening the housing may increase the level of risk.
- Current national regulations regarding laser protection must be observed.

Caution – Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

WARNING
Electrical voltage!

Electrical voltage can cause severe injury or death.

- Work on electrical systems must only be performed by qualified electricians.
- The power supply must be disconnected when attaching and detaching electrical connections.
- The product must only be connected to a voltage supply as set out in the requirements in the operating instructions.
- National and regional regulations must be complied with.
- Safety requirements relating to work on electrical systems must be complied with.

WARNING
Risk of injury and damage caused by potential equalization currents!

Improper grounding can lead to dangerous equipotential bonding currents, which may in turn lead to dangerous voltages on metallic surfaces, such as the housing. Electrical voltage can cause severe injury or death.

- Work on electrical systems must only be performed by qualified electricians.
- Follow the notes in the operating instructions.
- Install the grounding for the product and the system in accordance with national and regional regulations.

2.8 Warning signs on the device

A visible red laser is installed in the device. The laser corresponds to laser class 1. The laser class is identified on the type label of the device.

3 Product description

3.1 Product identification

Type label

The following information can be read from the type label on the device:

Figure 1: OD5000 type label (example)

① Type codes
② Part number
③ Serial number
④ MAC address
⑤ Data Matrix code
⑥ EEUP symbol - China
⑦ Conformity mark - Australia
⑧ Place of manufacture
⑨ Conformity mark - EU
⑩ Conformity mark - Russia
⑪ WEEE symbol
⑫ Conformity mark - US and Canada

3.2 Scope of delivery

Scope of delivery of the device

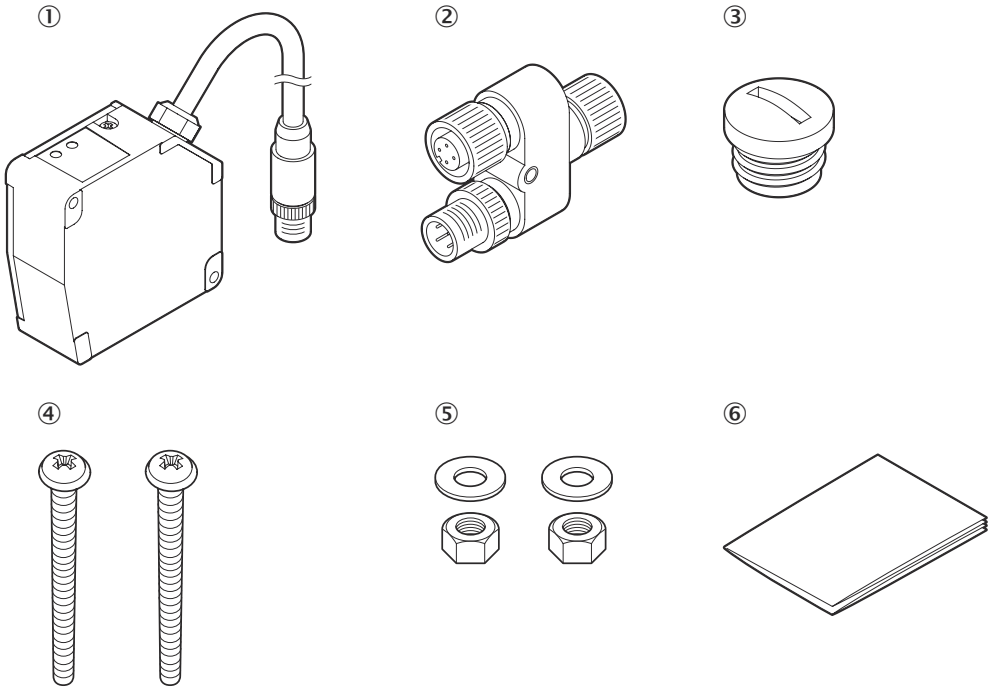


Figure 2: Scope of delivery

① OD5000
② Y-distribution
③ Screw-on protective cap for connection ② (female connector, M12, 5-pin, D-coded) of the Y distributor
④ 2 screws, M4 x 50 mm
⑤ 2 M4 nuts and 2 washers
⑥ Printed safety notes, multilingual (brief information and general safety notes)

Accessories

Accessories such as brackets and connecting cables is only delivered if the accessories have been ordered separately, see "Accessories", page 91.

3.3 Product characteristics

The device uses the triangulation principle for distance measurement. This technology makes it possible to measure the distance between the displacement measurement sensor and an object.

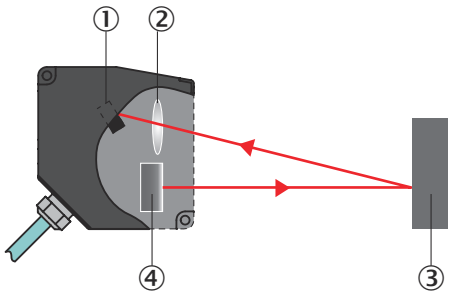


Figure 3: Triangulation principle

① Receiver
② Lens
③ Object
④ Laser

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 triangulated (lat. Triangulum: triangle).

The device can be configured via the SOPASair user interface. For additional information visit:

▶ www.sick.com/SOPASair

3.4 Setup and dimensions

OD5000-C15xxx

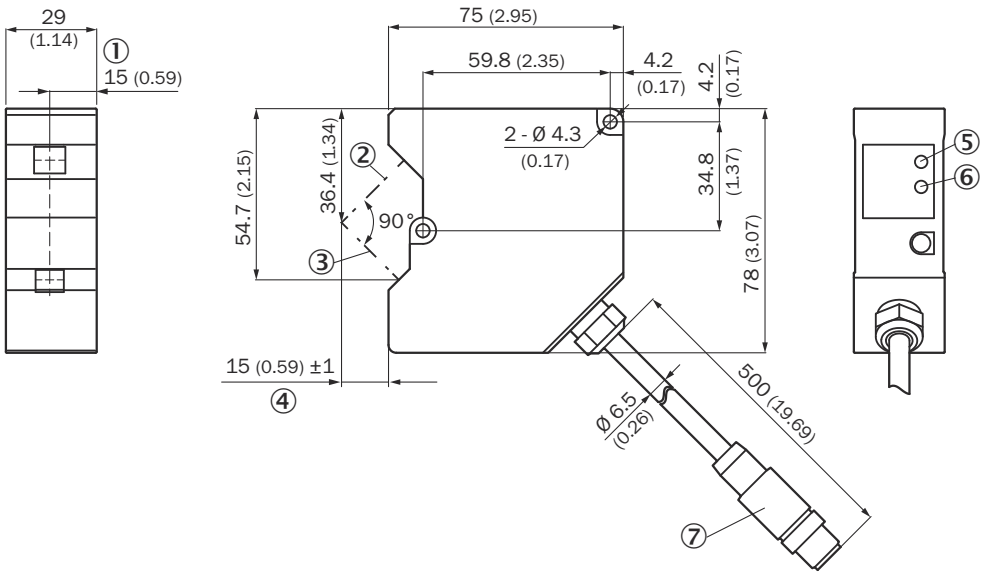


Figure 4: OD5000-C15xxx: Structure and dimensions, unit: mm (inch), decimal separator: period

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

OD5000-C30xxx

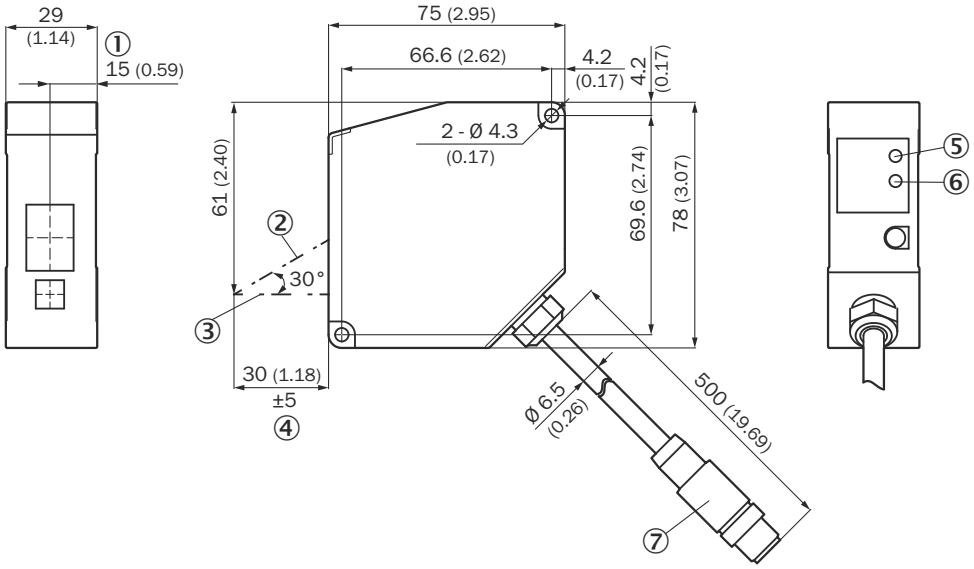


Figure 5: OD5000-C30xxx: Structure and dimensions, unit: mm (inch), decimal separator: period

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

OD5000-C85xxx

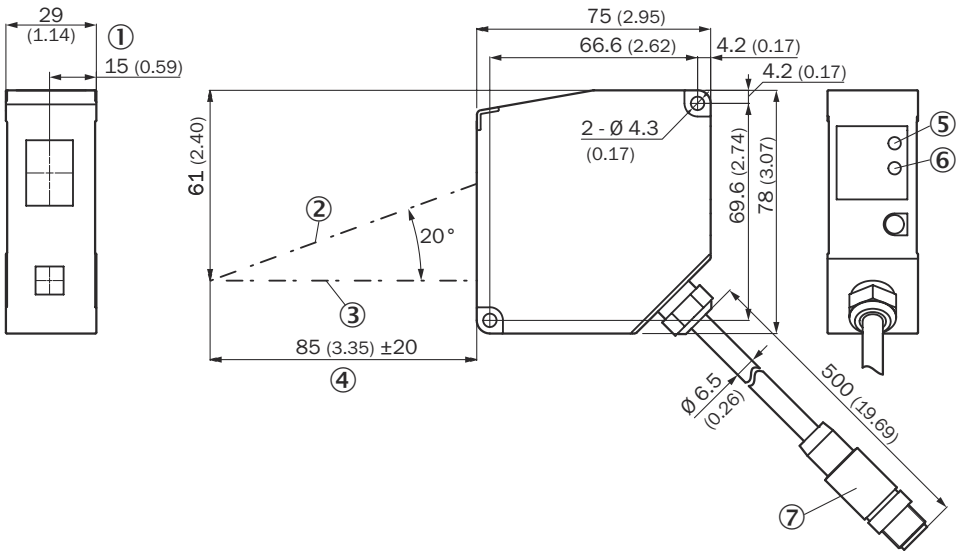


Figure 6: OD5000-C85xxx: Structure and dimensions, unit: mm (inch), decimal separator: period

① Reference plane
② Optical axis of the receiver
③ Optical axis of the sender
④ Measuring range
⑤ Link LED

⑥ Status LED

⑦ Male connector, M12, 8-pin, A-coded

OD5000-C150xxx

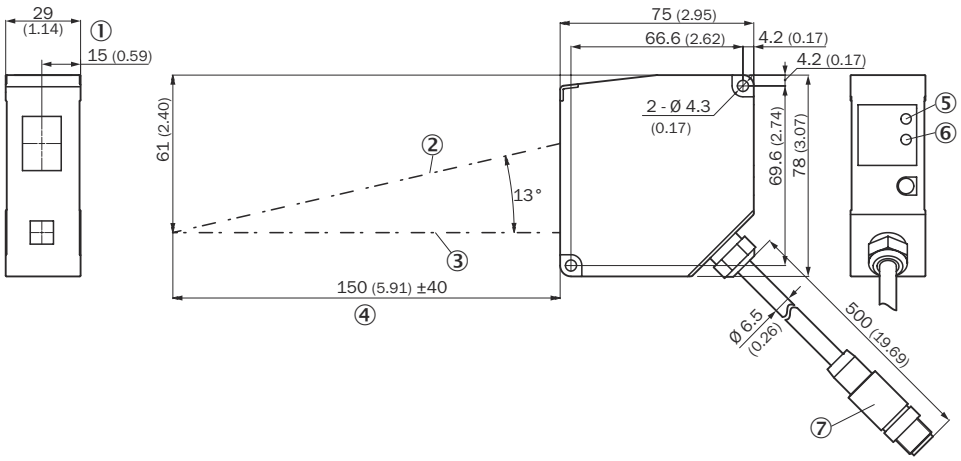


Figure 7: OD5000-C150xxx: Structure and dimensions, unit: mm (inch), decimal separator: period

① Reference plane

② Optical axis of the receiver

③ Optical axis of the sender

④ Measuring range

⑤ Link LED

⑥ Status LED

⑦ Male connector, M12, 8-pin, A-coded

Y-distribution

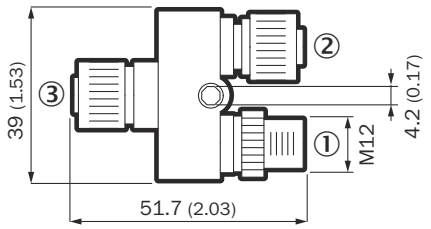


Figure 8: Y adapter: Structure and dimensions, unit: mm (inch), decimal separator: period

① M12 male connector, 4-pin, A-coded

② Female connector, M12, 5-pin, D-coded

③ Female connector, M12, 8-pin, A-coded

3.4.1 Light spot size

OD5000-C15T01

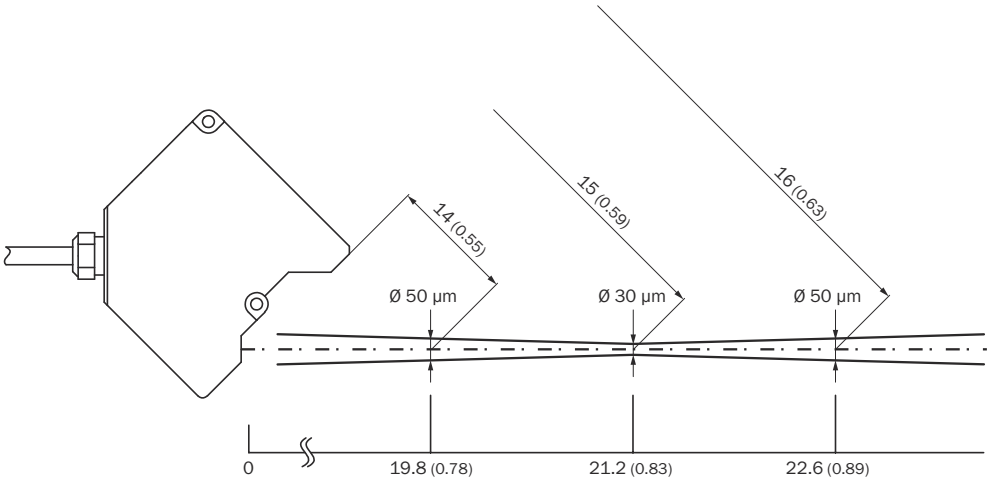


Figure 9: Typical light spot size of the OD5000-C15T01, unit for distance values: mm (inch), decimal separator: period

OD5000-C15W01

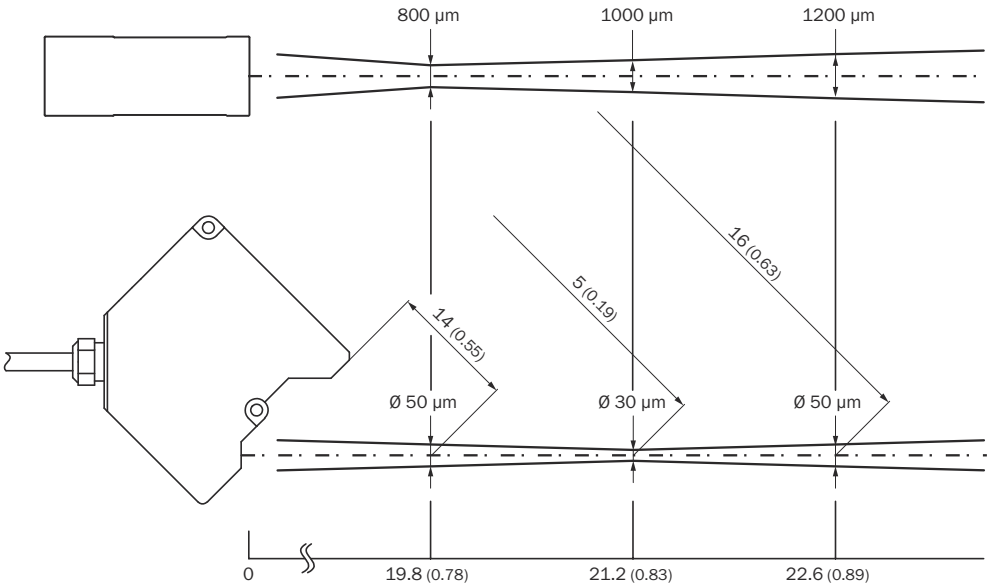


Figure 10: Typical light spot size of the OD5000-C15W01, unit for distance values: mm (inch), decimal separator: period

OD5000-C30T05

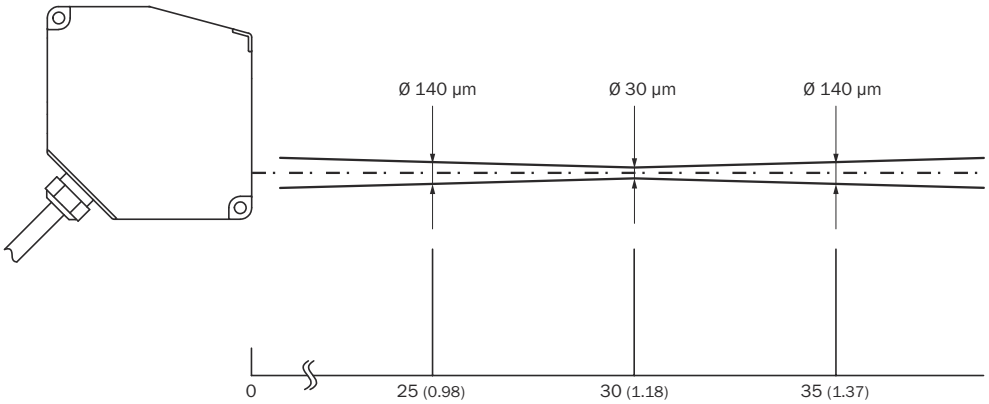


Figure 11: Typical light spot size of the OD5000-C30T05, unit for distance values: mm (inch), decimal separator: period

OD5000-C30W05

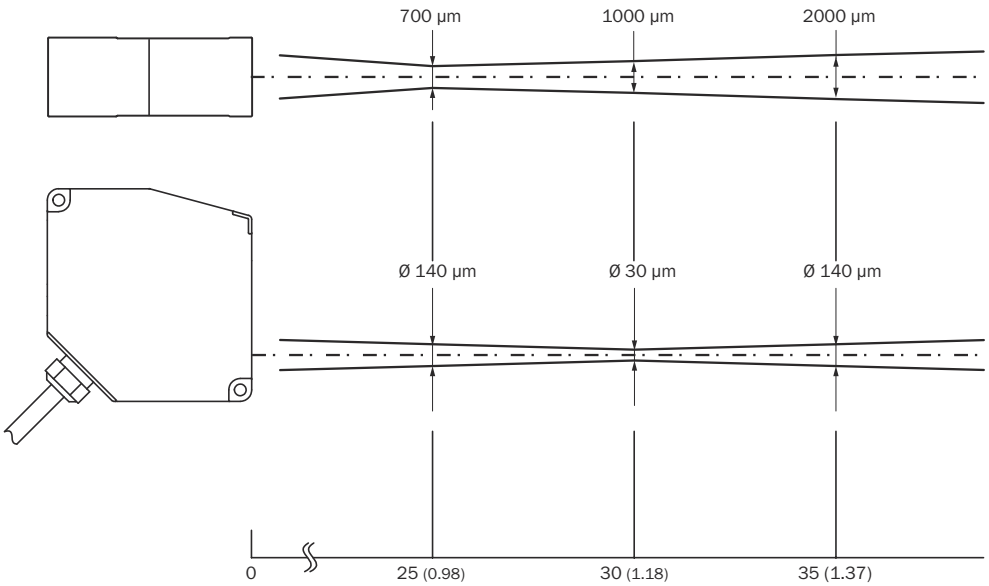


Figure 12: Typical light spot size of the OD5000-C30W05, unit for distance values: mm (inch), decimal separator: period

OD5000-C85T20

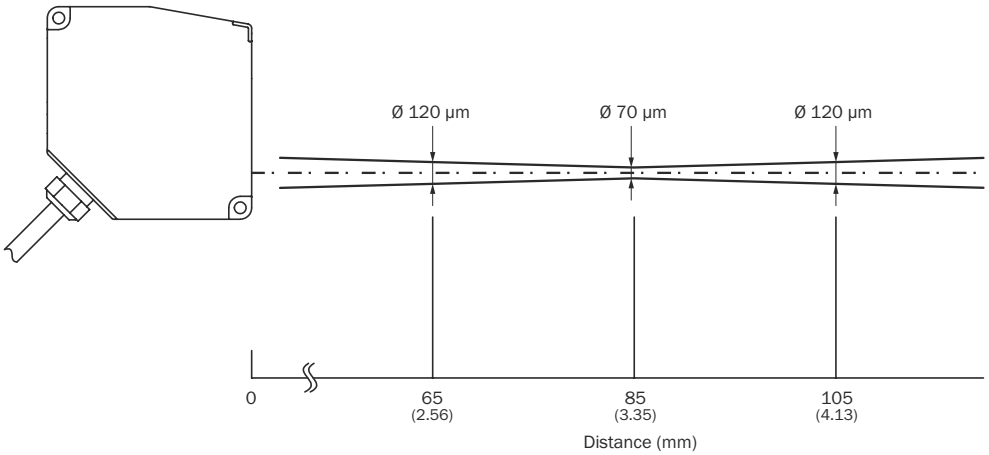


Figure 13: Typical light spot size of the OD5000-C85T20, unit for distance values: mm (inch), decimal separator: period

OD5000-C85W20

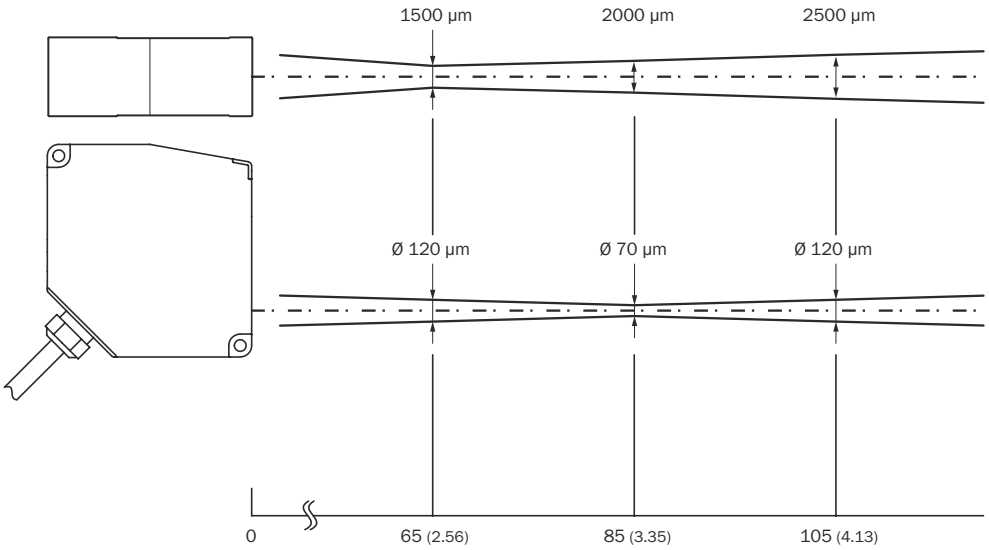


Figure 14: Typical light spot size of the OD5000-C85W20, unit for distance values: mm (inch), decimal separator: period

OD5000-C150T40

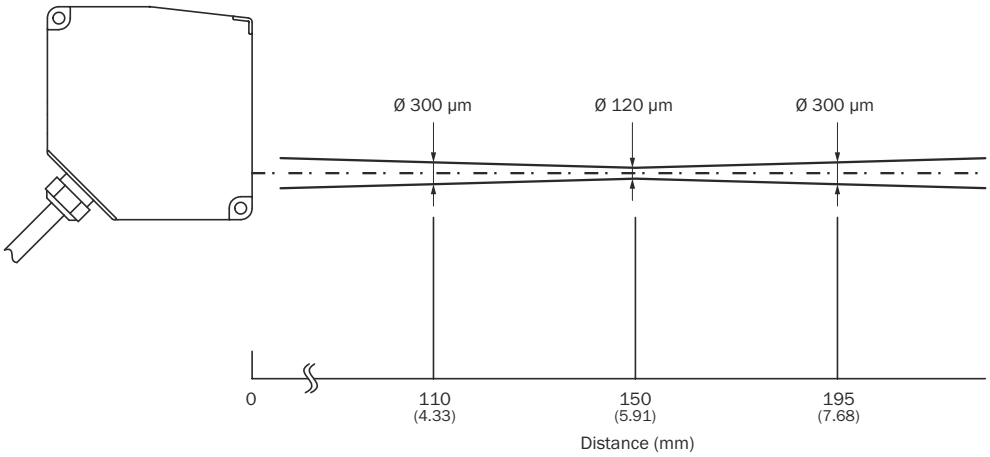


Figure 15: Typical light spot size of the OD5000-C150T40, unit for distance values: mm (inch), decimal separator: period

OD5000-C150W40

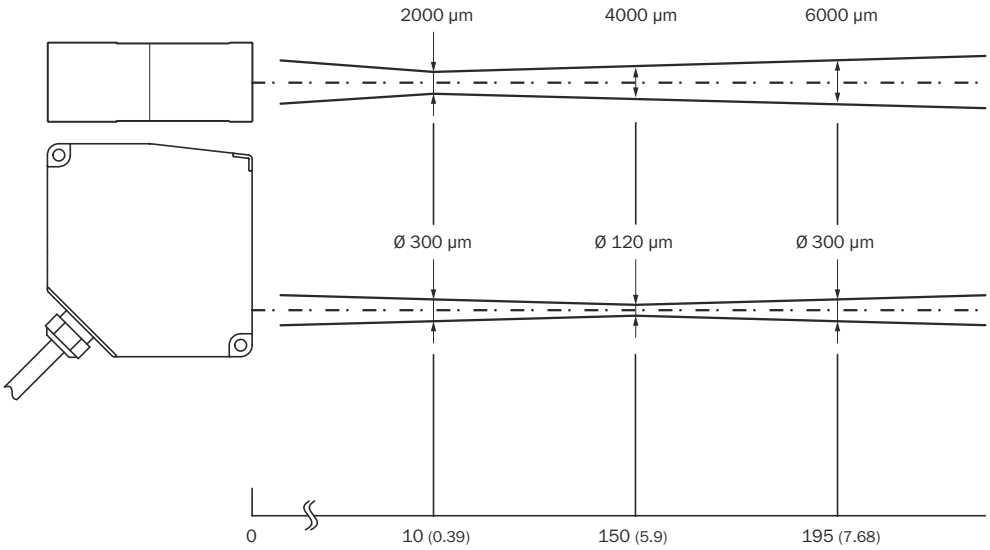


Figure 16: Typical light spot size of the OD5000-C150W40, unit for distance values: mm (inch), decimal separator: period

4 Transport and storage

4.1 Transport

For your own safety, please read and observe the following notes:

NOTICE

Damage to the product due to improper transport.

- The device must be packaged for transport with protection against shock and damp.
- Recommendation: Use the original packaging as it provides the best protection.
- Transport should be performed by trained specialist staff only.
- The utmost care and attention is required at all times during unloading and transportation on company premises.
- Note the symbols on the packaging.
- Do not remove packaging until immediately before you start mounting.

4.2 Unpacking

- To protect the device against condensation, allow it to equilibrate with the ambient temperature before unpacking if necessary.
- Handle the device with care and protect it from mechanical damage.

4.3 Transport inspection

Immediately upon receipt in Goods-in, check the delivery for completeness and for any damage that may have occurred in transit. In the case of transit damage that is visible externally, proceed as follows:

- Do not accept the delivery or only do so conditionally.
- Note the scope of damage on the transport documents or on the transport company's delivery note.
- File a complaint.

NOTE

Complaints regarding defects should be filed as soon as these are detected. Damage claims are only valid before the applicable complaint deadlines.

4.4 Storage

Store the device under the following conditions:

- Recommendation: Use the original packaging.
- Electrical connections are provided with a protective cap (as in the delivery condition).
- Do not store outdoors.
- Store in a dry area that is protected from dust.
- So that any residual damp can evaporate, do not package in airtight containers.
- Do not expose to any aggressive substances.
- Protect from sunlight.
- Avoid mechanical shocks.
- Storage temperature: see "Technical data", page 84.
- Relative humidity: see "Technical data", page 84.
- For storage periods of longer than 3 months, check the general condition of all components and packaging on a regular basis.

5 Mounting

5.1 Facilities for connecting

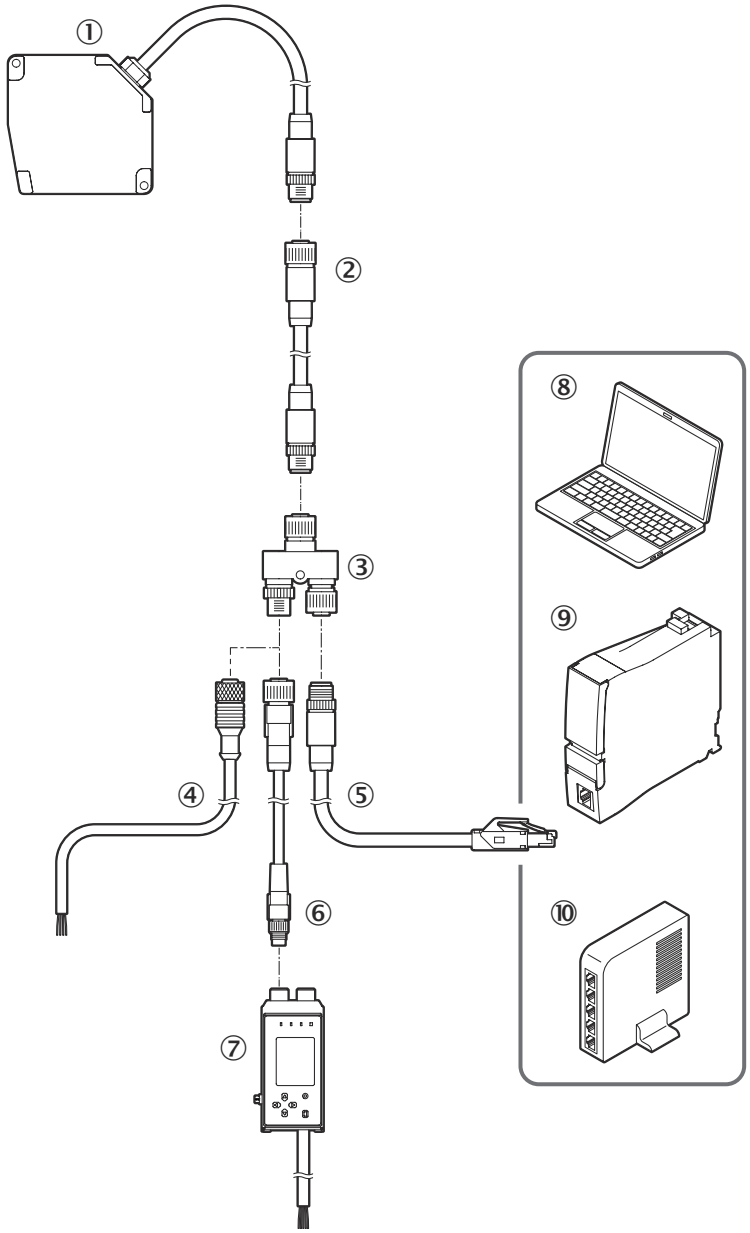


Figure 17: Facilities for connecting

① OD5000 displacement measurement sensor

② Extension cable for the device (e.g., DSC-1208-G02MA, 2 m, part number: 6064004) [1)]

③ Y-distribution (included in the scope of delivery of the device)

④ Cable with female connector, M12, 4-pin, A-coded and open end (e.g., YF2A14-020UB3XLEAX, 2 m, part number: 2095607) for connecting the supply voltage and, if applicable, wiring the input

⑤ Ethernet cable with male connector, M12, 4-pin, D-coded on male connector, RJ45, 8-pin (e.g., SSL-2J04-G02ME, 2 m, part number 6034414)

⑥ AOD1 connection cable, M12, 4-pin, A-coded on M8, 4-pin, coded (e.g., DSL-2804-G02MC, 2 m, part number: 6039180)

1) This connection cable is designed as a twisted pair. We do not recommend using a standard cable.

⑦ AOD1 evaluation unit (e.g., AOD1-MR27D4, part number: 6070574)
⑧ Computer
⑨ PLC
⑩ Switch

NOTICE
When the device is connected to the AOD1 evaluation unit, seal off the unused connection ② of the Y-distribution (Ethernet interface) using the enclosed protective cap. This is necessary to maintain the specified IP67 enclosure rating of the device, including connection cables and Y-distribution, during operation.

5.2 Mounting instructions

- Observe the technical data.
- Protect the sensor from direct sunlight.
- To prevent condensation, avoid exposing the device to rapid changes in temperature.
- The mounting site has to be designed for the weight of the device.
- To avoid inaccurate measurements when installing multiple devices: Make sure that the laser light spot of one device is not in the visible range of another device.
- Take into account the device warm-up time of 10 minutes. During the device warm-up phase, the measured values are subject to an increased variance (temperature drift).

5.3 Mounting device

1. Mount the device using the designated fixing holes, see "Setup and dimensions", page 14.
2. Make the electrical connection. Attach and tighten a voltage-free cable, see "Connecting the device electrically", page 30.
3. Switch on the supply voltage.

✓ The status LED lights up green.
The device needs around 10 seconds of initialization time before it is ready for operation.

4. Align the light spot so that the desired object is measured.

Mounting on the wall

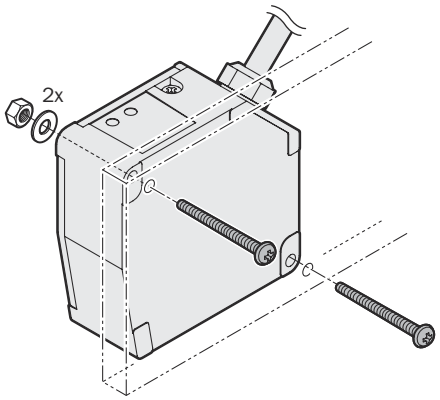


Figure 18: Mounting on the wall

Permissible bend radii of the connection cable

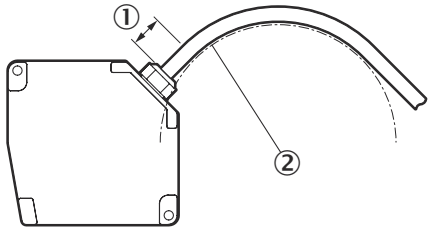


Figure 19: Permissible bend radius

① At least 10 mm

② Radius of at least 60 mm

NOTICE

- Do not bend the cable less than 10 mm from the sensor head.
- Do not bend the cable with a radius of more than 60 mm.

Mounting variations

There are two mounting variations for the device. Typically, diffuse reflection is used. Specular reflection is used when transparent or reflective surfaces are to be registered.

NOTE

The housing form for the device indicates the orientation of the correct mounting method. When mounting the device for the measurement of reflective objects, the device must be mounted so that it is slightly tilted. In doing so, the slanted edge of the housing must be positioned so that it is perpendicular to the measuring object. In this mounting variation, only a reduced measuring range is available, see "Technical data", page 84.

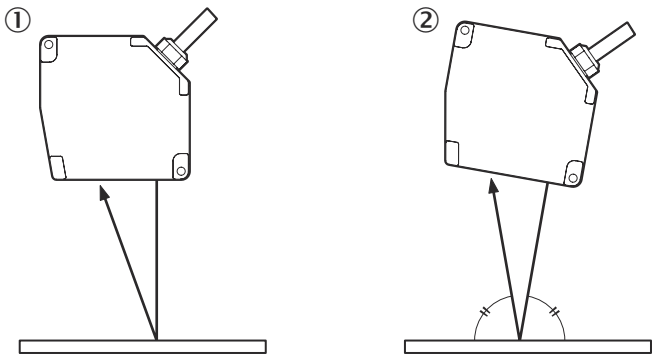


Figure 20: Mounting variations

① Diffuse reflection

② Specular reflection (except OD5000-C15(T/W)01)

5.3.1 Mounting the device depending on application

With height differences

The preferred direction must be taken into account during mounting in order to prevent shadows.

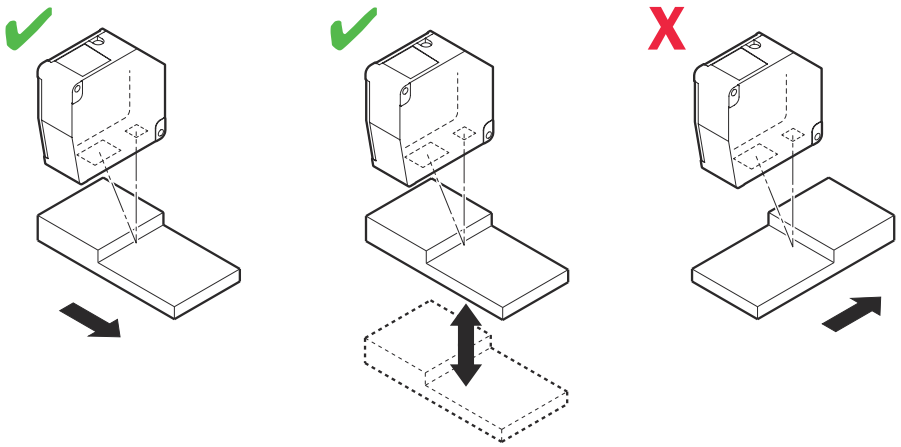


Figure 21: Mounting with height differences

With different material or colors

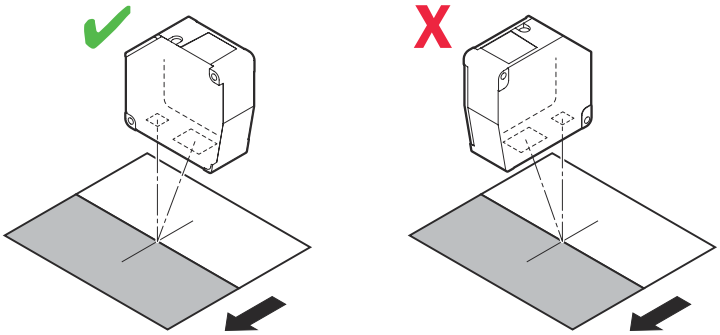


Figure 22: Mounting with different material or colors

With rotating surfaces

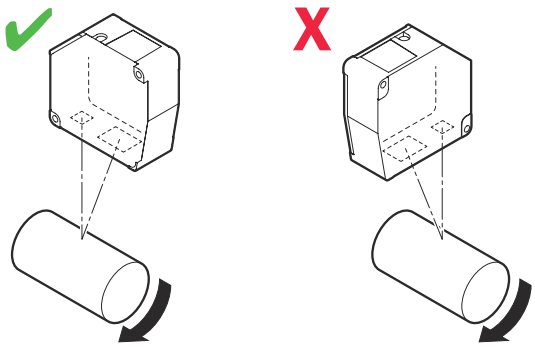


Figure 23: Mounting with rotating surfaces

With holes or recesses

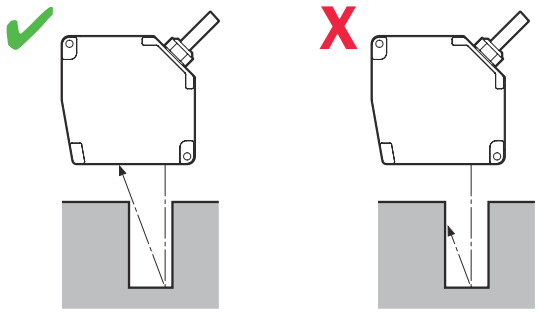


Figure 24: Mounting with holes or recesses

Mounting on the wall

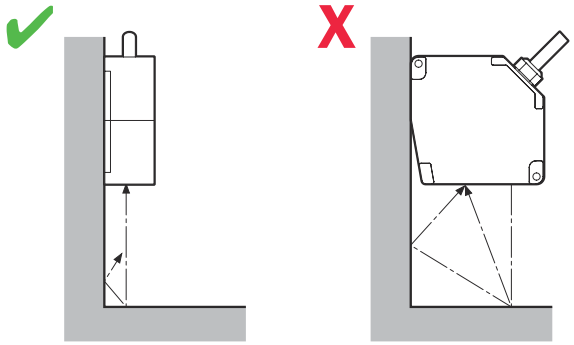


Figure 25: Mounting on the wall

6 Electrical installation

6.1 Safety

WARNING
Personal injury due to improper supply voltage!

- Only operate the device using safety extra-low voltage and safe electrical insulation as per protection class III.

NOTICE
Equipment damage or unpredictable operation due to working with live parts.

Working with live parts may result in unpredictable operation.

- Only carry out wiring work when the power is off.
- Only connect and disconnect electrical connections when the power is off.

6.2 Wiring instructions

NOTE
Pre-assembled cables can be found online at:

- www.sick.com/OD5000

NOTICE
Faults during operation and device or system defects!

Incorrect wiring may result in operational faults and defects.

- Follow the wiring notes precisely.

6.3 Pin assignment of the connections

Y-distribution

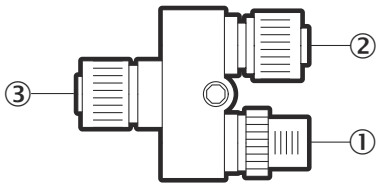


Figure 26: Y-distribution connections

① M12 male connector, 4-pin, A-coded
② Female connector, M12, 5-pin, D-coded
③ Female connector, M12, 8-pin, A-coded

Connection ① to the Y-distribution

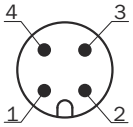


Figure 27: Male connector, M12, 4-pin, A-coded

Table 2: Pin assignment for male connector, M12, 4-pin, A-coded

Pin	Signal	Function
1	DC +24 V	Voltage supply
2	Input (MF) / RS485+	Input MF (NPN) / Reserved
3	0 V	Voltage supply
4	Input (MF) / RS485–	Input MF (PNP) / Reserved
-	Shield	-

Connection ② to the Y-distribution

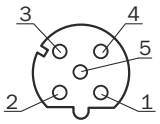


Figure 28: Female connector, M12, 5-pin, D-coded

Table 3: Pin assignment for female connector, M12, 5-pin, D-coded

Pin	Signal	Function
1	TxD+	Network interface (Ethernet)
2	RxD+	Network interface (Ethernet)
3	TxD–	Network interface (Ethernet)
4	RxD–	Network interface (Ethernet)
5	NC	Not connected
–	Shield	–

Connection ③ to the Y-distribution

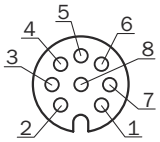


Figure 29: Female connector, M12, 8-pin, A-coded

Table 4: Pin assignment for female connector, M12, 8-pin, A-coded

Pin	Signal	Function
1	Input (MF) / RS485+	Input MF (NPN) / Reserved
2	0 V	Voltage supply
3	DC +24 V	Voltage supply
4	TxD–	Network interface (Ethernet)
5	RxD+	Network interface (Ethernet)
6	TxD+	Network interface (Ethernet)
7	Input (MF) / RS485–	Input MF (PNP) / Reserved
8	RxD–	Network interface (Ethernet)
–	Shield	–

Connecting the Ethernet cable (M12 to RJ45) ② to the Y-distribution

Pin assignments

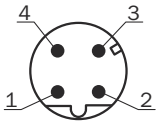


Figure 30: Male connector, M12, 4-pin, D-coded

Table 5: Pin assignment for male connector, M12, 4-pin, D-coded

Pin	Signal	Function
1	TxD+	Network interface (Ethernet)
2	RxD+	Network interface (Ethernet)
3	TxD–	Network interface (Ethernet)
4	RxD–	Network interface (Ethernet)
–	Shield	–

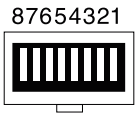


Figure 31: Male connector, RJ45

Table 6: Pin assignment for male connector, RJ45, 8-pin

Pin	Signal	Function
1	TxD+	Network interface (Ethernet)
2	TxD–	Network interface (Ethernet)
3	RxD+	Network interface (Ethernet)
4	NC	Not connected
5	NC	Not connected
6	RxD–	Network interface (Ethernet)
7	NC	Not connected
8	NC	Not connected
–	Shield	–

Connecting the voltage supply cable ① to the Y-distribution

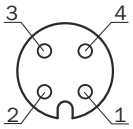


Figure 32: Female connector, M12, 4-pin, A-coded

Table 7: Pin assignment for female connector, M12, 4-pin, A-coded

Pin	Signal	Function
1	DC +24 V	Voltage supply
2	Input (MF) / RS485+	Input MF (NPN) / Reserved
3	0 V	Voltage supply
4	Input (MF) / RS485-	Input MF (PNP) / Reserved
–	Shield	–

Pin assignment for the voltage supply cable and signal cable, M12, 4-pin (e.g. DOL-1204-G02MAC, part number: 2088079). The cable can be used with a connection cable (e.g., YF2A14-020UB3XLEAX, 2 m, part number: 2095607) or with a AOD1 connection cable (z. B. DSL-2804- G02MC, 2 m, part number: 6039180).

6.4 Connecting the device electrically

NOTE
The connection diagram, and information on inputs and outputs, can be found on the side plate on the device.

NOTICE
All electrical circuits must be connected to the device with safety extra-low voltage (SELV or PELV).

1. Ensure that the voltage supply is not connected.
2. Observe the wiring instructions, see "Wiring instructions", page 27.
3. Connect the device according to the connection diagram.

7 Operation

7.1 General notes

If the device is not able to perform a measurement even though the measuring object is within the specified measuring range, check the alignment of the device and optimize it if necessary, see "Mounting the device depending on application", page 24. In general, adjusting the measuring rate can increase the measuring ability for very dark objects, for example.

To prevent EMC interference, observe the wiring instructions.

7.2 Control elements and status indicators

7.2.1 Indicator lights

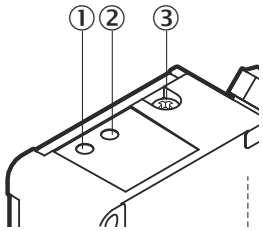


Figure 33: OD5000 control panel

① Communication LED (link)
② Status LED (power)
③ Cover screw for reset pushbutton

Table 8: Meaning of the indicator lights

Indicator	Status	Color	State
Communication LED (link)	☀	Green	Ethernet communication is active
Status LED (power)	☀	Blue	Laser off
	☀	Red	Invalid measurement
	●	Orange	Measured value valid, output state for channel A = high
	●	Green	Measured value valid, output state for channel A = low
	☀	White	“Find me” is active

☀ Flashing
● Permanently on

7.2.2 Operating elements

Table 9: Functions of the reset pushbutton

Hold down pushbutton for	Function	Status LED	Description
< 1 s	None	Unchanged	If the button is not held for long enough, the changes are not applied
1 to 5 s	IP address is initialized (static IP)	Flashing orange (slowly)	IP address is changed to 192.168.0.100
5 to 10 s	IP address is changed (DHCP)	Flashing green (slowly)	IP address is obtained and set to DHCP
> 10 sec	All settings are initialized	Flashing green (quickly)	All settings are reset to the factory settings

NOTE

- To reset all settings to the factory settings, press the reset pushbutton.

The reset pushbutton is only accessible once the screw has been removed.

- Always remove and store the screw together with the sealing ring.
- Refit the screw and sealing ring.
- Observe the maximum torque of 0.08 Nm ±20%.

The IP67 enclosure rating is only ensured with a proper screw connection and intact sealing ring.

Use the SOPASair web browser to configure the device. The UDP/IP interface is mainly recommended for streaming the measured values.

7.3 Operation via web browser (SOPASair)

7.3.1 Determining the device IP address

The default IP address of the device is 192.168.0.100.

The device IP address can be verified and adjusted by a device-specific search in SOPAS ET.

7.3.2 Connecting via the web browser

The following browsers are supported:

- Internet Explorer (version 11 or higher)
- Google Chrome (version 49 or higher)

1. Start browser.
2. Enter the device IP address.

✓ The SOPASair settings screen is displayed.

Logging in

The user must log in to edit the device settings. The button is located at the bottom left in the settings screen (person icon).

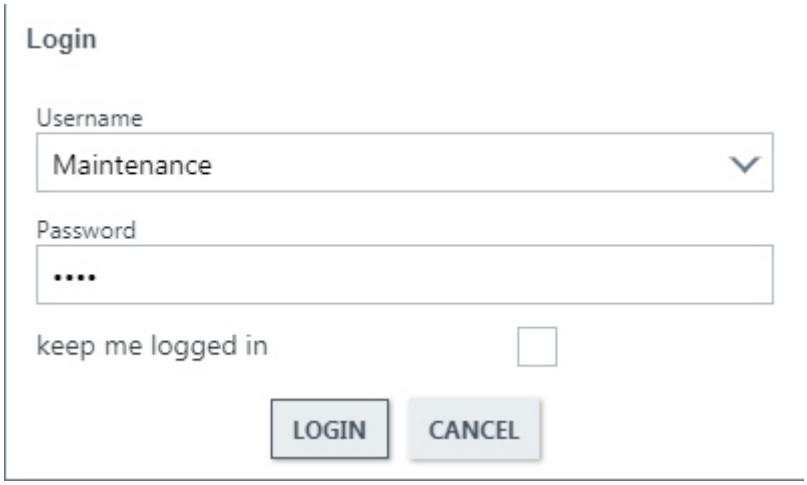


Figure 34: Log-in screen

The **Maintenance** user level is available for choosing settings.

Username: Maintenance

Password: main

The **Service** and **SICK Service** user level is for the exclusive use of trained and authorized service personnel at SICK AG, see "Expert", page 62.

NOTE

After logging in, it might be necessary to click on the “Pencil” button (top right in the window) to enable editing.

We recommend activating the “Stay logged in” selection box so you do not have to log in again every time the page is updated.

7.3.3 Overview of SOPASair

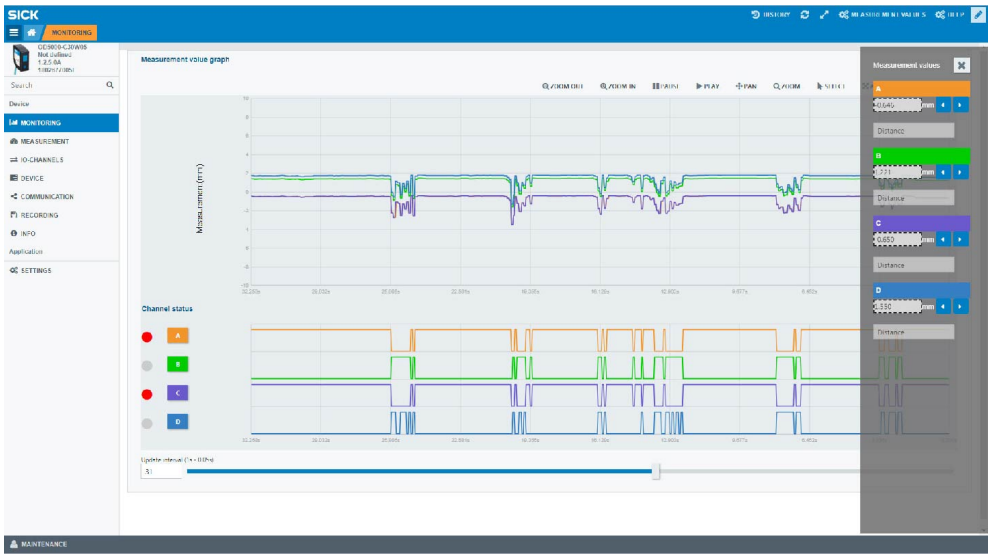


Figure 35: Overview of SOPASair

The following menu items are available when viewed online:

- **Monitoring**
- **Measurement**

- **IO-Channels**
- **Device**
- **Communication**
- **Recording**
- **Info**

The navigation screen on the left-hand side is displayed by default. It can be hidden, however, by clicking on the button with the three white bars (top left).

The following buttons are displayed on each bar at the top right:

Measured values: Displays the current measured values. The display of the measured value (number of decimal places) can be adapted using two buttons.

Help: Displays help texts on the current settings.

7.3.4 Monitoring

Figure 36: Overview of the Monitoring tab

① **A** - **D** buttons

② **Monitoring** tab

③ **Measured values** button

The measured value plotter displays the current measured values (distance/thickness). Current measured values can be hidden or displayed at any time using the **Measured values** button in the bar at the top of the screen. The color corresponds to the respective channel.

The display of the individual channels can be activated and deactivated using the buttons **A** to **D**.

The digital plotter displays the statuses of the output signals for channels A to D.

The status of the outputs is displayed by LEDs to the left of the buttons:

- Red = output active
- Grey = output deactivated

The speed at which the measured values and the digital plotter are output is adjusted equally by sliding the controller on the speed bar.

7.3.5 Measurement - Basic settings

The measurement settings can be configured in the **Measurement** - **Basic settings** tab.

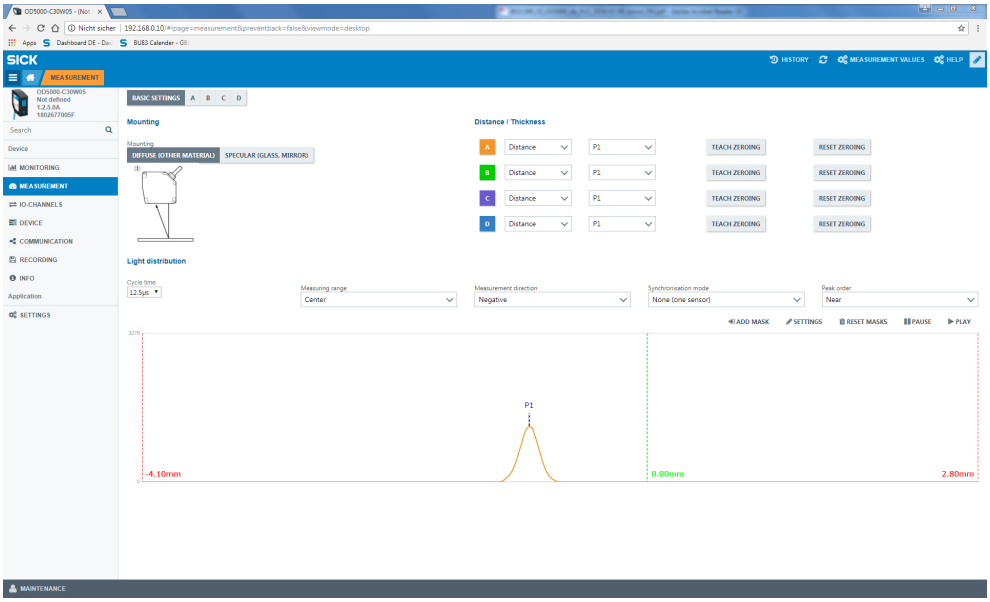


*Figure 37: Overview of the **Measurement** - **Basic settings** tab*

① **Measurement** tab

② **Basic settings** window

7.3.5.1 Setting diffuse or specular reflection

One of two options can be selected depending on the measuring object and the mounting method, see "Mounting device", page 23.

NOTE

Some device variants only support one mode.

The OD5000-C150xxx only supports diffuse reflection, the OD5000-C015xxx only specular reflection.

Part number	Device	Diffuse	Specular
6063619	OD5000-C15T01	Not supported	x
6063620	OD5000-C15W01	Not supported	x
6063621	OD5000-C30T05	x	x
6063622	OD5000-C30W05	x	x
6063623	OD5000-C85T20	x	x
6063624	OD5000-C85W20	x	x
6063625	OD5000-C150T40	x	Not supported
6063626	OD5000-C150TW0	x	Not supported

NOTE

The measuring range is reduced if the OD5000-C30xxx or OD5000-C85xxx is reflected specularly, see "Technical data", page 84.

7.3.5.2 Determining the measurement type

This function determines which measurement is used via the respective channel.

Table 10: Adjustments for the measurement type

Setting	Meaning
Distance	Measures the distance between the zero point and a defined peak (object surface)
Thickness	Measures the distance between two peaks, e.g., a transparent object with several reflective surfaces (e.g., layers of glass). When selecting, consider which thickness is to be measured.

Table 11: Minimum thickness of transparent material (thickness measurement)

Type	OD5000-C15xxx	OD5000-C30xxx	OD5000-C85xxx	OD5000-C150xxx
Standard thickness measurement	≥ 0.18 mm	≥ 0.6 mm	≥ 2.0 mm	Not supported
Optimized thin layer thickness measurement[1]	≥ 0.06 mm	≥ 0.18 mm	≥ 0.5 mm	Not supported

1 The linearity error increases by a factor of 5 ... 10.

Depending on the selected measurement type, it is possible to determine on which peak or between which peaks the measurement is to be taken.

With the distance measurement type, up to eight peaks can be selected. Peak 1 (P1) is activated by default.

With the thickness measurement type (for measuring a transparent object), a selection must also be made of the peaks between which the measurement is to be taken. If the selected peak does not exist then a measurement is not taken. If the same peak is selected twice in this case, 0 is output as the measured value.

NOTE

The thickness can only be measured with the **specular reflection** mounting. This mode is not available for all devices in the OD5000 series, see "Setting diffuse or specular reflection", page 35.

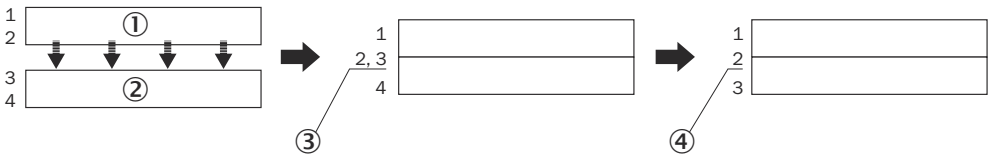


Figure 38: Thickness measurement of reflective surfaces

① First glass pane
② Second glass pane
③ Transparent objects very close to one another
④ Incorrectly detected single peak

NOTE

If two overlapping glass panes are measured so that the rear side of one pane is very close to the front side of the other pane, the device cannot differentiate between the two surfaces. The device then detects both surfaces as a single reflective surface.

Monitor the light wave shape to check how well the device detects reflective surfaces (see "Checking the light distribution curve and peaks", page 38).

7.3.5.3 Teaching in the zero point

The current distance is taught in as a new zero point (reference point) or reset to the output value.

7.3.5.4 Setting the sampling duration

The following settings are possible:

- 12.5 µs
- 14.3 µs
- 16.7 µs
- 20 µs
- 25 µs
- 50 µs (default value)
- 100 µs
- 500 µs
- 1,000 µs
- AUTO (selects the sampling rate for the quickest possible measurement depending on the measuring object)

NOTE

If the sampling duration is set to a time period of ≤20 µs , then the measuring range is reduced.

- Select the required range (near, medium, far) via the configuration interface.

For a sampling duration of ≤20 µs

Table 12: Measuring range at sampling duration ≤20 µs (OD5000-C15xxx and OD5000-C30xxx)

	OD5000-C15T01	OD5000-C15W01	OD5000-C30T05	OD5000-C30W05
Near	14.0 mm to 14.6 mm		25.0 mm to 28.1 mm 22.5 mm to 24.0 mm (for specular reflection)	
Medium (starting value)	14.4 mm to 15.4 mm		27.8 mm to 31.9 mm 22.8 mm to 27.9 mm (for specular reflection)	
Dist.	15.3 mm to 16.0 mm		31.1 mm to 35.0 mm 26.7 mm to 28.5 mm (for specular reflection)	

Table 13: Measuring range at sampling duration ≤20 µs (OD5000-C85xxx and OD5000-C150xxx)

	OD5000-C85T20	OD5000-C85W20	OD5000-C150T40	OD5000-C150W40
Near	65.0 mm to 77.7 mm 71.5 mm to 74.3 mm (for specular reflection)		110.0 mm to 134.4 mm	
Medium (starting value)	73.5 mm to 90.8 mm 70.6 mm to 86.9 mm (for specular reflection)		124.8 mm to 166.3 mm	
Dist.	84.8 mm to 105.0 mm 81.0 mm to 91.5 mm (for specular reflection)		150.2 mm to 190.0 mm	

An upper and lower limit must be set for the **Auto** setting. The actual sampling duration is automatically adjusted within these limits.

Table 14: Adjustments for the upper and lower limit

Lower limit	Upper limit
25 µs (default value)	25 µs
50 µs	50 µs
100 µs	100 µs
200 µs	200 µs
500 µs	500 µs (default value)
1,000 µs	1,000 µs

7.3.5.5 Determining the direction of detection

The direction of detection determines whether the measured value increases (positive) or decreases (negative) when the distance between the device and measuring object increases.

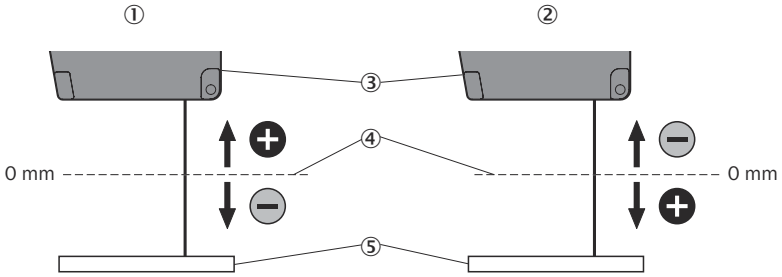


Figure 39: Direction of detection

① Set to positive
② Set to negative
③ Sensor head
④ Center point of the measurement
⑤ Measuring object

To determine the order of the peaks, see "Checking the light distribution curve and peaks", page 38.

7.3.5.6 Checking the light distribution curve and peaks

In this settings display, the user can check the light waveform which is displayed on the receiver. The peak displays the distance to the measuring object. If the device detects peaks then these are displayed in the corresponding light waveform and labeled P1 to P8.

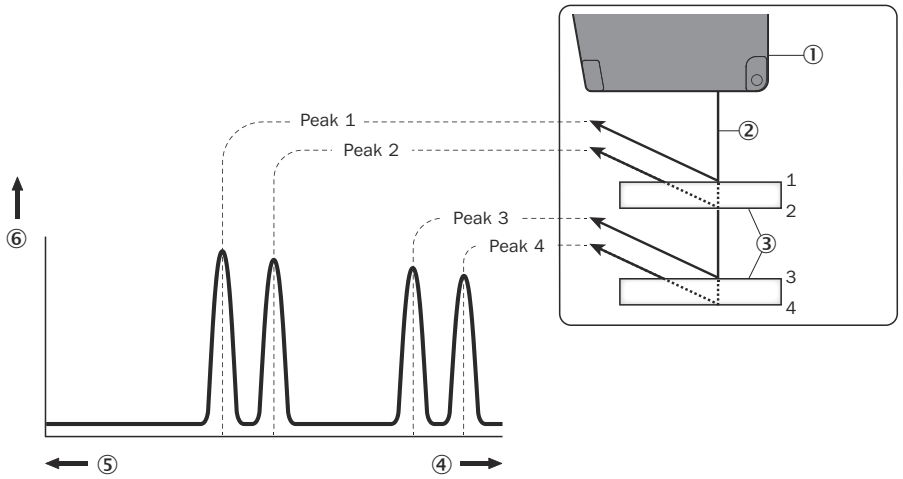


Figure 40: Light distribution curve

① Sensor head
② Laser
③ Reflective surface
④ Side close to the sensor head (depending on the **Measuring direction** setting)
⑤ Side far from the sensor head (depending on the **Measuring direction** setting)
⑥ Reflected light intensity

During the measurement, light can be reflected from several surfaces at the same time; for example, from the front and rear of a transparent measuring object.

Direction of detection: The device assigns numbers to the scanned surfaces. This means that the measurement can focus on individual reflection points (peaks). The numbers are assigned (using the direction of detection: near/far) in such a way that they either increase (near) or decrease (far) beginning on the side closest to the sensor.

Example based on four glass panes:

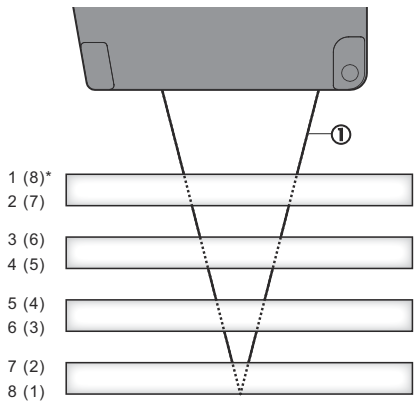


Figure 41: Peak detection

① Laser

1 = Near
(8) = Far

Near is selected as the standard setting, i.e., the numbering increases from the side closest to the sensor.

Mask function

The **Mask** function can be used to define one or more areas in which the device does not make measurements. A typical application is the blanking of a transparent protective screen located between the measuring object and device.

7.3.6 Measurement - Channels A–D

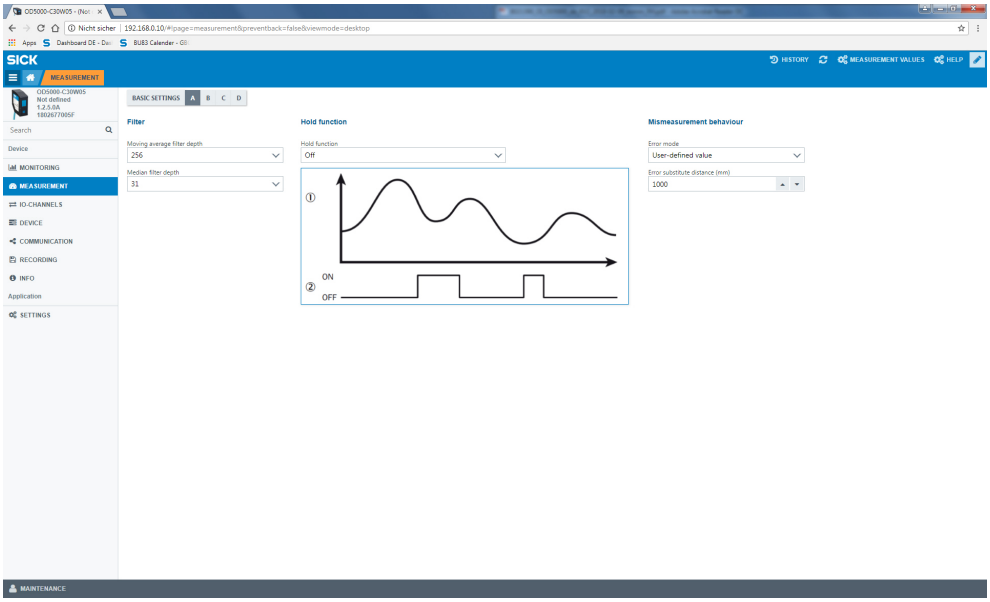


*Figure 42: Overview of the **Measurement** - **Channels A-D** tab*

① **Measurement** tab
② Channel **A** window

7.3.6.1 Setting the measurement value filter

The measurement value filters optimize the signal diagram in order to simplify the evaluation by the control system (e.g., for regulation tasks). You can select from the following filters:

- Average filter
- Median filter

By default, the average filter is set to a filter depth of 256 measured values and the median filter to a filter depth of 31 measured values.

Average filter

The average filter carries out a moving averaging of the measured values. This filter is suitable for smoothing a noisy signal diagram in order to ensure better repeatability.

Filter depth: 1 / 2 / 4 / 8 / 16 / 32 / 64 / 128 / 256 (default value) / 512 / 1024 / 2048 / 4096 / 8192 / 16384 / 32768 / 65536 (unit: measuring point)

The average filter can be deactivated by selecting filter depth 1.

Median filter

The moving median filter sorts the measured values according to their size and selects the middle value from a sequence. This filter is suitable for excluding individual outliers from the calculation of an average value.

Filter depth: Off / 7 / 15 / 31 (default value)

Both types of filter affect the response time of the device.

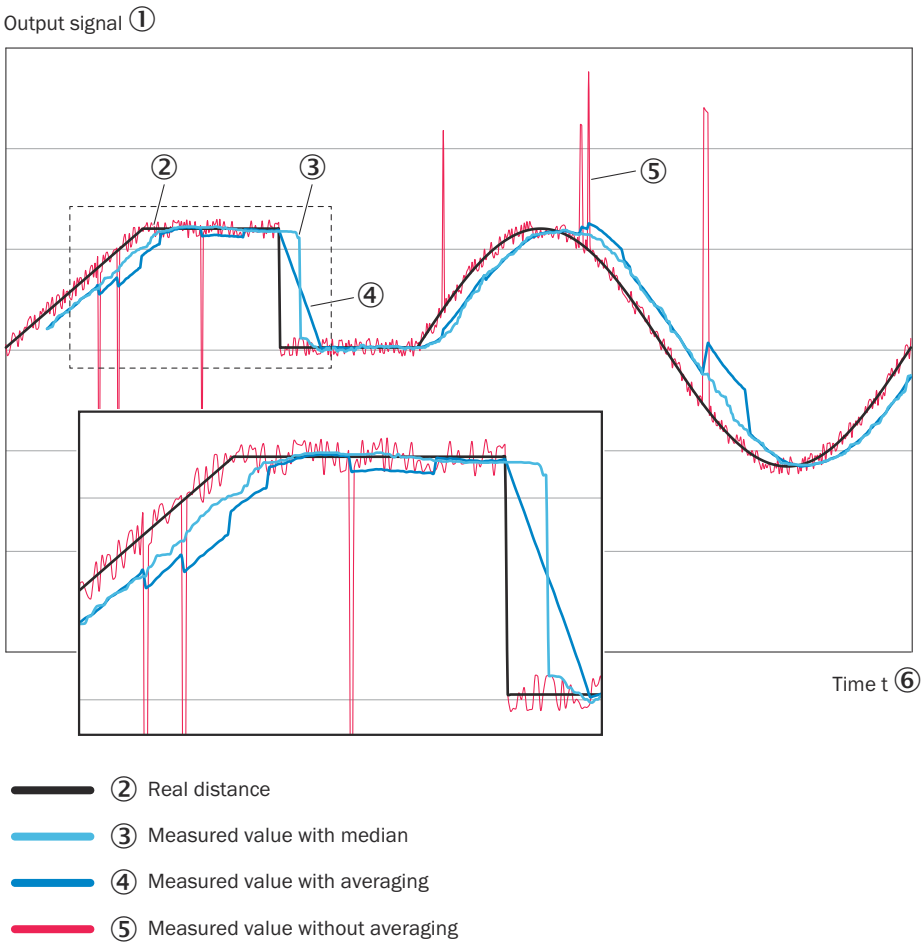


Figure 43: Median and average filter

① Output signal
② True distance
③ Measured value with median
④ Measured value with averaging
⑤ Measured value without averaging
⑥ Time

7.3.6.2 Setting the Hold function

The Hold function extracts a specific value such as the maximum or minimum value within a detection period. The value which was set under **Hold Set** is used as the holding period.

- Use this function after entering Hold Reset if Auto Peak or Auto Bottom is used.

Off

When the hold function is deactivated, the measurement result is output in an unedited format and the Hold Input is ignored.

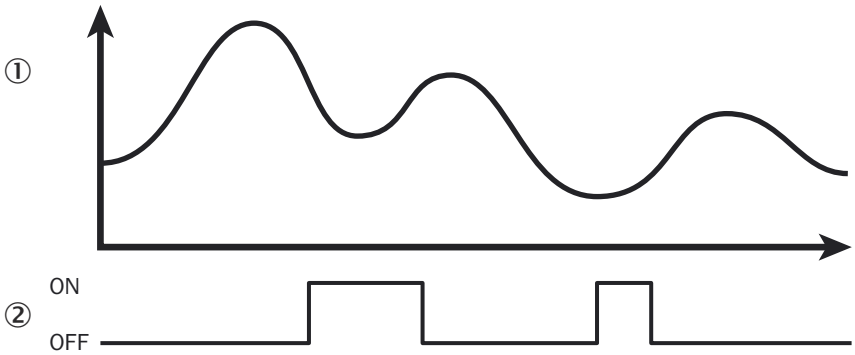


Figure 44: Hold function off

① Measured value
② Hold function

Normal

The measured value is held as long as a hold reset input is detected.

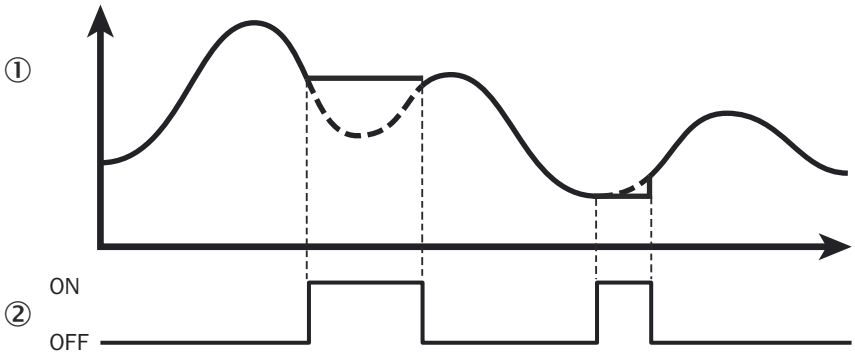


Figure 45: Normal hold function

① Measured value
② Hold function

Peak

The highest value within the detection period is output.

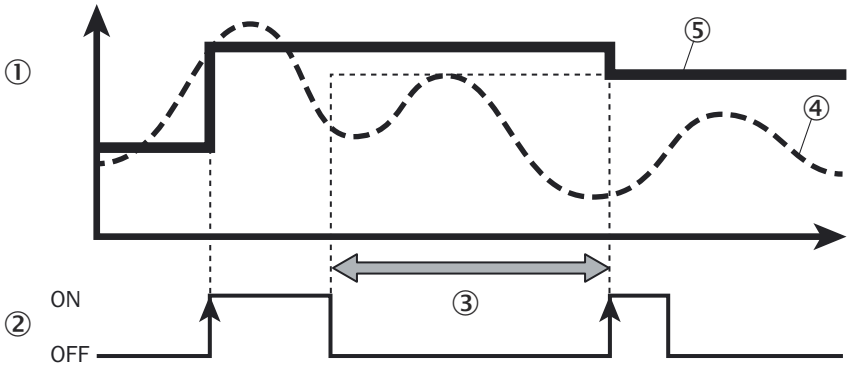


Figure 46: Hold function peak

① Measured value
② Hold
③ Detection period
④ Internal measured value
⑤ Measured value for the hold function peak

Bottom

The lowest value within the detection period is output.

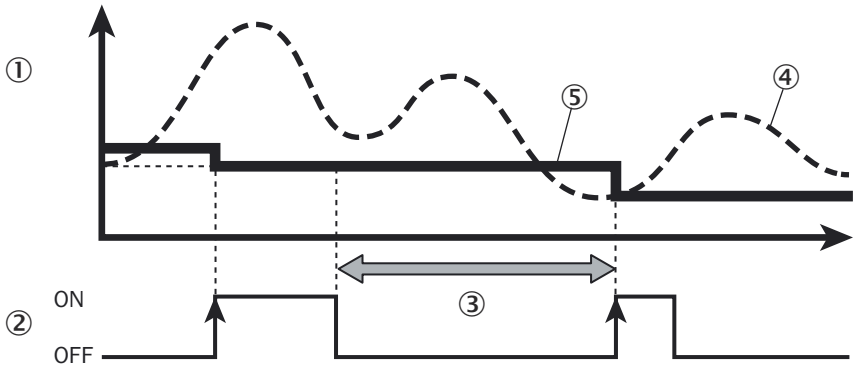


Figure 47: Bottom hold function

① Measured value
② Hold function
③ Detection period
④ Internal measured value
⑤ Measured value of the Bottom hold function

Sample Hold

The value for the rising signal edge is output.

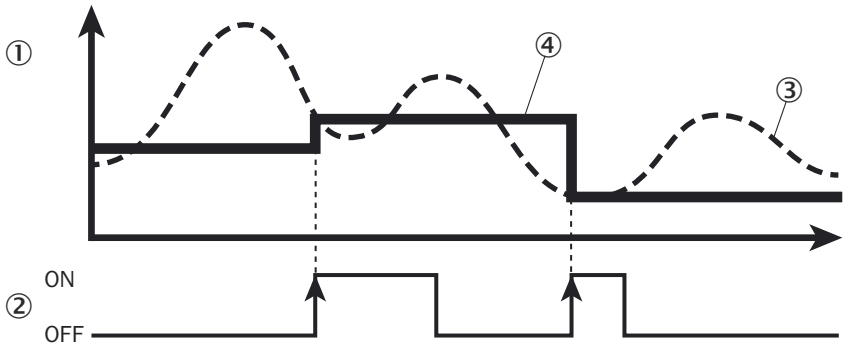


Figure 48: Sample Hold hold function

① Measured value
② Hold function
③ Internal measured value
④ Measured value of the Sample Hold hold function

Auto Peak

The highest value is recorded as soon as a hold reset input is detected.

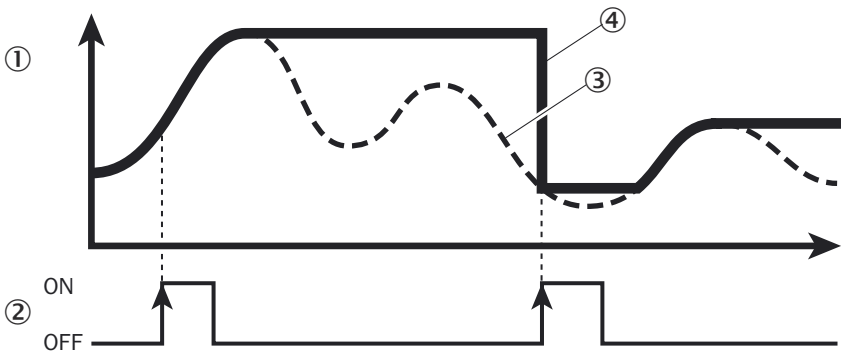


Figure 49: Auto Peak hold function

① Measured value
② Hold function
③ Internal measured value
④ Measured value of the Auto Peak hold function

Auto Bottom

The lowest value is recorded as soon as a hold reset input is detected.

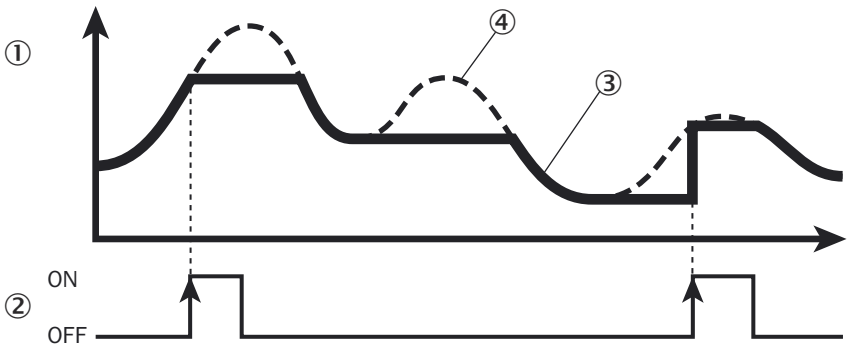


Figure 50: Auto Bottom hold function

① Measured value
② Hold function
③ Measured value of the Auto Bottom hold function
④ Internal measured value

Peak to Peak

The value is maintained from peak to peak. The differential value between the maximum (P(1)) and the minimum (B(1)) measured value within the measurement period is output.

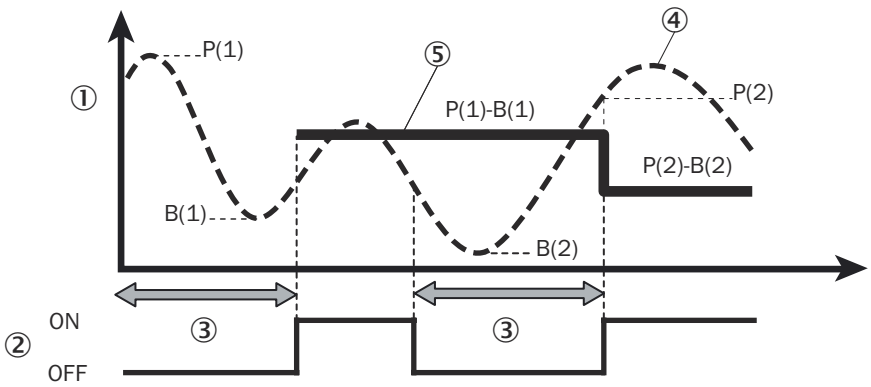


Figure 51: Peak to Peak hold function

① Measured value
② Hold function
③ Duration of measurement
④ Internal measured value
⑤ Output hold value

7.3.6.3 Mismeasurement behavior

This function allows you to determine the output when a measurement is not possible.

Table 15: Settings for behavior in case of mismeasurement

Setting	Meaning
User-defined value	A defined value is displayed.
Hold last value	The most recently measured value is displayed.
User-defined value at a set time	Forces the output of a user-defined value at a set time during a mismeasurement.

Mismeasurement behavior: User-defined value

The user-defined value is set in the **Mismeasurement behavior** area.

Values between 0 mm and 2,000.00 mm are allowed; the standard value is 1,000 mm.

Error suppression time

When **Delay user-defined value** is selected, the number of measuring points is determined by the setting of the **Error suppression time**, which is the time during which the most recently measured value is displayed. If a measurement still cannot be taken after this period then the user-defined value is displayed.

Values are possible from 0 (default value) to 4,095.

Restoration period following an error

When **Delay user-defined value** is selected, the number of measuring points is determined by the setting of the **Error recovery time**, which is the time the user-defined value continues to be output although a measurement is possible again.

Values are possible from 0 (default value) to 4,095.

7.3.7 Measurement - Sensor calculation

The **Sensor calculation** function enables the measured values of multiple sensor heads to be combined and the resultant measured values to be outputted. The sensor heads for which the measured values are to be combined must be synchronized in the network as master and slave, see "Synchronization settings (synchronizing multiple sensor heads)", page 57.

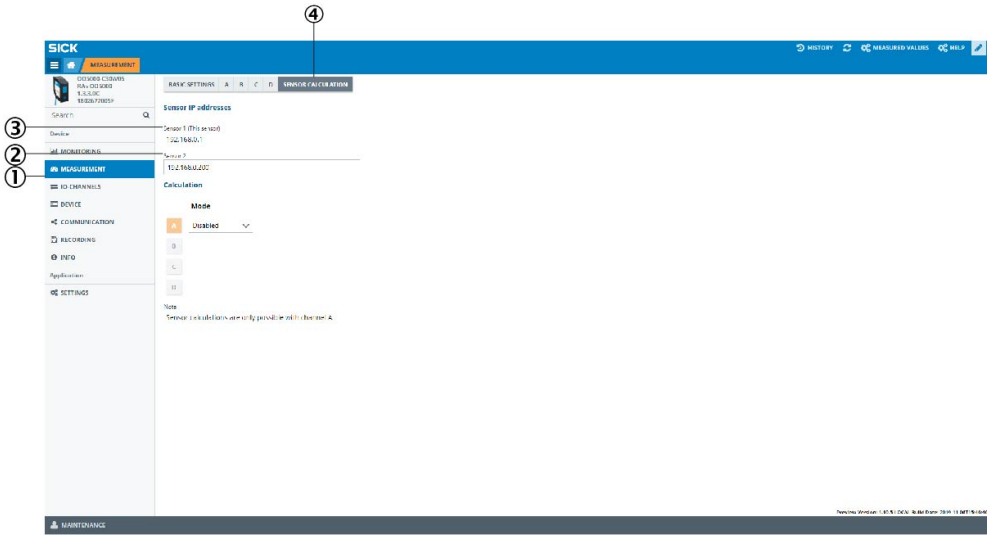


*Figure 52: **Measurement** - **Sensor calculation** tab*

① **Measurement** tab
② **Sensor 2**
③ **Sensor 1 (This sensor)**
② **Sensor calculation** window

IP addresses of the sensor heads

The communication settings are only configured on **Sensor 1 (This sensor)**. **Sensor 1** then automatically transmits the required settings to **Sensor 2**. No changes must be made to the communication settings on **Sensor 2**.

Sensor 1 (This sensor)

IP address of **Sensor 1** where the calculation settings are configured and via which the measured values are output to the target system (e.g., IPC, PLC). This IP address cannot be changed.

Sensor 2

Enter the IP address of **Sensor 2**, which will transmit its measured values to **Sensor 1** for combining.

Calculation - Mode

The following calculation modes can be selected:

- **Disabled:** no calculation
- **Overwrite with Sensor 2:** the measurement data of sensor 2 are outputted to channel A of sensor 1
- **Sensor 1 + Sensor 2**
- **Sensor 1 – Sensor 2**
- **Sensor 2 – Sensor 1**

NOTE

- Make sure that the **Calculation - Mode** setting on sensor 2 is set to **Disabled (no calculation)**.
- When using **Sensor calculation** mode, the measurement values can only be calculated and output via channel **A**.
- Only the sensor head where this setting has been made can transmit the measurement values via the UDP communication protocol.
- Cascading of more than two sensor heads is supported.

7.3.8 I/O Channels - A-D

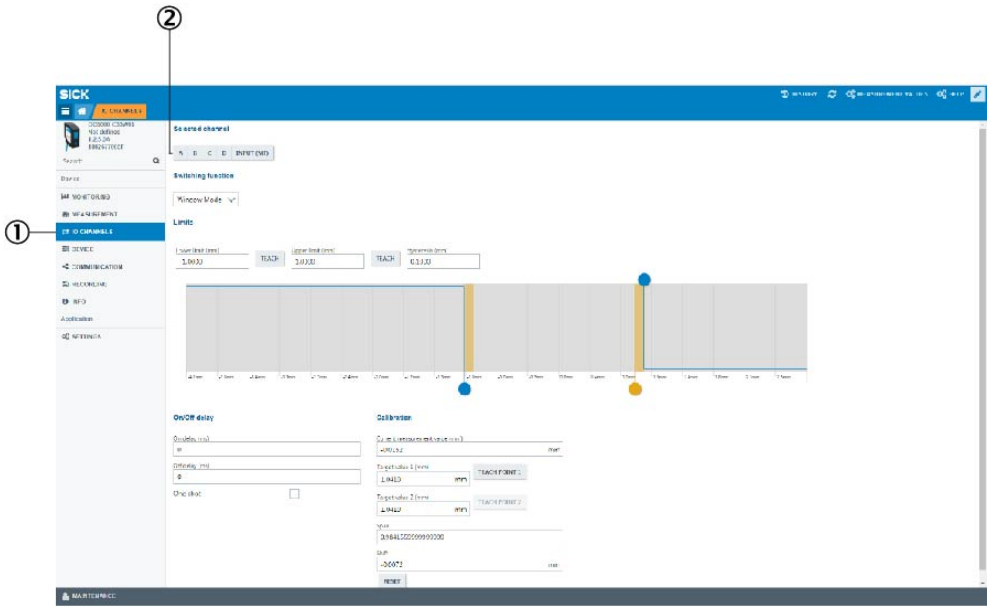


*Figure 53: Overview of the **IO Channels** tab*

① **IO Channels** tab

② Selectable channels

The settings for the digital signal of each channel are configured in this view. Four channels are available for this. The settings can be individually configured for each channel.

NOTE

The digital signals cannot be measured on the device pins but are made available via the Ethernet interface as part of data transmission.

7.3.8.1 Setting ObSB switching mode

ObSB = Object between Sensor and Background (object between device and background)

In this switching 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 device 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.

7.3.8.2 Setting DtO switching mode

DtO = Distance to Object, single switching point

A signal is output if the measured distance value has undershot (normally open – High Active) or exceeded (normally closed – Low Active) the switching point.

If the “DtO” switching mode is selected, the required settings can be taught in or set manually.

7.3.8.3 Setting Window switching 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 the window).

7.3.8.4 Setting edge height change switching mode

The edge height change function supplies a signal at the set device channel as soon as there is a change in value between two measured values. A typical application for this function is counting shingles in printing applications. The device takes on the complex evaluation tasks carried out by the control system.

The following settings must be configured on the device in order to use the edge height change function:

Maximum and minimum height change

The maximum and minimum height change values define the smallest and largest difference in mm by which the two measured values must differ in order for there to be an edge height change. This function only takes into account the difference between two measured values and is independent of the absolute distance of the object.

Change direction

- Both: All changes in measured values within the set limits are detected.
- Positive: Only changes in measured values within the set limits which result in larger distances are detected (factory setting).
- Negative: Only changes in measured values within the set limits which result in smaller distances are detected (to factory setting).

Hysteresis

Hysteresis is the difference in distance between the switch-on and switch-off points. This is necessary to ensure a stable signal 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 mm. More precise logic can be achieved by setting a lower value. Choose a higher value to ensure a more stable signal and reduce the probability of a faulty switch.

Cycle offset

The cycle offset value specifies which previous output value is compared with the value currently measured.

NOTE

A permanently set cycle time (≥ 25 µs) must be used in the edge height jump operating mode, see "Setting the sampling duration", page 37. This ensures time consistency for the output of measured values.

This switching function cannot be used in combination with the “Auto” sampling rate. In this case, the device independently changes the sampling rate from “Auto” to the standard value.

The allowed values are 0 to 100,000 (number of measurements), the default value is 20.

7.3.8.5 Setting limits

The threshold is set using limits. In doing so, the digital signal is set to **ON** or **OFF**. Not available for the edge height change switching mode.

Table 16: Upper limit of setting options

Device	Possible values	Default value
OD5000-C15xxx	±1.00 mm	+1.0 mm
OD5000-C30xxx	±5.00 mm	+1.0 mm
OD5000-C85xxx	±20.00 mm	+1.0 mm
OD5000-C150xxx	±40.00 mm	+1.0 mm

Table 17: Lower limit of setting options

Device	Possible values	Default value
OD5000-C15xxx	±1.00 mm	-1.0 mm
OD5000-C30xxx	±5.00 mm	-1.0 mm
OD5000-C85xxx	±20.00 mm	-1.0 mm
OD5000-C150xxx	±40.00 mm	-1.0 mm

7.3.8.6 Setting the hysteresis

If the measured value rises slightly above or drops slightly below the threshold, this can lead to the input and output repeatedly switching on and off within a short space of time. This can be prevented by assigning a defined tolerance to the measured value via the hysteresis setting, beyond which the device switches.

NOTE

The limits and the hysteresis can also be set by moving the corresponding marker in the graphic (blue: limits, yellow: hysteresis).

Default value is 0.1 mm.

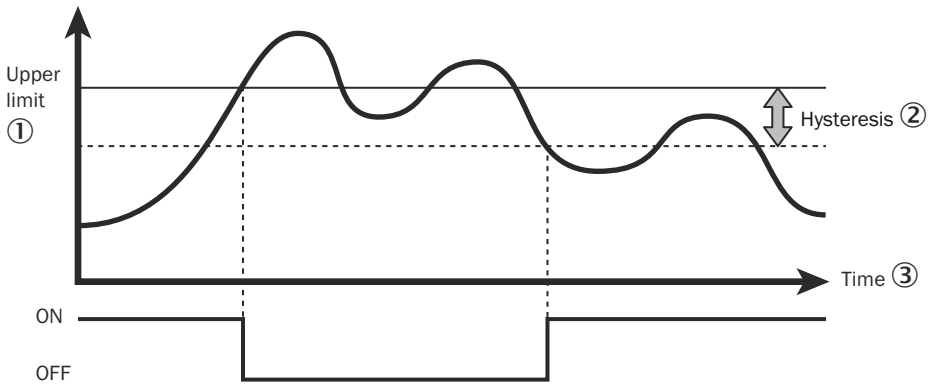


Figure 54: Hysteresis

① Upper threshold
② Hysteresis
③ Time

7.3.8.7 Setting the switch-on delay (on delay)

This setting is used to delay the switching on of the output by a set amount of time if the measured value exceeds the threshold.

This setting prevents the input and output from repeatedly switching on and off within a short period of time and enables the use of a slower PLC.

The delay is increased by the configured time by switching the switching output to **ON**.

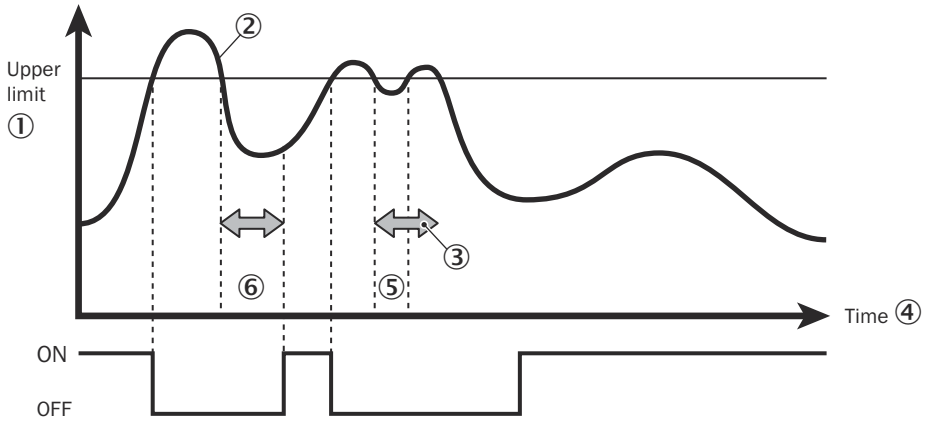


Figure 55: On Delay

① Upper threshold
② Measured value
③ Shorter than the defined time period
④ Time
⑤ The measured value is of equal size or greater than the threshold.
Output switches to OFF.
⑥ The measured value is below the threshold.
Output switches to ON.

The allowed values are 0 ms (default value) to 4,000 ms.

7.3.8.8 Setting the switch-off delay (Off Delay)

This setting is used to delay the switching off of the output by a set amount of time if the measured value falls below the threshold.

This function suppresses short signals (bursts) which prevents inaccurate measurements.

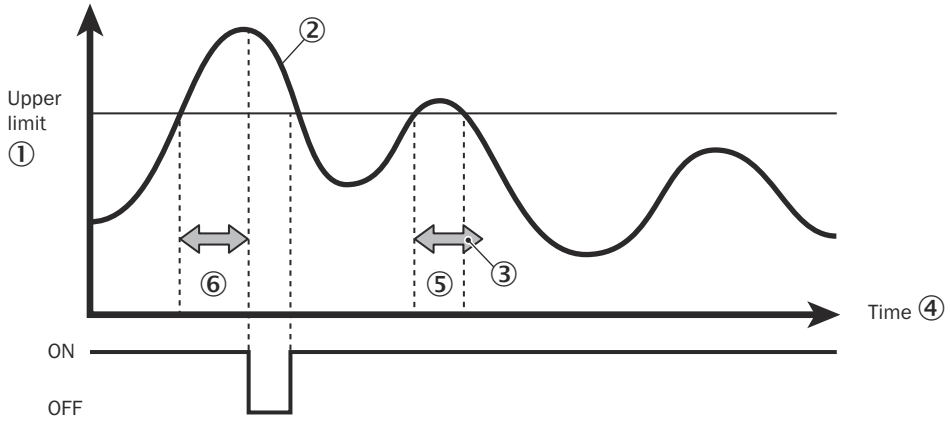


Figure 56: Off Delay

① Upper threshold
② Measured value
③ Shorter than the defined time period

④ Time
⑤ Output switches to OFF
⑥ Output switches to ON

Values are possible from 0 ms (default value) to 4,000 ms.

7.3.8.9 Setting the calibration

The display for setting the calibration will vary depending on the settings in the **Measurement** tab.

Distance

Shift

This setting is used to move the measured value to a fixed value. A corresponding correction value (shift) is added to or subtracted from the measured value of the sensor head.

Span

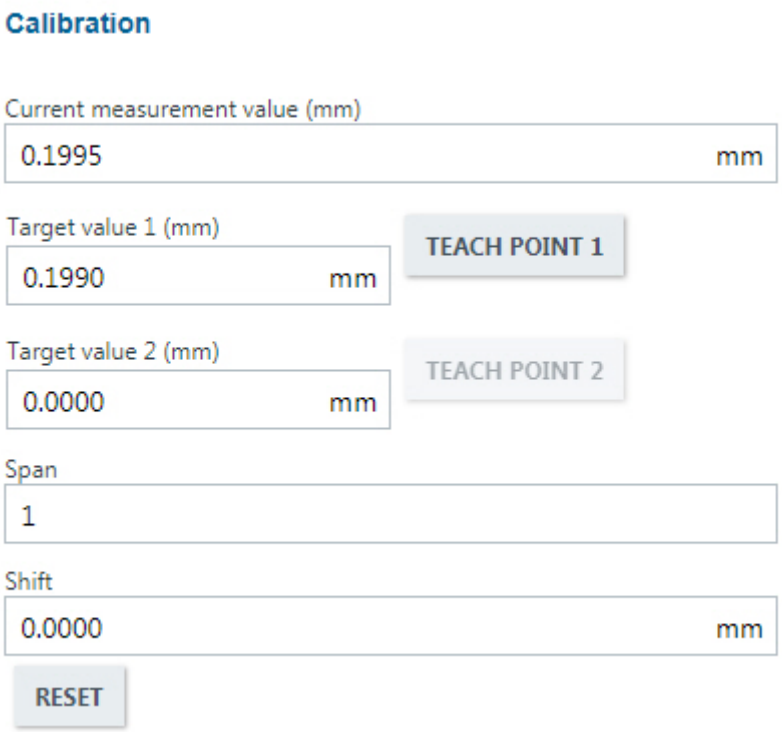
This value is selected according to the ratio of the measurement error to the measuring range. It is used for:

- compensating for a deviation caused by a tilted installation (distance)
- measuring the thickness of glass (so that refraction may be taken into account)

In a distance measurement, both values must usually be adjusted. With the thickness measurement type (for measuring the thickness of glass), it is important to set the calibration factor (span) to the correct value to ensure a precise measurement and to compensate for the refraction index of the measured material. Only the span value can be set for the thickness measurement.

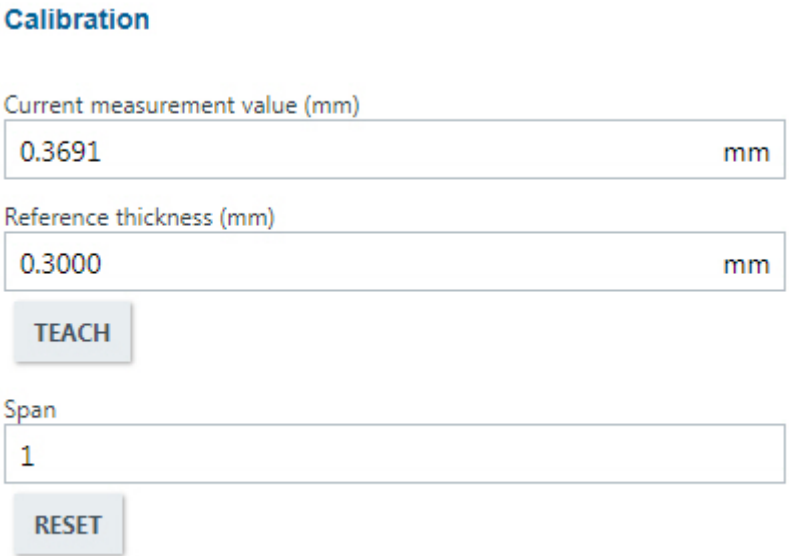
Teaching-in is a recommended process. For the distance measurement, two different objects which are far apart must be placed in front of the sensor head – the distances (reference values) must be known.

Teaching-in the distance measurement



1. Position the first object.
2. Enter the current measured value for the first object (background) in **Target value 1 (mm)**.
3. Click on the **Teach Point 1** button.
4. Position the second object.
5. Add target value 1 to the reference thickness of the second object and enter the result in **Target value 2 (mm)**.

Teaching-in for thickness measurement



1. Position an object with a known reference thickness in front of the sensor head.
2. Enter the reference thickness in the **Reference thickness (mm)** field.

3. Click on the **Teach** button.
✓ The device calculates the suitable span value and applies this to the measurement.

NOTE
The span and shift values can be adjusted manually at any time after the teach-in.

7.3.8.10 Setting One shot

If this function is activated, the output is only given once when the conditions for output are met. The output is then switched off.

The output time is set via the switch-off delay (off delay). The switch-on delay (on delay) can still be used in this mode.

7.3.9 I/O Channels - Input (MF)

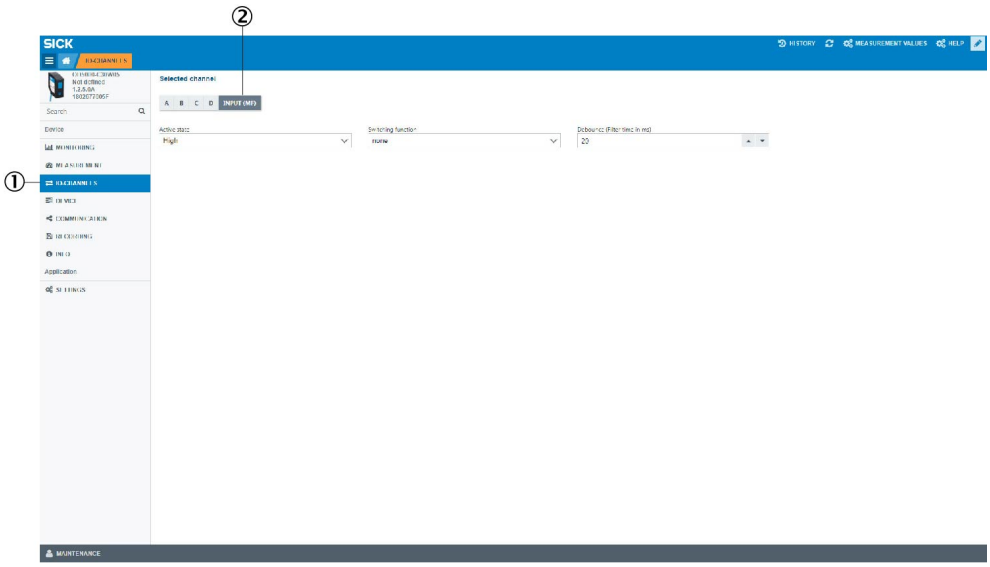


*Figure 57: Overview of the **IO Channels - Input (MF)** tab*

① **IO Channels** tab
② **Input (MF)** window: The multifunctional input of the sensor can be configured in this view.

7.3.9.1 Setting the polarity (active state)

This is where the polarity is set for the external input terminal.

Table 18: Input terminal settings

Setting	Meaning
High	Switches on when input is detected
Low	Switches off when input is detected

High (N.O.) is set by default.

7.3.9.2 Setting the switching function

This is where the function is set for the external input terminal.

Table 19: Switching function settings

Setting	Meaning
None	Input (MF) is not used (input is ignored).
Laser off	Laser is switched off during input.

<table>
<tr><th>Setting</th><th colspan="2">Meaning</th></tr>
<tr><td>Hold function ON/reset</td><td colspan="2">If the hold function is activated, the external input terminal is used as a hold input or reset input.
Peak Hold/Bottom Sample Hold: Hold input
Auto Peak Hold/Auto Bottom Hold: Reset input</td></tr>
<tr><td>Start process recording</td><td colspan="2">Used as a recording input.
If this setting is activated, recording is performed. When the specified amount of saved entries is reached, the recording is stopped and a file is created.
If the input setting is set to OFF during the recording, the process is paused and a file is created using the data saved up until that point.</td></tr>
<tr><td>Measured value offset</td><td colspan="2">Used as an offset or offset release input to shift the zero point.
< 1 s: Offset
≥ 1 s: Reset offset</td></tr>
<tr><td>Teach-in</td><td colspan="2">The following switching functions (teach-in of limits) are performed depending on the duration of the signal at the MF input:</td></tr>
<tr><td></td><td>Pulse duration (ms)</td><td>Function</td></tr>
<tr><td></td><td>0 - 100</td><td>No operation</td></tr>
<tr><td></td><td>100 - 199</td><td>Ch1 Upper limit teach</td></tr>
<tr><td></td><td>200 - 299</td><td>Ch1 Lower limit teach</td></tr>
<tr><td></td><td>300 - 399</td><td>Ch2 Upper limit teach</td></tr>
<tr><td></td><td>400 - 499</td><td>Ch2 Lower limit teach</td></tr>
<tr><td></td><td>500 - 599</td><td>Ch3 Upper limit teach</td></tr>
<tr><td></td><td>600 - 699</td><td>Ch3 Lower limit teach</td></tr>
<tr><td></td><td>700 - 799</td><td>Ch4 Upper limit teach</td></tr>
<tr><td></td><td>800 - 899</td><td>Ch4 Lower limit teach</td></tr>
<tr><td></td><td>> 900</td><td>No operation</td></tr>
<tr><td>Recording of single values</td><td colspan="2">With every trigger signal, a new measured value is saved and stored in a file on the device. Select the Start recording function to create a new file. Select the Stop recording function to close and save this file, see "Starting and testing the recording", page 59.</td></tr>
</table>

The default mode is **None**.

7.3.9.3 Setting the debounce

Sets the delay time with which the external input is switched on until actual operation begins. This prevents the external input from suddenly being switched on or off.

Values are possible from 0 ms to 32,767 ms, the standard value is 20,000 ms.

7.3.10 Device

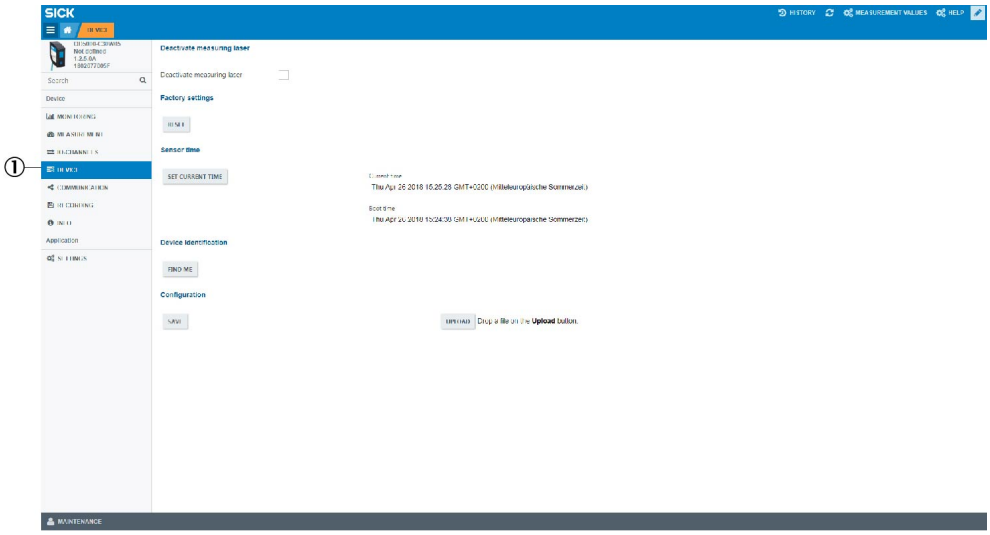


Figure 58: Overview of the Device tab

① **Device** tab

General device settings can be configured in this view. The following functions are available here:

7.3.10.1 Deactivating the measurement laser

Checking or unchecking the box next to **Deactivate measuring laser** activates and deactivates the laser. If the laser is deactivated then measurement stops as a result. The laser is activated as standard.

7.3.10.2 Resetting the device to factory settings

Selecting this function resets all device settings to their factory settings. This does not include network settings (e.g., IP addresses). A subsequent device restart (power reset) is recommended.

7.3.10.3 Setting the sensor time

This section displays the current time as well as the time at which the device was started. Clicking on the **Set current time** button adjusts the device time to the time set on the computer being used.

7.3.10.4 Device identification (find me)

When this function is selected, the status LED of the device in question flashes for 5 s.

7.3.10.5 Saving the configuration

When this function is selected, the entire device configuration is saved in a file and prepared for download. A save location must be selected for the file.

NOTE
The default save location is normally the download folder (this depends on the individual browser settings).

7.3.10.6 Loading the configuration

When this function is activated, a previously stored OD5000 configuration file must be selected from the computer being used. This is then uploaded to the device and all settings are adopted accordingly.

7.3.11 Communication

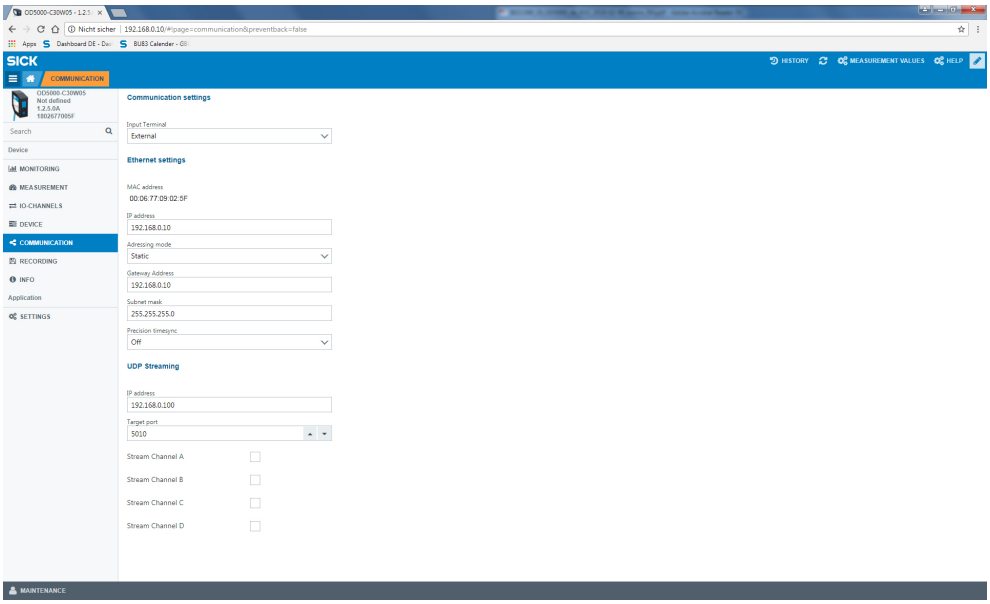


Figure 59: ***Communication*** *tab*

① Overview of the **Communication** tab

The settings relating to communication with and from the device can be configured in this view. The following settings are available here:

7.3.11.1 Communication settings

Input settings

This is where the MF access is assigned a function.

The possible selection includes:

- External Input: The MF access is used for the selected switching function, see "Setting the switching function", page 53.
- AOD1: The OD5000 can be connected with an AOD1 evaluation unit via its pins RS485+/RS485- (see "Pin assignment of the connections", page 27).

NOTE
Only one channel (A) can be used when AOD1 is selected.

7.3.11.2 Network settings

Ethernet settings are also defined from the Communication tab.

MAC address

The device-specific MAC address is displayed in this field.

IP address

The device IP address is defined in this field.

The default value is 192.168.0.100.

Addressing mode

This field is used to select either a static IP address or DHCP.

Subnet mask

The device subnet mask is defined in this field.

The default value is 255.255.255.0.

Standard gateway

The standard gateway of the device is defined in this field.

The default value is 0.0.0.0.

7.3.11.3 Synchronization settings (synchronizing multiple sensor heads)

Synchronization mode

If several sensor heads are used in the application, they can be synchronized using the settings described here. **One sensor head** is selected by default. To use two sensor heads, a drop-down menu is displayed with the following prompt:

Table 20: Configuration options: Synchronization mode

Setting	Meaning
Synchronous	Synchronizes several sensor heads
Anti interference 1/2	Switches between two sensor heads

The following should be considered when using these modes:

In synchronization mode, the measurement results from two sensor heads are recorded simultaneously. This can be used, for example, to measure the thickness of non-transparent objects using two sensor heads. The individual results from the sensor heads must be accounted for using special control software, which is not possible with the SOPASair configuration software.

In **Anti interference** mode, the measurement results from several sensor heads are recorded one after the other. This increases the measurement time to double the sampling duration for that measurement. This can be in used, for example, in an application in which the laser beams overlap a pair of sensor heads.

To use this mode, the following settings must be made:

1. Define one device as a master and the others as slaves, see "Network settings", page 56.
2. Set **Anti interference 1** for the master.
3. Set **Anti interference 2** for the slave.

✓ The devices will now take measurements one after the other.

Accurate time synchronization

A PD5000 is defined as a time server in this field. This allows the internal clock within all the connected devices to be synchronized precisely via the standardized precision time protocol (PTP). To use this function, one device must be defined as a master. All the other devices must be defined as a slave.

This procedure is necessary when **Synchronous** or **Anti interference** is set as the synchronization mode.

Table 21: Configuration options: Accurate time synchronization

Mode	Meaning
Off (default value)	Function has been deactivated
Master	Device is defined as master
Slave	Device is defined as slave

NOTE

If a device on the network is already defined as a PTP time server, then that device must be used. All OD devices must be defined as a slave. Otherwise, synchronization cannot be executed properly.

7.3.11.4 UPD Streaming

This area can be used to set how data (see "Operation via Ethernet", page 62) should be transmitted.

- Target IP address for receiving process data (192.168.0.200)
- Target port for receiving process data (default: 5010)
- Selecting the data to be transmitted between channel A-D

NOTE

When selecting the IP address and the port, take into account the conditions of your local network. They must be in the receivable range.

7.3.12 Recording

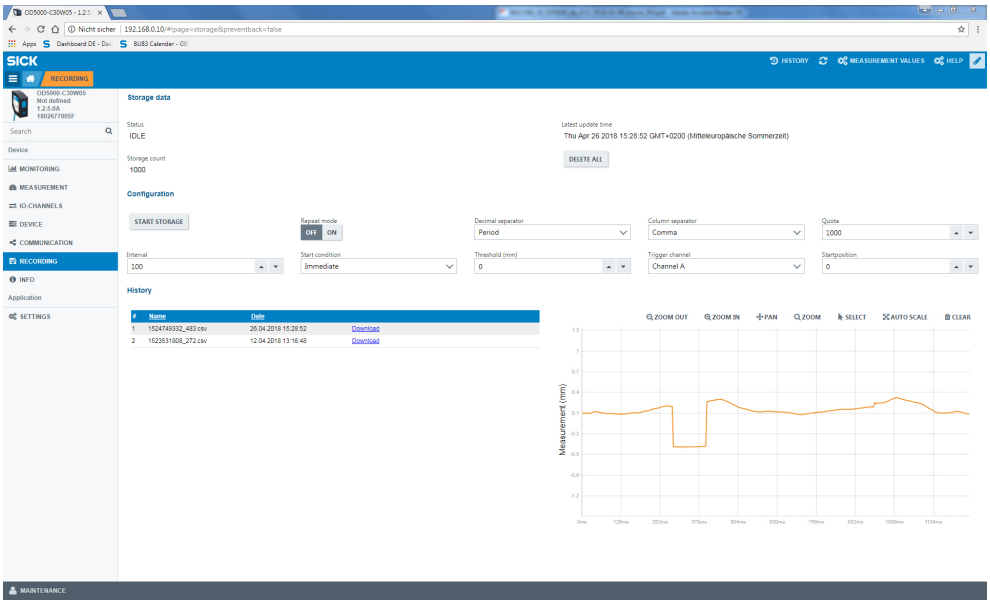


*Figure 60: **Recording** tab*

① **Recording** tab

Recording is used to prepare measurement data for storage. Output is in the form of a *.csv file. Saved data is listed and can be downloaded to the corresponding list entry at the click of a button. The exact download process depends on the individual browser settings.

Various functions are available in this view.

7.3.12.1 Formatting settings

In the **Decimal separator** field, select whether the measured values in the *.csv file should use a period or a comma as the decimal separator.

In the **Column delimiter** field, select whether the data columns in the *.csv file should be separated by a comma or semicolon.

NOTE
*.csv files become illegible if a comma is used as both a decimal separator and column delimiter.

7.3.12.2 Starting and testing the recording

Start recording

Click on the **Start recording** button to start recording measurement data. A new file for storing the recorded measurement values is opened automatically.

Stop Recording

Click on the **Stop recording** button to stop recording measurement data. The opened file is closed and saved on the device. If the maximum number of measurement values in the preset parameters is reached before this, the file is closed automatically and saved on the device.

7.3.12.3 Determining the allocation

In the Allocation field, the user can define the number of data entries to be saved until the memory function is stopped. Values are possible from 1 to 100,000; the standard value is 1,000.

7.3.12.4 Setting the interval

The intervals at which data is to be saved is set in this field. This means that data is only saved periodically, thereby reducing the total quantity of stored data and simplifying any further processing.

NOTE
If the **Recording of single values** switching function was previously selected (see "Setting the switching function", page 53), the **Interval** parameter is automatically changed to “1”.

When the value is set to 1, all data is saved.

For values (n) greater than 1, only every nth measured value is saved.

Values are possible from 0 to 100,000; the standard value is 100.

7.3.12.5 Setting the start conditions

The following settings are possible:

Table 22: Settings for the recording start condition

Function	Meaning
Immediately (default value)	Memory function starts immediately
Error off	Memory function starts as soon as measurements are possible
Error on	Memory function starts as soon as measurements are not possible

Function	Meaning
Upper threshold	Memory function starts when measured values exceed the threshold
Lower threshold	Memory function starts when measured values fall below the threshold
Both thresholds	Memory function starts when measured values exceed or fall below the threshold

7.3.12.6 Defining the threshold

The threshold must be defined when one of the following modes is set as the start condition:

- Upper threshold
- Lower threshold
- Both thresholds

Values of ±2,000.000 mm are possible; the default value is 0.

7.3.12.7 Defining the trigger channel

The target output is defined in this field when the trigger for the start of the memory function is defined.

The options are Channel A (default value), B, C, or D.

7.3.12.8 Setting the start position

Indicates by how many measuring points the start of the recording is to be delayed when the start condition is met.

The following modes are possible:

Table 23: Start position settings

Setting	Meaning
Positive value	Delayed by the specified number of measurements and then starts the memory function
0	Starts the memory function as soon as the start condition is met
Negative value	Starts the saving function and considers the specified number of measured values which preceded fulfillment of the start condition

Values of ±50,000 are possible; the default value is 0.

7.3.12.9 View process

All recorded measurements are listed in this table.

By clicking on the underlined link with the file name of the measurement, the measurement file can be downloaded in CSV format (values separated by commas).

By clicking in the rows of the corresponding measurement outside of the link, the measurement process is displayed on the page.

There is a column for the sensor status in the measurement file. It contains a string with 20 characters and has the following meaning:

LAI- Hiz1 Hiz2 Hiz3 Hiz4L

Table 24: Sensor status

Code	Meaning
L	Laser on
A	Alarm on

Code	Meaning
I	External input status
-	Reserved
H	Hold status
i	Invalid measurement data
z	Zero set status
Channel number	Output status {number, l, g, h}
Number	Switch on output
l	Below the lower limit
h	Above the upper limit
g	Between lower and upper limit

7.3.13 Info

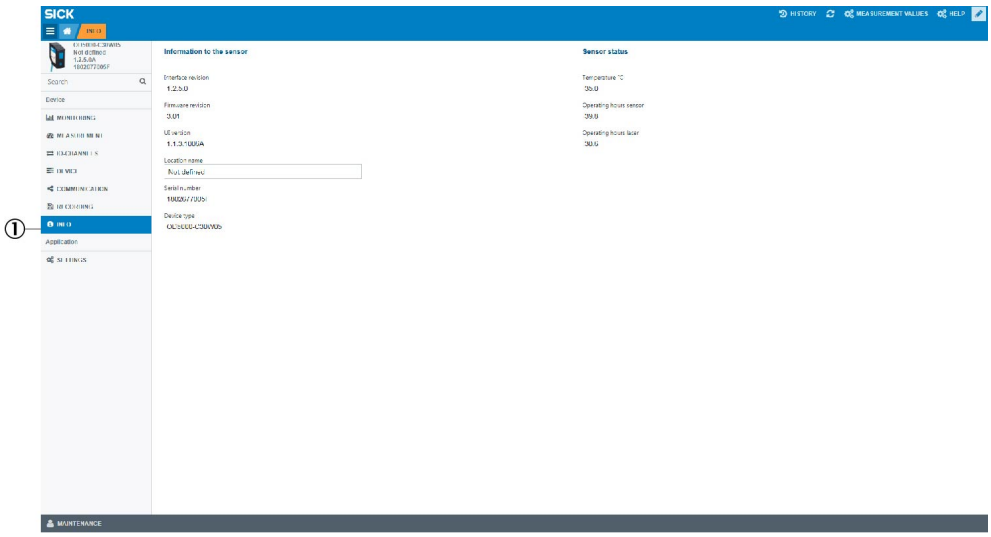


*Figure 61: Overview of the **Info** tab*

① **Info** tab

This view can be used check the device status and display various information.

Information on the device

The following device information is displayed:

- Interface version
- Firmware version
- mSDD version
- Temperature
- Operating hours of the device
- Laser operating hours
- Serial number
- Device type

Site

The installed location of the device can be entered into the **Location name** field for traceability purposes.

7.3.14 Expert

More advanced settings can be made in the **Expert** tab. This tab is only available after having logged in with the **Service** user level. Settings in this level may only be made by qualified and authorized service personnel from SICK AG.

7.3.15 Settings

7.3.15.1 Selecting a language

The language used in the SOPASair interface can be changed under **Settings**. The user can choose between:

- German
- English (default value)
- Spanish
- French
- Italian
- Korean
- Chinese

NOTE
The interface must be reloaded after a new language has been selected.

7.3.15.2 Selecting the display mode

The user can choose between different display modes for the configuration interface. These provide an optimized display which is suitable for the end device:

- Phone
- Tablet
- Desktop (default value)

7.4 Operation via Ethernet

Measured values can be read out via the Ethernet interface and parameters can also be checked and adjusted.

Table 25: Parameters for Ethernet

Parameter	Value
Protocol	UDP (multicast, broadcast)
Port number	5010 (data transmission) 5011 (control)
Byte sequence	Big endian

NOTE
The IP address and port number are user-configurable, see "Communication settings", page 56.

7.4.1 Reading and writing data

Commands for reading and writing are transmitted to port 5011 via the UDP.

Reading

Table 26: Read request

0x30	0x06	0x00	0x00	Command (2 bytes)	Data length (2 bytes)

Table 27: Read response

0xBn	nn (data length)	Response data (nnn bytes)

The data length identifies the number of response bytes that the user would like to read. This is limited to a maximum of 4,095 bytes (0x0FFF). The maximum is also limited by the network's Maximum Transmission Unit (MTU). This is usually 1,500 bytes for the Ethernet.

The response telegram contains the returned data lengths (without the two leading bytes which designate the response indicator 0xB and the length itself).

If exactly 4 bytes are requested then an abbreviated read request is possible:

Table 28: Short read request

0x30	0x02	Command (2 bytes)

Table 29: Short read response

0xB0	0x04	Response data (4 bytes)

Example: Reading out measured values from channel A (short)

Read request: 0x3002 0x0D60

Read response: 0xB004 0x0012D687 (4 bytes are output with the value nnnnnnn nm)

Example: Reading out user-defined application tag

Read request: 0x3006 0x0000 0x0160 0x001E

Read response: 0xB01E (30 characters for user-defined application tag)

Writing

Table 30: Write request

0x40	0x02	Command (2 bytes)	0nnn (data length)	Writing data (nnn bytes)

Table 31: Write response

0xC0	0x00

The data length identifies the number of response bytes that the user would like to write. This is limited to a maximum of 4,095 bytes (0x0FFF). The maximum is also limited by the network's Maximum Transmission Unit (MTU). This is usually 1,500 bytes for the Ethernet.

Example: Setting the sampling rate to 100 µs

Write request: 0x4002 0x0C10 0x0004 0x00000003

Write response: 0xC000

Example: Determining user-defined application tag

Write response: 0x4002 0x0160 0x001E (30 characters for user-defined application tag)

Write response: 0xC000

7.4.2 Command list

The following commands can be accessed at port 5011 via the UDP interface. The parameters are always saved as 4-byte values in the big-endian format unless specified otherwise (with the most significant value in the memory first).

7.4.2.1 Outputting measured values

Table 32: Command list for sensor status and measured values

Access	Command	Name	Parameter	Comments
R	0x0D60	Value of channel A displacement		
R	0x0D64	Value of channel B displacement		
R	0x0D68	Value of channel C displacement		
R	0x0D6C	Value of channel D displacement		
R	0x0DA0	Channel A output status	*1	
R	0x0DA4	Channel B output status	*1	
R	0x0DA8	Channel C output status	*1	
R	0x0DAC	Channel D output status	*1	
R	0x01F4	Sensor status	*2	

Explanation of the bits relating to *1 (status of channel A/B/C/D)

*Table 33: Explanation of the bits relating to *1 (status of channel A/B/C/D)*

Bit	Comments
1 (0x0001)	Channel switched on/off (corresponding to setting in 0x0200 / 0x0280 / 0x0300 / 0x0380)
2 (0x0002)	Channel output rate (output state)
3 (0x0004)	Measured value of channel valid (0) / invalid (1)
4 (0x0008)	Unused, always 0
5 (0x0010)	Zero teach of channel off (0) / on (1)
6 (0x0020)	Hold function of channel off (0) / on (1)
7 (0x0040)	Unused, always 0
8 (0x0080)	
9 (0x0100)	Measured value of channel lower than lower switching threshold
10 (0x0200)	Measured value of channel between switching thresholds
11 (0x0400)	Measured value of channel higher than upper switching threshold
12 ... 32 (0x0800 ... 0x80000000)	Unused, always 0

Explanation of the bits relating to *2 (sensor status)

*Table 34: Explanation of the bits relating to *2 (sensor status)*

Bit	Comments
1 (0x0001)	Always at (1)
2 (0x0002)	Output value of channel A (output state)
3 (0x0004)	Measured value of channel A valid (0) / invalid (1)
4 (0x0008)	Unused, always 0
5 (0x0010)	Zero teach of channel A off (0) / on (1)
6 (0x0020)	Hold function of channel A off (0) / on (1)
7 (0x0040)	Unused, always 0
8 (0x0080)	
9 (0x0100)	Measured value of channel A lower than lower switching threshold
10 (0x0200)	Measured value of channel A between switching thresholds
11 (0x0400)	Measured value of channel A higher than upper switching threshold
12 ... 16 (0x0800 ... 0x8000)	Unused, always 0
17 (0x00010000)	Output value of channel A (output state) (Identical to bit 2)
18 (0x00020000)	Output value of channel B (output state)
19 (0x00040000)	Output value of channel C (output state)
20 (0x00080000)	Output value of channel D (output state)
21 ... 24 (0x00100000 ... 0x00800000)	Unused, always 0
25 (0x01000000)	Output state of external input
26 ... 27 (0x02000000 ... 0x04000000)	Unused, always 0
28 (0x08000000)	All measured values of channels A ... D valid (0) / at least one measured value invalid (1)
29 (0x10000000)	Precision time sync off (0) / on (1)
30 (0x20000000)	Memory for recording available (0) / full (1)
31 (0x40000000)	Laser off (0) / on (1)
32 (0x80000000)	Unused, always 0

NOTE

Sensor status of bits 2 ... 16 is identical to status of channel A bits 2 ... 16.

7.4.3 Measurement

7.4.3.1 Selecting default settings

Table 35: Command list for default settings

Access	Command	Name	Parameter	Comments
R/W	0x0CA0	Mounting	0x00: Diffuse 0x01: Specular	

Access	Command	Name	Parameter	Comments
R/W	0x0CA8	Synchronization mode	0x00: None 0x01: Synchronous 0x02: Anti-interference 1 0x03: Anti-interference 2	
R/W	0x0C10	Sampling rate	0x00: 12.5 0x01: 25 0x02: 50 0x03: 100 0x04: 200 0x05: 500 0x06: 1000 0x09: Auto 0x0A: 14.3 0x0B: 16.7 0x0C: 20	Unit: µs
R/W	0x0C28	Tailoring the measured values	0x00: Near 0x01: Center 0x02: Far	Can only be used when a detection duration of 12.5 µs is selected
R/W	0x0C14	Automated duration of sampling: Upper limit value	0x01: 25 0x02: 50 0x03: 100 0x04: 200 0x05: 500 0x06: 1000	Can only be used when automated detection duration is selected
R/W	0x0C18	Automated duration of sampling: Lower limit value	0x01: 25 0x02: 50 0x03: 100 0x04: 200 0x05: 500 0x06: 1000	Can only be used when automated detection duration is selected
R/W	0x0C48	Order of sampling	0x00: Near 0x01: Far	
R/W	0x0CA4	Measurement direction	0x00: Positive 0x01: Negative	
R	0x0400	Waveform	*3	1024 bytes
R	0x0D14	Peak position 1 in waveform	*4	
R	0x0D18	Peak position 2 in waveform	*4	
R	0x0D1C	Peak position 3 in waveform	*4	
R	0x0D20	Peak position 4 in waveform	*4	
R	0x0D24	Peak position 5 in waveform	*4	
R	0x0D28	Peak position 6 in waveform	*4	
R	0x0D2C	Peak position 7 in waveform	*4	

Access	Command	Name	Parameter	Comments
R	0x0D30	Peak position 8 in waveform	*4	
R/W	0x0C44	Waveform mask ON/OFF	0x00: OFF 0x01: ON	
R/W	0x0C60	Mask 1 starting position	Range 0 ... 511 (0x00000000 ... 0x000001FF)	Pixel number at which the mask starts
R/W	0x0C64	Mask 1 end position	Range 0 ... 511 (0x00000000 ... 0x000001FF)	Pixel number at which the mask ends
R/W	0x0C68	Mask 2 starting position	Range 0 ... 511 (0x00000000 ... 0x000001FF)	Pixel number at which the mask starts
R/W	0x0C6C	Mask 2 end position	Range 0 ... 511 (0x00000000 ... 0x000001FF)	Pixel number at which the mask ends
R/W	0x0C70	Mask 3 starting position	Range 0 ... 511 (0x00000000 ... 0x000001FF)	Pixel number at which the mask starts
R/W	0x0C74	Mask 3 end position	Range 0 ... 511 (0x00000000 ... 0x000001FF)	Pixel number at which the mask ends
R/W	0x0C78	Mask 4 starting position	Range 0 ... 511 (0x00000000 ... 0x000001FF)	Pixel number at which the mask starts
R/W	0x0C7C	Mask 4 end position	Range 0 ... 511 (0x00000000 ... 0x000001FF)	Pixel number at which the mask ends

***3: Explanation of the returned value (waveform)**

The received waveform is returned as an array of 512 values (16 bits unsigned) which represents the light intensity of each pixel of the receiver.

***4: Explanation of the returned value (peak position in the waveform)**

The returned value represents the number of pixels of the receiver (upper 2 bytes) and fraction between two pixels (lower 2 bytes).

Default settings per measurement channel

Table 36: Command list for default settings per measurement channel

Access	Command				Name	Parameter	Comments
	Channel A	Channel B	Channel C	Channel D			
R/W	0x0200	0x0280	0x0300	0x0380	Channel usage	0x00: Disable 0x01: Enable	
R/W	0x0204	0x0284	0x0304	0x0384	Measurement method	0x00: Distance 0x01:Thickness	

Access	Command				Name	Parameter	Comments
	Channel A	Channel B	Channel C	Channel D			
R/W	0x0208	0x0288	0x0308	0x0388	Peak number	0x00: No. 1 peak to 0x07: No. 8 peak	
R/W	0x020C	0x028C	0x030C	0x038C	Peak number 2 (for thickness measurement)	0x00: No. 1 peak to 0x07: No. 8 peak	Can only be used when thickness measurement is selected
R/W	0x0220	0x02A0	0x0320	0x03A0	Measurement offset	*5	
R/W	0x0234	0x02B4	0x0334	0x03B4	Execute teach	0x00: None 0x01: Execute offset 0x02: Clear offset	Also used to execute span teach Is returned in response to read requests when teach is being executed

*5: Explanation of the parameters (measurement offset)

The applied parameter (in nm) is added to the raw displacement measurement. Alternatively, after a zero set operation has been executed, this parameter contains the calculated offset.

7.4.3.2 Making the settings for channels A–D

Table 37: Command list for the settings for channels A–D

Access	Command				Name	Parameter	Comments
	Channel A	Channel B	Channel C	Channel D			
R/W	0x0210	0x0290	0x0310	0x0390	Median filter	0x01: Not used (1) 0x07: 7 0x0F: 15 0x1F: 31	
R/W	0x0214	0x0294	0x0314	0x0394	Moving average	Range 2^n (n = 0...16)	

Access	Command				Name	Parameter	Comments
	Channel A	Channel B	Channel C	Channel D			
R/W	0x022C	0x02AC	0x032C	0x03AC	Hold mode	0x00: OFF 0x01: Peak 0x02: Bottom 0x03: Sample Hold 0x04: Auto Peak 0x05: Auto Bottom 0x06: Peak to Peak 0x07: Normal	
W	0x0238	0x02B8	0x0338	0x03B8	Hold version	0x00: None 0x01: Hold ON 0x02: Hold OFF 0x03: Hold reset	
R/W	0x0260	0x02E0	0x0360	0x03E0	Alarm	0x00: Clamp 0x01: Hold 0x02: Delay clamp	
R/W	0x0264	0x02E4	0x0364	0x03E4	Clamp value during alarm	Range -2,000,000,000 ... +2,000,000,000	Unit: nm Can only be used when clamp or clamp delay for alarm is selected
R/W	0x0268	0x02E8	0x0368	0x03E8	Number of measurements for delayed alarm	Range 0 ... 4095	Can only be used when clamp delay for alarm is selected
R/W	0x026C	0x02EC	0x036C	0x03EC	Number of measurements to be restored after alarm	Range 2^n (n = 0...16)	

7.4.4 I/O settings

7.4.4.1 Configuring channels A–D

Table 38: Command list for channels A–D

Access	Command				Name	Parameter	Comments
	Channel A	Channel B	Channel C	Channel D			
R/W	0x0244	0x02C4	0x0344	0x03C4	Upper limit	Range -2,000,000,000 ... +2,000,000,000	Unit: nm
R/W	0x0248	0x02C8	0x0348	0x03C8	Lower limit	Range -2,000,000,000 ... +2,000,000,000	Unit: nm
R/W	0x024C	0x02CC	0x034C	0x03CC	Hysteresis	Range -2,000,000,000 ... +2,000,000,000	Unit: nm
R/W	0x0254	0x02D4	0x0354	0x03D4	One shot	0x00: OFF 0x01: ON	
R/W	0x0258	0x02D8	0x0358	0x03D8	ON Delay time	Range 0 ... 4,000,000	Unit: µs
R/W	0x025C	0x02DC	0x035C	0x03DC	OFF Delay time	Range 0 ... 4,000,000	Unit: µs If One Shot is activated, this value refers to the time which must pass before the output channel may be reset
R/W	0x0218	0x0298	0x318	0x0398	ObSB tolerance	Range 0 ... 2,000,000,000	Unit: nm Can only be used if output mode is set to ObSB

Access	Command				Name	Parameter	Comments
	Channel A	Channel B	Channel C	Channel D			
R/W	0x0224	0x02A4	0x0324	0x03A4	Calibration span	Range -2,000,000 ... +2,000,000 Values within the range -99,999 to +99,999 are invalid	Applied factor multiplied by 1,000,000 (e.g., factor 1 → 1,000,000)
R/W	0x0228	0x02A8	0x0328	0x03A8	Calibration shift	Range -2,000,000,000 ... +2,000,000,000	Unit: nm
R/W	0x0230	0x02B0	0x0330	0x03B0	Reference thickness	Range 0 ... 2,000,000,000	Unit: nm Can only be used for the teach function when measuring thickness
R/W	0x0234	0x02B4	0x0334	0x03B4	Execute teach	0x00: None 0x03: Teach thickness measurement 0x04: Reset teach thickness measurement 0x05: Teach upper limit 0x06: Teach lower limit	Also used for teach for offset Is returned in response to read requests when teach is being executed
R/W	0x0240	0x02C0	0x0340	0x03C0	Output mode	0x00: DtO 0x01: Window 0x02: ObSB 0x03: Edge height	

Access	Command				Name	Parameter	Comments
	Channel A	Channel B	Channel C	Channel D			
R/W	0x0250	0x02D0	0x0350	0x3D0	Change direction	0x00: Both 0x01: Up 0x01: Down	Can only be used in edge height mode
R/W	0x0270	0x02F0	0x0370	0x03F0	Cycle offset	Department 1 ... 100,000	Can only be used in edge height mode

7.4.4.2 Configuring MF input

Table 39: MF input command list

Access	Command	Name	Parameter	Comments
R/W	0x0C90	Input polarity	0x00: N.O. 0x01: N.C.	
R/W	0x0C94	Input filter time	Parameter: Range 0 ... +32767	Unit: µs
R/W	0x0C98	Input action	0x00: None 0x01: Laser off 0x02: Hold/reset 0x03: Recording start 0x04: Offset (Zeroing)	Can only be used when MF usage is set to external input
R/W	0x0CB0	MF usage	0x00: External input 0x01: AOD1 interface	

7.4.5 Device settings

Table 40: Command list for device settings

Access	Command	Name	Parameter	Comments
R/W	0x0C40	Switching on laser	0x00: ON 0x01: OFF	
W	0x004C	Resetting to factory settings	0x03E7	This command returns all settings to their factory settings (except for Ethernet settings)
R/W	0x0030	Sensor time		Unit: Unix epoch (seconds since Jan 1, 1970)
W	0x004C	Changing the time	0x03D4	This command sets the system time to the value of the sensor time
R	0x0100	Boot time		Unit: Unix epoch (seconds since Jan 1, 1970)
R	0x012C	System time		Unit: Unix epoch (seconds since Jan 1, 1970)
W	0x105C	Find-me function		Unit: ms

Access	Command	Name	Parameter	Comments
R/W	0x0160	User-defined application tag		30 bytes

7.4.6 Communication

Table 41: Command list for communication settings

Access	Command	Name	Parameter	Comments
R	0x0018	MAC address		6 bytes
R/W	0x0CBC	Precision time-sync	0x00: OFF 0x01: Slave 0x02: Master	

Other communication parameters (IP address, subnet mask...) can only be set via a web browser (SOPASair).

7.4.7 Saving data

Table 42: Command list for memory settings

Access	Command	Name	Parameter	Comments
R	0x0CC4	Recording count		
R	0x0CC8	Recording state	0x00: Stopped 0x01: Waiting 0x02: Trigger standby 0x03: Operating 0x04: Operation complete	
R	0x0CCC	Load Recording time		Unit: Unix epoch (seconds since Jan 1, 1970)
R/W	0x0CD0	Recording quota	Range 0 ... 100,000	
R/W	0x0CD4	Recording rate	Range 0 ... 100,000	
R/W	0x0CD8	Recording repeating	0x00: OFF 0x01: ON	
W	0x004C	Delete all storage files	0x024E	
R/W	0x0CDC	Recording start condition	0x00: Immediate 0x01: Alarm Off edge 0x02: Alarm Off edge 0x03: Threshold Up edge 0x04: Threshold Down edge 0x05: Threshold Both edge	
R/W	0x0CE0	Recording trigger channel	0x00: Ch.A 0x01: Ch.B 0x02: Ch.C 0x03: Ch.D	

Access	Command	Name	Parameter	Comments
R/W	0x0CE4	Recording trigger threshold	Range -2,000,000,000 ... +2,000,000,000	Unit: nm
R/W	0x0CE8	Recording start delay	Range -50,000 ... +50,000	If positive, start delay; if negative, number of preliminary samples
R/W	0x0CF0	Recording control	0x00: Stop 0x01: Start	
R	0x0110	File system free space		Unit: kByte
R	0x0114	File system capacity		Unit: kByte
R/W	0x0074	Client Port (storage data)	0 ... 65535	The target IP port for the data push must be set as a 16-bit signed integer.
R/W	0x0070	Client IP (storage data)	Byte array	Example: The IP address 192.168.0.200 is the write parameter 0xC0A800C8
R/W	0x0078	Transmission interval (storage data)	0 to 100	Wait time between data packages in [ms]
R/W	0x0CF8	Storage data reading	0x00: Stop 0x01: Start	

7.4.8 Info

Table 43: Command list for reading information

Category	Command	Name	Parameter	Comments
R	0x0004	Firmware version		
R	0x0008	Software version		
R	0x0120	Temperature		Unit: 1/1000 °C
R	0x0124	Device operating time		Unit: s
R	0x0128	Laser operating time		Unit: s

7.4.9 Determining measured values using time specifications

In addition to the measured values, the associated time specifications are also required for some operations. Using the following command, the device supplies the measured values together with a time stamp and then outputs this information.

Table 44: Transmitted command

30	06	00	00	01	F0	00	0C

Table 45: Received command

B0	0C	Measured value (4 bytes)	Device status/ measurement result (4 bytes)	Time stamp (4 bytes)

The time stamp is specified as a value between 0 ns and 999,999,999 ns which counts down after each measurement until it reaches 0. This means that the timing and the sequence of the individual measured values can be read.

NOTE
Receiving measured value with a time stamp is only possible for channel A (see "Obtaining data continuously", page 75 for options for receiving data with a time stamp for all channels).

7.4.10 Obtaining data continuously

The device permits measurement data to be continually obtained via the Ethernet User Datagram Protocol (UDP to port 5010). This mode permits this data to be used in real time applications or when user-defined memory mechanisms are implemented.

In this mode, the device transmits the measured values automatically at intervals of 1 ms. If detection times are used which are faster than 1 ms, each data transmission will contain several measured values.

In order to activate Push mode, a target must be available for the data push (target IP address, port) and a selection of data channels (channel A, B, C, and/or D).

NOTE
The device can transmit several channels at the same time.

The commands for configuring the push mode must be transmitted through control port 5011.

Table 46: Command list for data push

Access	Command	Name	Parameter	Comments
R/W	0x10E0	Data push port	*7	4 bytes Requires firmware version V3.08 or higher
R/W	0x10E2	Data push port	*7	2 bytes
R/W	0x10E4	Data push IP address	*8	
R/W	0x01E0	Data push channel selection	0x00: Stop Data Push 0x01 ... 0x0F: Start Data Push	Sets the measured value channel of the output by setting the following bits: Bit 0: Channel A Bit 1: Channel B Bit 2: Channel C Bit 3: Channel D
R/W	0x004C	Delete all storage file	0x24E	
R/W	0x0CA4	Measurement direction	0:Positive 1:Negative	

***7: Explanation of the parameters (data push port)**

The target IP port for the data push must be set as a 16-bit signed integer (0 to 65535). The port is usually selected automatically by the target computer when it initiates UDP communication to OD5000.

***8: Explanation of the parameters (data push IP address)**

The IP address in decimal format is set with a byte array (e.g., IP address 192.168.0.10 → write parameter is 0xC0 A8 00 0A).

The data format of the push data transmission is defined as follows:

Table 47: Meaning of the bytes

Byte no.	Length	Meaning
0 ... 1	2	Bits 15 to 12: Data push identifier 0xD bits 11 to 0: Length of the data frame (without bytes 0 to 1)
2 ... 5	4	Sensor status (see command 0x01F4)
6 ... 9	4	Time stamp of the first value (unit: ns) The time stamp of the remaining values must be ascertained on the basis of the detection period. The time stamp is reset to zero after every second.
10 ... 13	4	Measurement counter of the first value. The measurement counter determines whether measurements between two references were deleted.
14 ...	Various	The remaining data frame (as indicated by the length indicator in bytes 0 to 1) contains the measured values. Each measured value is displayed as a signed 32-bit value (big-endian). Each channel returns values which were collected in the previous 1 ms. The sequence is: (Channel first selected, oldest value) - (channel selected second, oldest value) ... - (channel selected last, oldest value) ... (Channel first selected, most recent value) - (channel selected second, most recent value) ... - (channel selected last, most recent value)

Example:

OD5000 with sampling rate of 100 µs (10 measurements/1 ms)

The received push data package contains the information (0 to 13) and 20 measured values (10 per channel).

Table 48: Push data package information

Byte no.	Value (hex)	Meaning
[0]	D0	Push data identifier
[1]	5C	Data length (92 bytes)
[2]	40	Sensor status
[3]	00	
[4]	04	
[5]	01	
[6]	1D	Time stamp (498.592.366 ns)
[7]	B7	
[8]	EA	
[9]	6E	
[10]	00	Measurement counter (# 3810558)
[11]	3A	
[12]	24	
[13]	FE	
[14]	00	Channel A, first value (15,262,800 nm)
[15]	E8	
[16]	E4	
[17]	50	

Byte no.	Value (hex)	Meaning
[18]	FF	Channel B, first value (-5,243,400 nm)
[19]	AF	
[20]	FD	
[21]	F8	
[22]	00	Channel A, second value (15,262,200 nm)
[23]	E8	
[24]	E1	
[25]	F8	
[26]	FF	Channel B, second value (-5,243,400 nm)
[27]	AF	
[28]	FD	
[29]	F8	
...		
[86]	00	Channel A, final value (15,257,400 nm)
[87]	E8	
[88]	CF	
[89]	38	
[90]	FF	Channel B, final value (-5,242,200 nm)
[91]	B0	
[92]	02	
[93]	A8	

7.4.11 Error messages

Action in case of incorrect measurements

If a measurement cannot be run, an error is output. Possible causes of the error:

- The measuring object is outside of the measuring range.
- The light signal received by the device is not strong enough.
- The laser is switched off.

You can configure the device behavior for the event that no measurement is possible. The following options are available:

- **Error suppression time:** It is possible to set a time for which the last valid measured value or the error value is displayed and held.
- **Hold last value**: If no measurement is possible, the last valid measured value is displayed and held until a valid measured value is available again or for the duration of the specified error suppression time.
- **Substitute value in the event of an error**: If no measurement is possible, the specified replacement value is displayed and held until a valid measured value is available again or for the duration of the specified error suppression time.
- **Substitute value in the event of an error**: A numerical value can be entered which is output when no measurement is possible.

When an error occurs, the device sends an error message in the following format:

Table 49: Format of the error message

E0	02	Details of error

E0 02 Details of error

Table 50: Error messages

Name of error	Details of error	Details
Command error	0x00E1	The specified command does not exist
Address error	0x00E2	The specified address exceeds the permitted range
Overflow	0x00E9	Data overflow is returned

7.4.12 Reading saved measurement data

This function is used to output the measurement values recorded with the **Recording** function (see see "Recording", page 58) using UDP data packets.

The outputted UDP data packet contains the measurement values of all 4 channels as a 4-byte double word with a maximum of 80 measurement values per packet.

If one of the four channels is inactive or less than 80 measurement values per channel are being transmitted, the substitute value “7F FF FF FF” is written instead.

The first four bytes of a packet contain the sequence number of the respective packet. This sequence number is “00 00 00 00” for the first packet and increases by 1 for each subsequent packet. The last packet transmitted has the sequence number “FF FF FF FF”, which signals the end of the transmission.

The measurement data request occurs via the control port 5011. The requested measurement data are transmitted from port 5008.

Example:

400 measurement values were collected using the recording function.

Channel A is active, Channels B-D are inactive.

The measurement values are to be sent from the OD5000 to the target IP address “192.168.0.50” and the target port “30718”.

The data packets are to be sent at time intervals of 2 ms.

Table 51: Commands for the example data

Description	Command
Write target IP address	`0x4002 0x0070 0x0004 0xC0A8 0x0032`
Write target port	`0x4002 0x0074 0x0004 0x0000 0x77FE`
Write transmission interval	`0x4002 0x0078 0x0004 0x0000 0x0002`
Read measurement data	`0x4002 0x0CF8 0x0004 0x0000 0x0001`

Table 52: Responses for the example data

Description	Data packets
Last packet	FF FF FF FF 00 3D DF 74 7F FF FF FF 7F FF FF FF 7F FF FF FF 00 3D DF 73 …
…	…
4th packet	00 00 00 03 00 3D DF 63 7F FF FF FF 7F FF FF FF 7F FF FF FF 00 3D DF 64 …
3rd packet	00 00 00 02 00 3D DF 70 7F FF FF FF 7F FF FF FF 7F FF FF FF 00 3D DF 70 …
2nd packet	00 00 00 01 00 3D DF 59 7F FF FF FF 7F FF FF FF 7F FF FF FF 00 3D DF 55 …
1st packet	00 00 00 00 00 3D DF 51 7F FF FF FF 7F FF FF FF 7F FF FF FF 00 3D DF 51 …

Color legend: Sequence number Measured value 1 Channel A Measured value 1 Channel B Measured value 1 Channel C Measured value 1 Channel D Measured value 2 Channel A …

8 Maintenance

8.1 Maintenance plan

During operation, the device works maintenance-free.

Depending on the assignment location, the following preventive maintenance tasks may be required for the device at regular intervals:

Table 53: Maintenance plan

Maintenance work	Interval	To be carried out by
Check device and connecting cables for damage at regular intervals.	Depends on ambient conditions and climate.	Specialist
Clean housing and viewing window.	Depends on ambient conditions and climate.	Specialist
Check the screw connections and plug connectors.	Depends on the place of use, ambient conditions or operating requirements. Recommended: At least every 6 months.	Specialist

8.2 Cleaning

NOTICE

Equipment damage due to improper cleaning.

Improper cleaning may result in equipment damage.

- Only use recommended cleaning agents and tools.
- Never use sharp objects for cleaning.

▶ Clean the front screen at regular intervals and in the event of contamination using a lint-free lens cloth (part no. 4003353) and plastic cleaning agent (part no. 5600006). The cleaning interval essentially depends on the ambient conditions.

9 Troubleshooting

9.1 General faults, warnings, and errors

Possible faults and corrective actions are described in the table below for troubleshooting. In the case of faults that cannot be rectified using the information below, please contact SICK Service. To find your agency, see the final page of this document.

NOTE
Before calling, make a note of all type label data such as type code, serial number, etc., to ensure faster processing.

General faults are subdivided into warnings and errors. Current measured values continue being output when there are warnings; measurement is no longer possible when there are faults.

Question/Problem	Possible causes	Troubleshooting
The device is not displaying a measurement.	• Laser of the device not activated • Laser spot not aimed at object • Object outside the measuring range • Receiver element of the device not receiving light	• Check whether the laser of the device is activated. • Check whether the laser spot is aimed at the object. • Make sure that the object is within the measuring range of the device. • Check the light distribution curve in SOPAS ET. The light distribution curve shows whether the receiver element of the device is receiving light. In this case, the light distribution curve normally displays a maximum within the area shown. This graphic visualizes the light reflectance on the receiver element.
Measurement not possible.	• Light path obscured • Device not in measuring range • Specular surfaces	• Make sure that the light path is clear. • Make sure that the device is in the measuring range. • Check the surface characteristics.
The link LED is not illuminated.	Ethernet connection not possible.	Check the Ethernet connection.

9.2 Detecting and displaying errors

In addition to measurement errors, the device can also detect and display other errors. These errors are outputted via SOPAS ET, IO-Link, or the software user interface.

Error memory

The device has an error memory where its internal error states are recorded. The last error to have occurred is always saved. The content of the error memory is retained when the device is switched off and when the **Reset** > **Factory settings** function is used.

Possible errors

Table 54: Explanation of the error codes

Error code	SOPAS ET hex code / device status	Meaning	Troubleshooting
-	- / No signal	No measurement possible	• Check the measuring range. • Increase the cycle time setting. • Decrease the distance to the object. If the error cannot be rectified, contact SICK Service.
-	- / Laser switched off	Laser is deactivated	Turn laser on.
Temperature error	0x50 / Temperature error 0x10 / Temperature warning	Operating temperature undershot or exceeded	Check the ambient temperature and raise or lower it if necessary.
Laser error	0x11 / Laser warning 0x60 / Laser error 1 0x61 / Laser error 2 0x62 / Laser error 3	Laser error	Please contact the manufacturer's technical support.
Internal error	0x80 / Internal error 1 0x81 / Internal error 2 0x82 / Internal error 3 0x83 / Internal error 4	Operating fault	Check the electrical environment and improve it, if necessary (stability, voltage supply, EMC influences). If the error cannot be rectified, contact SICK Service.

If a different message is outputted, contact the manufacturer's technical support.

9.3 Information for service cases

You should collect and write down the following device information ahead of time if you need to contact SICK Service:

- Information about the firmware version
- Information about the hardware
- Information about operating hours

This information can be accessed via SOPASair.

9.4 Returns

▶ Do not dispatch devices to the SICK Service department without consultation.
▶ The device must be sent in the original packaging or an equivalent padded packaging.

NOTE
To enable efficient processing and allow us to determine the cause quickly, please include the following when making a return:

- Details of the contact person
- Description of the application
- Description of the fault that occurred

9.5 Repairs

Repair work on the device may only be performed by qualified and authorized personnel from SICK AG. Interruptions or modifications to the device by the customer will invalidate any warranty claims against SICK AG.

10 Decommissioning

10.1 Disposal

CAUTION

Risk of injury due to hot device surface.

The surface of the device can become hot during operation.

- Before commencing disassembly, switch off the device and allow it to cool down as necessary.

If a device can no longer be used, dispose of it in an environmentally friendly manner in accordance with the applicable country-specific waste disposal regulations. Do not dispose of the product along with household waste.

NOTICE

Danger to the environment due to improper disposal of the device.

Disposing of devices improperly may cause damage to the environment.

Therefore, observe the following information:

- Always observe the national regulations on environmental protection.
- Separate the recyclable materials by type and place them in recycling containers.

11 Technical data

NOTE

The relevant online data sheet for your product, including technical data, dimensional drawing, and connection diagrams can be downloaded, saved, and printed from the Internet:

- www.sick.com/OD5000

Please note: This documentation may contain further technical data.

11.1 Mechanics and electronics

Table 55: Technical data for mechanics and electronics

Supply voltage U_V	12 V DC ... 24 V (±10%, including residual ripple)
Power consumption	180 mA (at 24 V)
Warm-up time	< 10 min
Housing material	Aluminum die cast, acrylic glass (PMMA), with scratch-proof coating
Connection type	Cable, 0.5 m with M12, 8-pin, A-coded male connector
Indicator	2 status LEDs
Weight	280 g
Dimensions	see "Setup and dimensions", page 14
Enclosure rating	IP67
Protection class	III (EN 50178)

11.2 Performance

OD5000-C15xxx

Table 56: OD5000-C15xxx: Technical data for performance

	OD5000-C15T01 (Part no. 6063619)	**OD5000-C15W01 (Part no. 6063620)**
Specular reflection		
Laser type	Thin	Wide
Typical light spot size (center of the measuring range)	ø 30 µm	30 × 1,000 µm
Measuring range	14 mm ... 16 mm	
Linearity (near side)	± 1 µm	
Linearity (far side)	± 1 µm	
General details		
Reproducibility	0.01 µm	
Response time	12.5 µs / 14.3 µs / 16.7 µs / 20 µs / 25 µs / 50 µs / 100 µs / 200 µs / 500 µs / 1 ms / Auto [1)]	
Measuring frequency	≤ 80 kHz	
Light sender	Laser, red (visible, wavelength 655 nm, max. output power: 0.39 mW)	

	OD5000-C15T01 (Part no. 6063619)	OD5000-C15W01 (Part no. 6063620)
Laser class	Laser class 1 according to EN/IEC 60825-1:2014. Complies with 21 CFR 1040.10 and 1040.11 except for the listed tolerances in the document “Laser Notice No. 50” of June 24, 2007.	

1) At 12.5 µs / 14.3 µs/ 16.7 µs / 20 µs measurement is only possible in a sub-area, see "Setting the sampling duration", page 37.

NOTE

No diffuse reflection is possible with the OD5000-C15xxx. Observe the mounting instructions, see "Mounting device", page 23.

OD5000-C30xxx

Table 57: OD5000-C30xxx: Technical data for performance

	OD5000-C30T05 (Part no. 6063621)	OD5000-C30W05 (Part no. 6063622)
Diffuse reflection		
Laser type	Thin	Wide
Typical light spot size (center of the measuring range)	ø 30 µm	30 × 1,000 µm
Measuring range	25 mm ... 35 mm	
Linearity (near side)	± 3.0 µm	± 1.5 µm
Linearity (far side)	± 3.0 µm	± 1.5 µm
Specular reflection		
Laser type	Thin	Wide
Measuring range	22.5 mm ... 28.5 mm	
Linearity (near side)	± 4 µm	
Linearity (far side)	± 4 µm	
General details		
Reproducibility	0.05 µm	
Response time	12.5 µs / 14.3 µs / 16.7 µs / 20 µs / 25 µs / 50 µs / 100 µs / 200 µs / 500 µs / 1 ms / Auto [1]	
Measuring frequency	80 kHz	
Light sender	Laser, red (visible, wavelength 655 nm, max. output power: 0.39 mW)	
Laser class	Laser class 1 according to EN/IEC 60825-1:2014. Complies with 21 CFR 1040.10 and 1040.11 except for the listed tolerances in the document “Laser Notice No. 50” of June 24, 2007.	

1) At 12.5 µs / 14.3 µs/ 16.7 µs / 20 µs measurement is only possible in a sub-area, see "Setting the sampling duration", page 37.

OD5000-C85xxx

Table 58: OD5000-C85xxx: Technical data for performance

	OD5000-C85T20 (Part no. 6063623)	OD5000-C85W20 (Part no. 6063624)
Diffuse reflection		
Laser type	Thin	Wide

	OD5000-C85T20 (Part no. 6063623)	OD5000-C85W20 (Part no. 6063624)
Typical light spot size (center of the measuring range)	ø 70 µm	70 × 2,000 µm
Measuring range	85 ± 20 mm	85 ± 20 mm
Linearity (near side)	± 7.2 µm	± 6 µm
Linearity (far side)	± 12 µm	± 6 µm
Specular reflection		
Laser type	Thin	Wide
Measuring range	81.5 ± 10 mm	81.5 ± 10 mm
Linearity (near side)	± 6 µm	± 6 µm
Linearity (far side)	± 6 µm	± 6 µm
General details		
Reproducibility	0.1 µm	
Response time	12.5 µs / 14.3 µs / 16.7 µs / 20 µs / 25 µs / 50 µs / 100 µs / 200 µs / 500 µs / 1 ms / Auto [1]	
Measuring frequency	80 kHz	
Light sender	Laser, red (visible, wavelength 655 nm, max. output power: 0.39 mW)	
Laser class	Laser class 1 according to EN/IEC 60825-1:2014. Complies with 21 CFR 1040.10 and 1040.11 except for the listed tolerances in the document “Laser Notice No. 50” of June 24, 2007.	

1) At 12.5 µs / 14.3 µs/ 16.7 µs / 20 µs measurement is only possible in a sub-area, see "Setting the sampling duration", page 37.

OD5000-C150xxx

Table 59: OD5000-C150xxx: Technical data for performance

	OD5000-C150T40 (Part no. 6063625)	OD5000-C150W40 (Part no. 6063626)
Diffuse reflection		
Laser type	Thin	Wide
Typical light spot size (center of the measuring range)	ø 120 µm	120 × 4,000 µm
Measuring range	150 ± 40 mm	150 ± 40 mm
Linearity (near side)	± 24 µm	± 12 µm
Linearity (far side)	± 32 µm	± 12 µm
General details		
Reproducibility	0.2 µm	
Response time	12.5 µs / 14.3 µs / 16.7 µs / 20 µs / 25 µs / 50 µs / 100 µs / 200 µs / 500 µs / 1 ms / Auto [1]	
Measuring frequency	80 kHz	
Light sender	Laser, red (visible, wavelength 655 nm, max. output power: 0.39 mW)	

	OD5000-C150T40 (Part no. 6063625)	OD5000-C150W40 (Part no. 6063626)
Laser class	Laser class 1 according to EN/IEC 60825-1:2014. Complies with 21 CFR 1040.10 and 1040.11 except for the listed tolerances in the document “Laser Notice No. 50” of June 24, 2007.	

1) At 12.5 µs / 14.3 µs/ 16.7 µs / 20 µs measurement is only possible in a sub-area, see "Setting the sampling duration", page 37.

NOTE
Specular reflection is not supported for OD5000-C150xx. Observe the mounting instructions, see "Mounting device", page 23.

11.3 Interfaces

Table 60: Technical data for interfaces

Ethernet	UDP and TCP/IP
Digital inputs	IN1 Can be used as laser off, external teach-in, or deactivated

11.4 Ambient data

Table 61: Ambient data

Ambient operating temperature (air humidity)	–10 °C ... +50 °C 1) (35% to 85%)
Storage temperature (air humidity)	–20 °C ... +60 °C (35% to 85%)
Temperature drift	± 0.01% FS / °C (at –10 °C to +40 °C), ± 0.03% FS / °C (at +40 °C to +50 °C)
Type Ambient light immunity	Artificial light: ≤ 3,000 lx 2) Sunlight: ≤ 10,000 lx
Vibration resistance	EN 60068-2-6 / EN 60068-2-64
Shock resistance	EN 60068-2-27

1) At U_V = 24 V
2) With constant object movement in the measuring range

11.5 Linearity diagram

OD5000-C15Txx and OD5000-C15Wxx

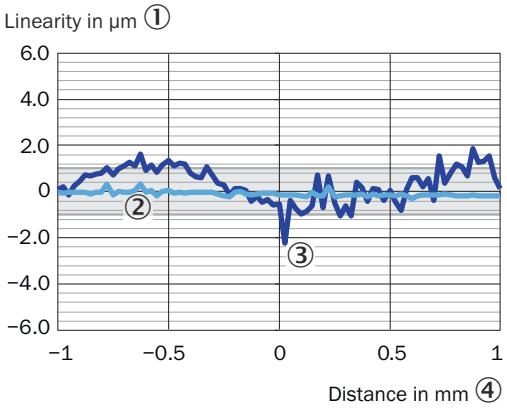


Figure 62: Linearity OD5000-C15Txx (specular reflection)

① Linearity in µm
② Glass
③ Reflector
④ Distance in mm

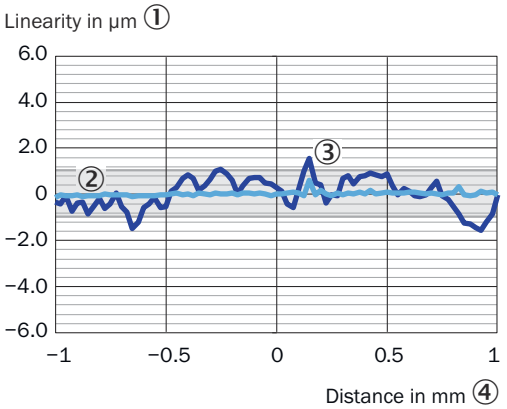


Figure 63: Linearity OD5000-C15Wxx (specular reflection)

① Linearity in µm
② Glass
③ Reflector
④ Distance in mm

OD5000-C30Txx

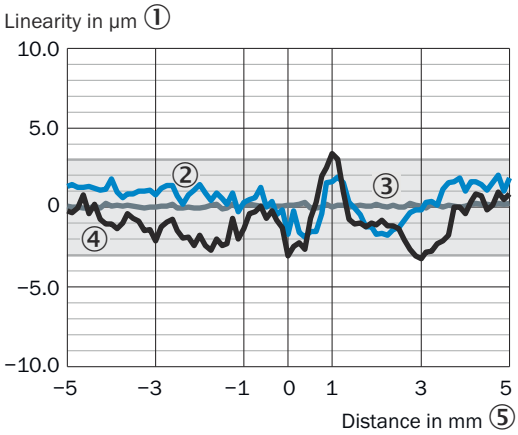


Figure 64: Linearity OD5000-C30Txx (diffuse reflection)

① Linearity in µm
② Ceramic, white (60% reflectance)
③ Stainless steel
④ Rubber, black (10% reflectance)
⑤ Distance in mm

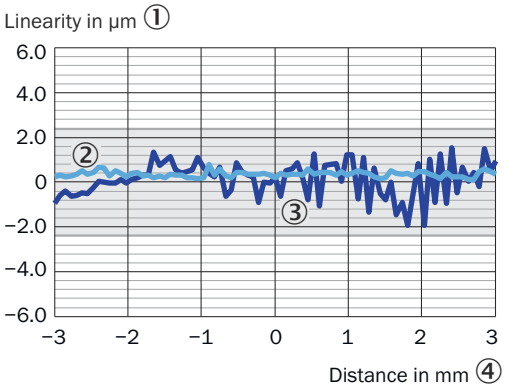


Figure 65: Linearity OD5000-C30Txx (specular reflection)

① Linearity in µm
② Glass
③ Reflector
④ Distance in mm

OD5000-C30Wxx

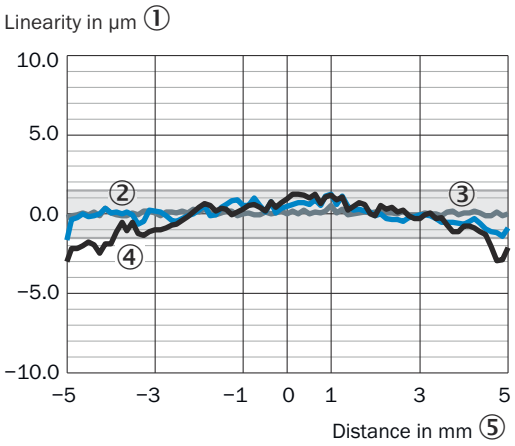


Figure 66: Linearity OD5000-30Wxx (diffuse reflection)

① Linearity in µm
② Ceramic, white (60% reflectance)
③ Stainless steel
④ Rubber, black (10% reflectance)
⑤ Distance in mm

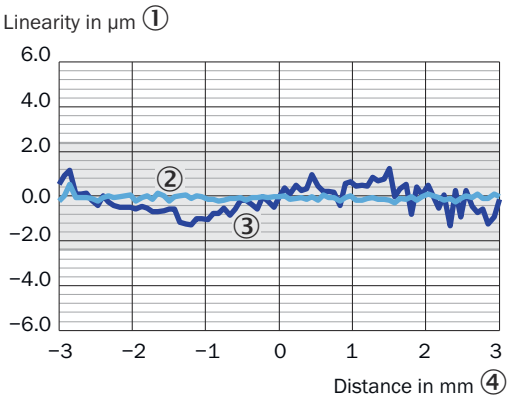


Figure 67: Linearity OD5000-30Wxx (specular reflection)

① Linearity in µm
② Glass
③ Reflector
④ Distance in mm

OD5000-C85Txx

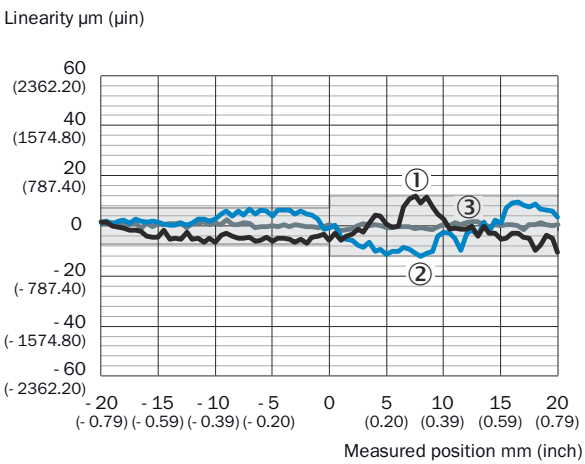


Figure 68: Linearity OD5000-C85Txx (diffuse reflection)

① Linearity in µm (µinch)
② Rubber, black (10% reflectance)
③ Stainless steel
④ Ceramic, white (60% reflectance)
⑤ Distance in mm (inch)

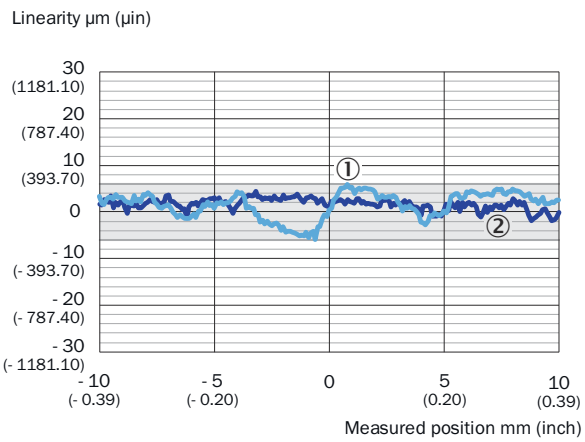


Figure 69: Linearity OD5000-C85Txx (specular reflection)

① Linearity in µm (µinch)
② Glass
③ Reflector
④ Distance in mm (inch)

OD5000-C85Wxx

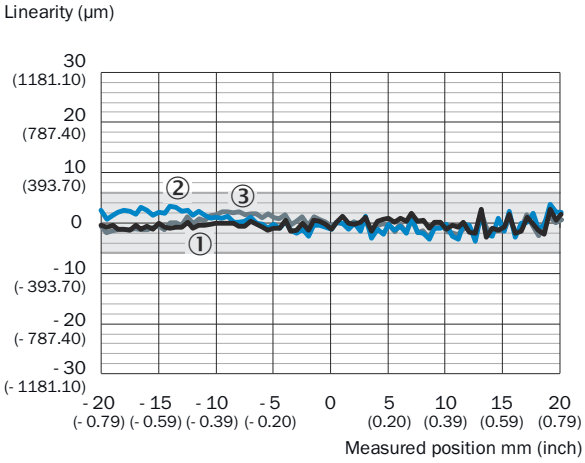


Figure 70: Linearity OD5000-C85Wxx (diffuse reflection)

① Linearity in µm (µinch)
② Ceramic, white (60% reflectance)
③ Stainless steel
④ Rubber, black (10% reflectance)
⑤ Distance in mm (inch)

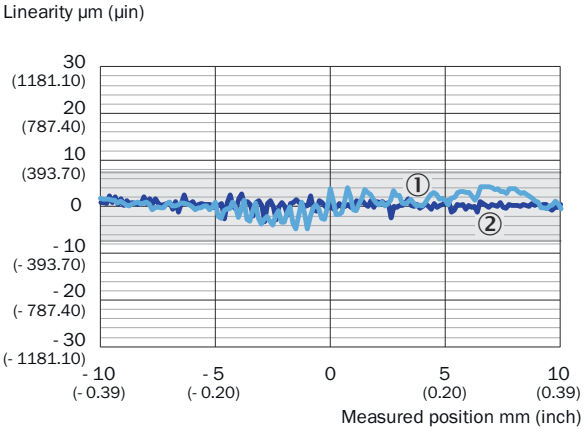


Figure 71: Linearity OD5000-C85Wxx (specular reflection)

① Linearity in µm (µinch)
② Glass
③ Reflector
④ Distance in mm (inch)

OD5000-C150Txx and OD5000-C150Wxx

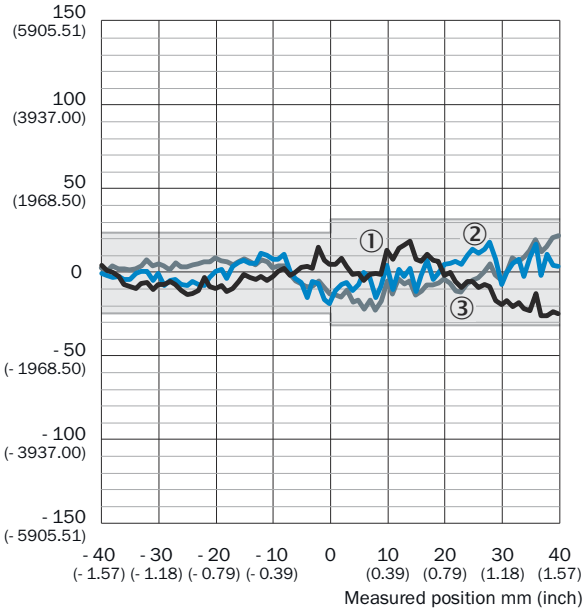


Figure 72: Linearity OD5000-C150Txx (diffuse reflection)

① Linearity in µm (µinch)
② Rubber, black (10% reflectance)
③ Ceramic, white (60% reflectance)
④ Stainless steel
⑤ Distance in mm (inch)

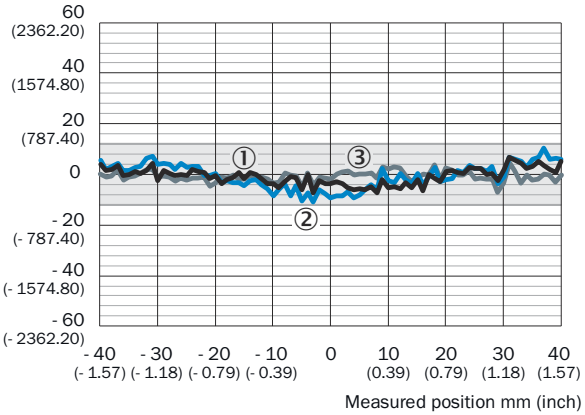


Figure 73: Linearity OD5000-C150Wxx (diffuse reflection)

① Linearity in µm (µinch)
② Rubber, black (10% reflectance)
③ Stainless steel
④ Ceramic, white (60% reflectance)
⑤ Distance in mm (inch)

12 Accessories

NOTE
Accessories and where applicable mounting information can be found online at:

- www.sick.com/OD5000

12.1 Recommended accessories

Designation	Model name	Part number
Y-distribution [1]	SYL-1208-G0M	6064008
Y-distribution extension cable	DSC-1208-G02MA (2 m)	6064004
	DSC-1208-G05MA (5 m)	6064005
	DSC-1208-G10MA (10 m)	6064006
	DSC-1208-G30MA (30 m)	6064007
Supply cable	DOL-1204-G02MAC	2088079
Ethernet cable	SSL-2J04-G02ME	6034414
AOD1 connection cable	DSL-2804-G02MC	6039180

1) Included in the scope of delivery of the OD5000

13 Annex

13.1 EU declaration of conformity / Certificates

The EU declaration of conformity and other certificates can be downloaded from the Internet at:

- www.sick.com/OD5000

13.2 Licenses

SICK uses open source software which is published by the rights holders under a free license. Among others, the following license types are used: GNU General Public License (GPL version 2, GPL version 3), GNU Lesser General Public License (LGPL), MIT license, zlib license and licenses derived from the BSD license.

This program is provided for general use without warranty of any kind. This warranty disclaimer also extends to the implicit assurance of marketability or suitability of the program for a particular purpose.

More details can be found in the GNU General Public License. View the complete license texts here: www.sick.com/licensetexts. Printed copies of the license texts are also available on request.

8021391/17Y6/2020-05-11/en

Australia
Phone +61 (3) 9457 0600
1800 33 48 02 – tollfree
E-Mail sales@sick.com.au

Austria
Phone +43 (0) 2236 62288-0
E-Mail office@sick.at

Belgium/Luxembourg
Phone +32 (0) 2 466 55 66
E-Mail info@sick.be

Brazil
Phone +55 11 3215-4900
E-Mail comercial@sick.com.br

Canada
Phone +1 905.771.1444
E-Mail cs.canada@sick.com

Czech Republic
Phone +420 234 719 500
E-Mail sick@sick.cz

Chile
Phone +56 (2) 2274 7430
E-Mail chile@sick.com

China
Phone +86 20 2882 3600
E-Mail info.china@sick.net.cn

Denmark
Phone +45 45 82 64 00
E-Mail sick@sick.dk

Finland
Phone +358-9-25 15 800
E-Mail sick@sick.fi

France
Phone +33 1 64 62 35 00
E-Mail info@sick.fr

Germany
Phone +49 (0) 2 11 53 010
E-Mail info@sick.de

Greece
Phone +30 210 6825100
E-Mail office@sick.com.gr

Hong Kong
Phone +852 2153 6300
E-Mail ghk@sick.com.hk

Hungary
Phone +36 1 371 2680
E-Mail ertekesites@sick.hu

India
Phone +91-22-6119 8900
E-Mail info@sick-india.com

Israel
Phone +972 97110 11
E-Mail info@sick-sensors.com

Italy
Phone +39 02 27 43 41
E-Mail info@sick.it

Japan
Phone +81 3 5309 2112
E-Mail support@sick.jp

Malaysia
Phone +603-8080 7425
E-Mail enquiry.my@sick.com

Mexico
Phone +52 (472) 748 9451
E-Mail mexico@sick.com

Netherlands
Phone +31 (0) 30 229 25 44
E-Mail info@sick.nl

New Zealand
Phone +64 9 415 0459
0800 222 278 – tollfree
E-Mail sales@sick.co.nz

Norway
Phone +47 67 81 50 00
E-Mail sick@sick.no

Poland
Phone +48 22 539 41 00
E-Mail info@sick.pl

Romania
Phone +40 356-17 11 20
E-Mail office@sick.ro

Russia
Phone +7 495 283 09 90
E-Mail info@sick.ru

Singapore
Phone +65 6744 3732
E-Mail sales.gsg@sick.com

Slovakia
Phone +421 482 901 201
E-Mail mail@sick-sk.sk

Slovenia
Phone +386 591 78849
E-Mail office@sick.si

South Africa
Phone +27 10 060 0550
E-Mail info@sickautomation.co.za

South Korea
Phone +82 2 786 6321/4
E-Mail infokorea@sick.com

Spain
Phone +34 93 480 31 00
E-Mail info@sick.es

Sweden
Phone +46 10 110 10 00
E-Mail info@sick.se

Switzerland
Phone +41 41 619 29 39
E-Mail contact@sick.ch

Taiwan
Phone +886-2-2375-6288
E-Mail sales@sick.com.tw

Thailand
Phone +66 2 645 0009
E-Mail marcom.th@sick.com

Turkey
Phone +90 (216) 528 50 00
E-Mail info@sick.com.tr

United Arab Emirates
Phone +971 (0) 4 88 65 878
E-Mail contact@sick.ae

United Kingdom
Phone +44 (0)17278 31121
E-Mail info@sick.co.uk

USA
Phone +1 800.325.7425
E-Mail info@sick.com

Vietnam
Phone +65 6744 3732
E-Mail sales.gsg@sick.com

Detailed addresses and further locations at **www.sick.com**

SICK AG | Waldkirch | Germany | www.sick.com

SICK
Sensor Intelligence.