**wenglor**
the innovative family

Operating Instructions
**OPT2504**
**Laser Distance Sensor Triangulation**

EN

# Table of Contents

# 1 General

## 1.1 Information Concerning these Instructions

- These instructions make it possible to use the product safely and efficiently.
- These instructions are an integral part of the product and must be kept on hand for the entire duration of its service life.
- Local accident prevention regulations and national work safety regulations must be complied with as well.
- The product is subject to further technical development, and thus the information contained in these operating instructions may also be subject to change. The current version can be found at www.automationdirect.com in the product's separate download area.

## INFORMATION

The operating instructions must be read carefully before using the product and must be kept on hand for later reference.

## 1.2 Explanation of Symbols

- Safety precautions and warnings are emphasized by means of symbols and signal words.
- Safe use of the product is only possible if these safety precautions and warnings are adhered to.

The safety precautions and warnings are laid out in accordance with the following principle:

**SIGNAL WORD**

**Type and source of danger!**

Possible consequences in the event that the hazard is disregarded.

→ Measures for averting the hazard.

The meanings of the signal words, as well as the scope of the associated hazards, are listed below:

## ⚠ DANGER

This signal word indicates a hazard with a high degree of risk which, if not avoided, results in death or severe injury.

## ⚠ WARNING

This signal word indicates a hazard with a medium degree of risk which, if not avoided, may result in death or severe injury.

## ⚠ CAUTION

This signal word indicates a hazard with a low degree of risk which, if not avoided, may result in minor or moderate injury.

## NOTICE

This signal word draws attention to a potentially hazardous situation which, if not avoided, may result in property damage.

## INFORMATION

Information draws attention to useful tips and suggestions, as well as information on efficient, error-free use.

# 1.3    Limitation of Liability

- The product has been developed in consideration of the current state-of-the-art technology, as well as applicable standards and guidelines. Subject to change without notice.
- A valid declaration of conformity can be accessed at www.automationdirect.com in the product's separate download area.
- wenglor sensoric elektronische Geräte GmbH (hereinafter referred to as "wenglor") excludes all liability in the event of:
    - Non-compliance with the instructions
    - Use of the product for purposes other than those intended.
    - Use by untrained personnel.
    - Use of unapproved spare parts.
    - Unapproved modification of products.
- These operating instructions do not include any guarantees from wenglor with regard to the described procedures or specific product characteristics.
- wenglor assumes no liability for printing errors or other inaccuracies contained in these operating instructions unless wenglor was verifiably aware of such errors at the point in time at which the operating instructions were prepared.

## 1.4 Copyrights

- The contents of these instructions are protected by copyright law.
- All rights are reserved by wenglor.
- Commercial reproduction or any other commercial use of the provided content and information, in particular graphics and images, is not permitted without previous written consent from wenglor.

# 2 For Your Safety

## 2.1 Use for Intended Purpose

**Laser Distance Sensors Triangulation**

Triangulation laser distance sensors work according to the principle of angle measurement, where the object's color, shape, and surface do not affect the measurement. Depending on the setting, they can be operated at very high speed or resolution. The measuring range can be selected individually within the sensor's working range.

**This product can be used in the following industry sectors:**

- Special-purpose mechanical engineering
- Heavy mechanical engineering
- Logistics
- Automotive industry
- Food industry
- Packaging industry
- Pharmaceuticals industry
- Plastics industry
- Woodworking industry

- Consumer goods industry
- Paper industry
- Electronics industry
- Glass industry
- Steel industry
- Aviation industry
- Chemicals industry
- Alternative energies
- Raw materials extraction

## 2.2 Use for Other than the Intended Purpose

- Not a safety component in accordance with 2006/42/EC (Machinery Directive).
- The product may be used only with accessories supplied or approved by wenglor, or in combination with approved products. A list of approved accessories and combination products can be found at www.automationdirect.com on the product detail page.

⚠️ **DANGER**

**Risk of personal injury or property damage in case of use for other than the intended purpose!**

Use for other than the intended purpose may lead to hazardous situations.

→ Observe instructions regarding use for intended purpose.

## 2.3 Personnel Qualifications

- Suitable technical training is a prerequisite.
- In-house electronics training is required.
- Trained personnel who use the product must have (permanent) access to the operating instructions.

⚠️ **DANGER**

**Risk of personal injury or property damage in case of incorrect initial start-up and maintenance!**

Personal injury and damage to equipment may occur.

→ Adequate training and qualification of personnel

## 2.4 Modification of Products

⚠️ **DANGER**

**Risk of personal injury or property damage if the product is modified!**

Personal injury and damage to equipment may occur. Noncompliance may result in loss of the CE and/or UKCA mark and voiding of the warranty.

→ Modification of the product is not permitted

## 2.5 General Safety Precautions

**INFORMATION**

These instructions are an integral part of the product and must be kept on hand for the entire duration of its service life.

In the event of possible changes, the current version of the operating instructions can be found at www.automationdirect.com in the product's separate download area.

Read the operating instructions carefully before using the product.

Protect the sensor against contamination and mechanical influences.

## 2.6 Laser Warnings
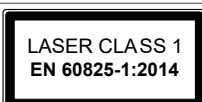
| LASER CLASS 1<br>**EN 60825-1:2014** | **Laser Class 1 (EN 60825-1)**<br>Applicable standards and safety regulations must be observed. |
|---|---|

## 2.7    Approvals and Protection Class
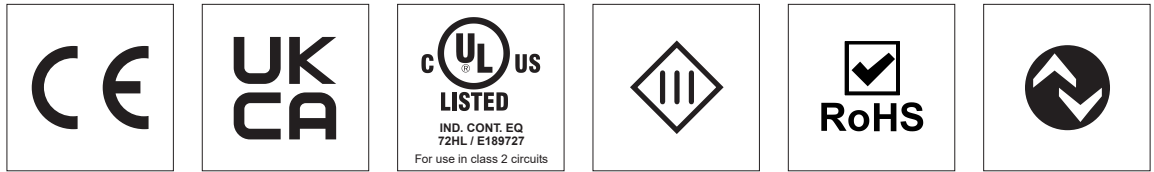


⚠️ **NOTICE**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Caution: Any changes or modifications not expressly approved by the party responsible

for compliance could void the user's authority to operate this equipment.

# 3 Technical Data

## 3.1 General Data

| Technical Data | |
|---|---|
| **Optical Data** | |
| Working Range | 40 ... 240 mm |
| Measuring Range | 40 ... 240 mm |
| Reproducibility maximum | 70 µm |
| Reproducibility: 1 Sigma | 6 µm |
| Linearity Deviation | 200 µm |
| Light Source | Laser (red) |
| Wavelength | 655 nm |
| Service Life (T = +25 °C) | 100000 h |
| Laser Class (EN 60825-1) | 1 |
| Max. Ambient Light | 20000 Lux |
| Light Spot Diameter | See section Light Spot Diameter [▶ 11] |
| **Electrical Data** | |
| Supply Voltage | 18 ... 30 V DC |
| Current Consumption (Ub = 24 V) | < 60 mA |
| Measuring Rate | 2500 /s |
| Response Time | < 0.5 ms |
| Temperature Drift | < 15 µm/K |
| Temperature Range | -30 ... 60 °C |
| Analog Output | 4...20 mA |
| Short Circuit and Overload Protection | yes |
| Reverse Polarity Protection | yes |
| Interface | IO-Link V1.1 |
| Baud Rate | COM3 |
| Protection Class | III |
| FDA Accession Number | 2310674-000 |
| **Mechanical Data** | |
| Setting Method | (OLED)/Bluetooth menu |
| Housing Material | Aluminum, anodised |
| | Plastic, ABS |
| Optic Cover | Plastic, PMMA |
| Degree of Protection | IP67 |
| Connection | M12 × 1; 4/5-pin |
| Contains FCC ID: 2A3OLDC1392 | x |
| **Output Functions** | |
| Output | Analog Output |
| **Technical Safety Data** | |
| MTTFd (EN ISO 13849-1) | 408.4 a |

The information on accuracy (linearity deviation, reproducibility and temperature drift) refers to the measured values transmitted via IO-Link.

If an analog output is used, its deviation must be taken into account when considering accuracy. The maximum deviation here is:

Analog output 0...10 V: +/−15 mV at >5 kOhm load

Analog output 4...20 mA: +/−25 µA at 0...500 ohm load

### 3.1.1 Light Spot Diameter

| Working Distance | 40 mm | 140 mm | 240 mm |
|---|---|---|---|
| Light Spot Diameter | 1,5 mm | 1 mm | 1 mm |

## 3.2 Warm-Up Phase

The warm-up phase typically lasts 5 minutes. After this time, the sensor delivers the specified values of the linearity deviation.

Specifications correspond to measured value without load. For all variants, the specification may differ due to the load on the output.

## 3.3 Housing Dimensions
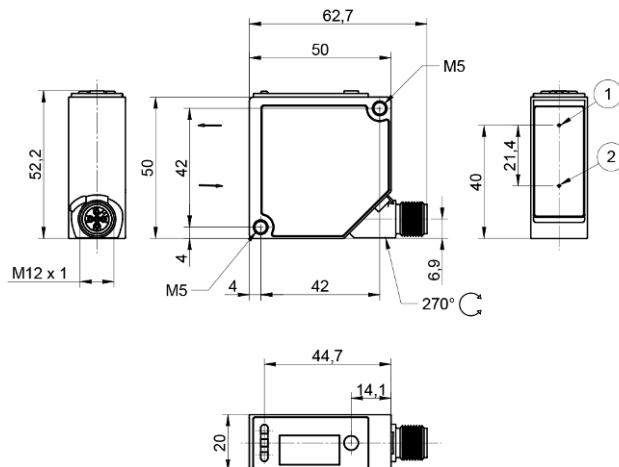


① = emitted light

② = receiver diode

M4 screw = 1 Nm

M5 screw = 2 Nm

**Dimensions specified in mm (1 mm = 0.03937")**

## 3.4 Control Panel

X6
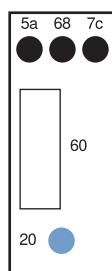
5a = switching status display, A1

7c = analog output O display

20 = enter key

60 = display

68 = supply voltage indicator

## 3.5 Complementary Products

wenglor offers you the right connection and mounting technology as well as other accessories for your product. You can find this at www.automationdirect.com on the product details page at the bottom.

## 3.6 Scope of Delivery

• Sensor
• Safety precaution
• BEF-SET-02 mounting set

# 4 Transport and Storage

## 4.1 Transport

Upon receipt of shipment, the goods must be inspected for damage in transit. In the case of damage, conditionally accept the package and notify the manufacturer of the damage. Then return the device, making reference to damage in transit.

## 4.2 Storage

The following points must be taken into consideration with regard to storage:

- Do not store the product outdoors.
- Store the product in a dry, dust-free place.
- Protect the product against mechanical impacts.
- Protect the product against exposure to direct sunlight.

| **NOTICE** |
| --- |

**Risk of property damage in case of improper storage!**

The product may be damaged.

→ Storage instructions must be complied with.

# 5 Installation and Electrical Connection

## 5.1 Installation

- Protect the product from contamination during installation.
- Observe all applicable electrical and mechanical regulations, standards and safety rules.
- Protect the product against mechanical influences.
- Make sure that the sensor is mounted in a mechanically secure fashion.
- Specified torque values must be complied with
- Install the sensor by means of the mounting hole with M4 screws (included in the scope of delivery).



- Alternatively, the sensors can also be attached using M5 screws (not included in the scope of delivery) via the thread built into the housing.



- Do not exceed max. tightening torque:
    - If using M4 screws: 1 Nm
    - If using M5 screws: 2 Nm

⚠️ **NOTICE**

**Risk of property damage in case of improper installation!**

The product may be damaged!

→ Comply with installation instructions.

⚠️ **⚠ CAUTION**

**Risk of personal injury or property damage during installation!**

Personal injury and damage to the product may occur.

→ Ensure a safe installation environment.

## 5.2    Adjustment

When adjusting sensors, note the following instructions so that the most stable object detection/measurement can be achieved:

**Steps/Edges/Depressions**
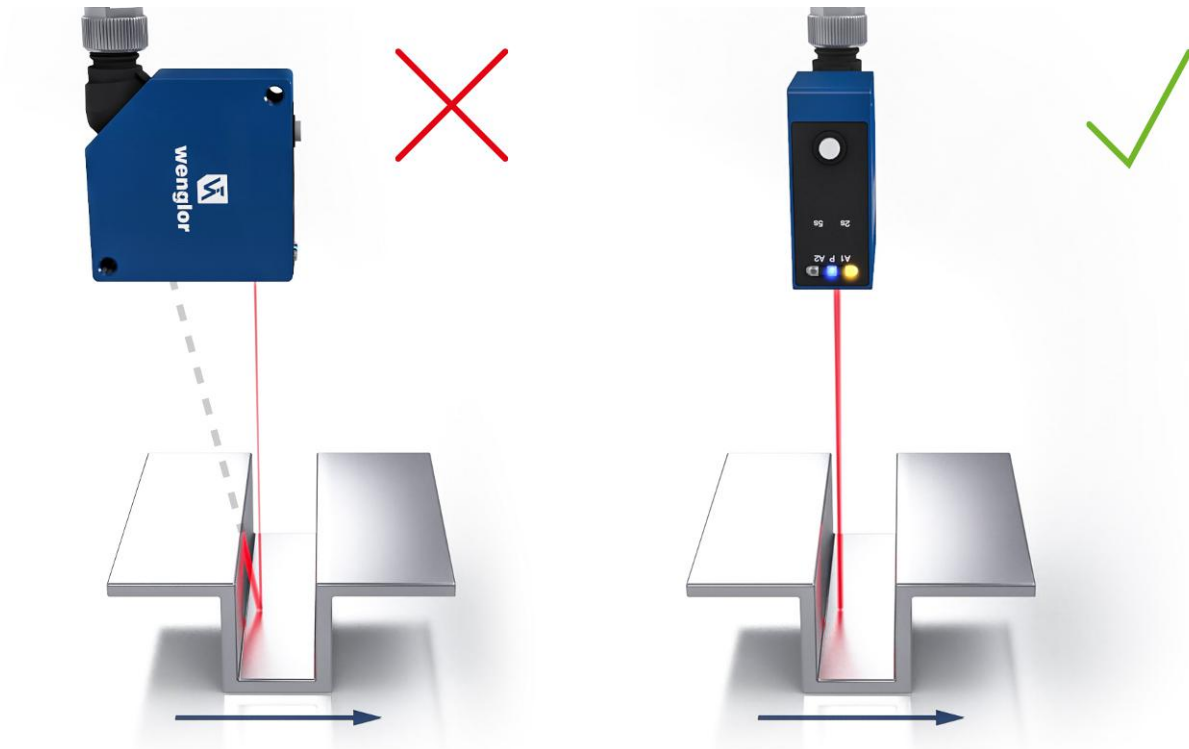


If measuring directly next to steps/edges/depressions, make sure that the receiving beam is not covered by the step/edge. The same applies when measuring the depth of gaps and holes.

With holes, blind holes and edges in the surface of moving parts, the sensor must be positioned so that the edge does not obscure the laser dot.

## Round, Glossy surfaces
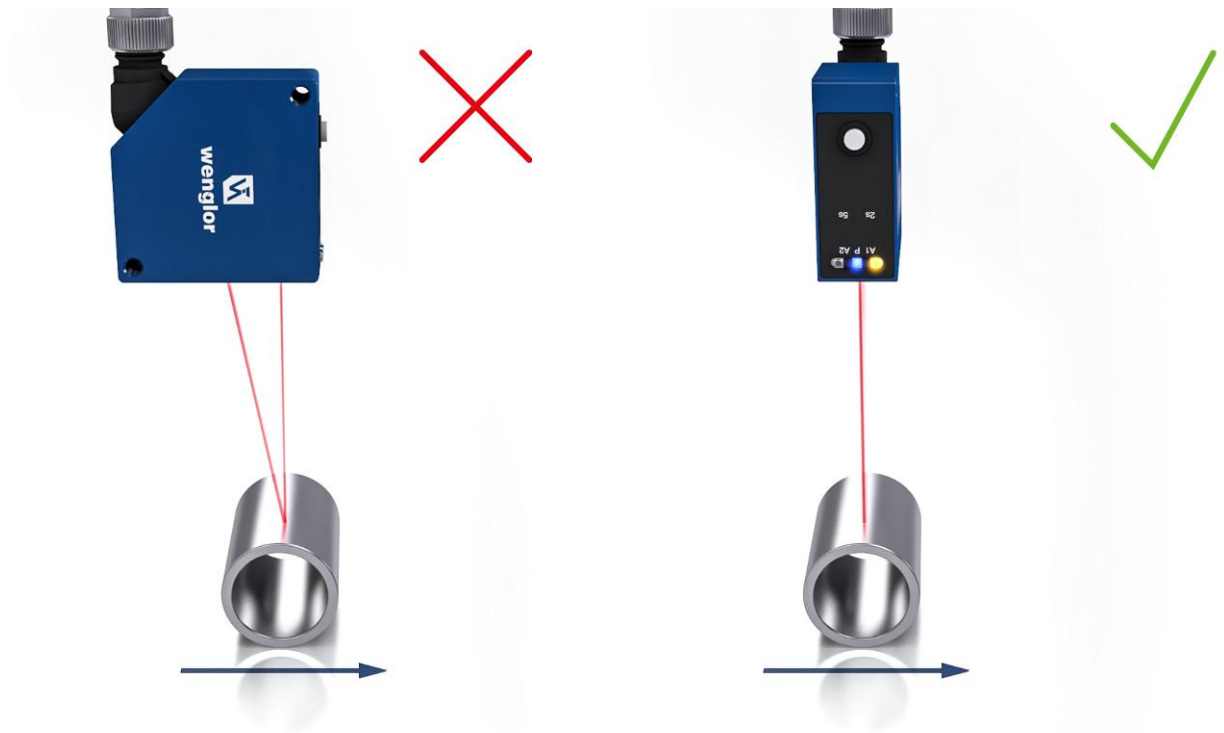


With round, glossy surfaces, the sensor should be positioned on an axis with the round object in order to avoid reflection.

## Measuring Objects with Evenly Positioned, Colored Edges
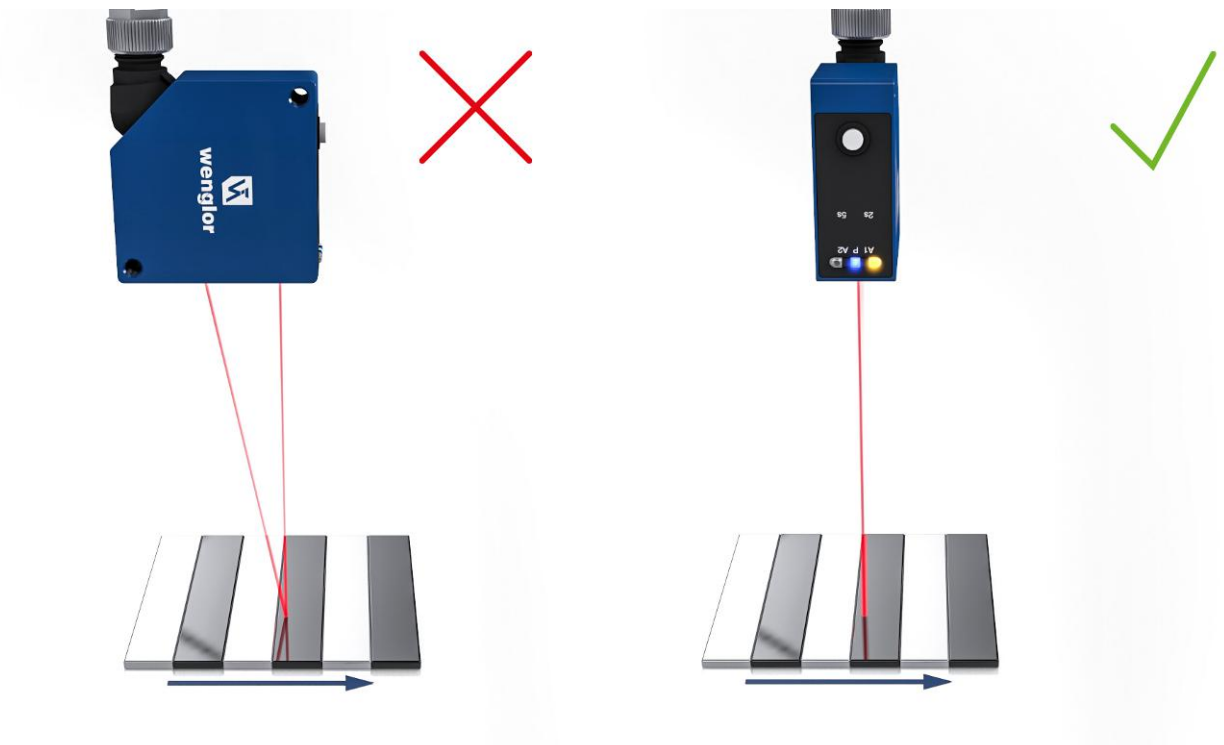


When oriented correctly, the influence on measuring accuracy is minimal. When oriented incorrectly, the different reflectivity of the various colors will result in deviations.

**Moving Measuring Objects**
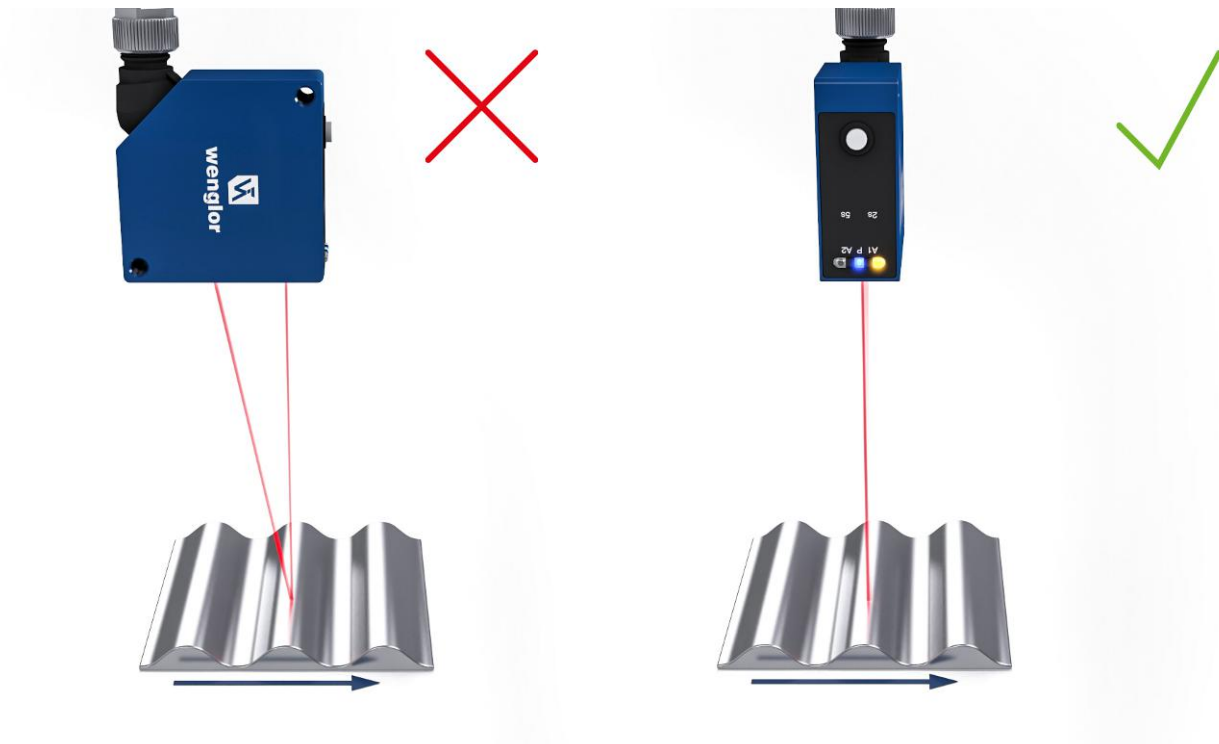


When measuring a moving object, the object must be able to move transversely to the sensor. This prevents shadows and direct reflection to the receiver.

## 5.3　Electrical Connection

- Wire the sensor in accordance with the connection diagram.
- Switch on the supply voltage (see section Technical Data [▶ 10]).
- If using IO-Link, connect the sensor to 18...30 V DC.
- If not using IO-Link, connect the sensor to 10...30 V DC.
- The blue supply voltage indicator lights up.
- Adjust the sensor so that the light spot strikes the object to be detected/measured.



### ⚠ DANGER

**Risk of personal injury or property damage due to electric current.**

Voltage-conducting parts may cause personal injury or damage to equipment.

→ The electric device may be connected by appropriately qualified personnel only.

| 1 | brown | 2 | white |
|---|---|---|---|
| 3 | blue | 4 | black |
| 5 | gray | | |

Legend

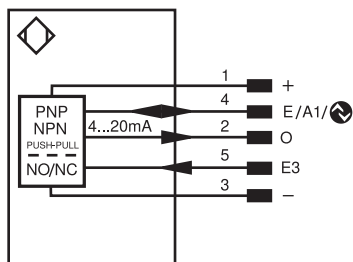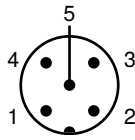| | | | | | | |
|---|---|---|---|---|---|---|
| + | Supply Voltage + | PT | Platinum measuring resistor | ENₐR5422 | Encoder A/Ā (TTL) | |
| − | Supply Voltage 0 V | nc | not connected | ENᵦR5422 | Encoder B/B̄ (TTL) | |
| ~ | Supply Voltage (AC Voltage) | U | Test Input | ENₐ | Encoder A | |
| A | Switching Output (NO) | Ū | Test Input inverted | ENᵦ | Encoder B | |
| Ā | Switching Output (NC) | W | Trigger Input | AMIN | Digital output MIN | |
| V | Contamination/Error Output (NO) | W− | Ground for the Trigger Input | AMAX | Digital output MAX | |
| V̄ | Contamination/Error Output (NC) | O | Analog Output | AOK | Digital output OK | |
| E | Input (analog or digital) | O− | Ground for the Analog Output | SY In | Synchronization In | |
| T | Teach Input | BZ | Block Discharge | SY OUT | Synchronization OUT | |
| Z | Time Delay (activation) | AMV | Valve Output | OLT | Brightness output | |
| S | Shielding | a | Valve Control Output + | M | Maintenance | |
| RxD | Interface Receive Path | b | Valve Control Output 0 V | rsv | reserved | |
| TxD | Interface Send Path | SY | Synchronization | Wire Colors according to IEC 60757 | | |
| RDY | Ready | SY− | Ground for the Synchronization | BK | Black | |
| GND | Ground | E+ | Receiver-Line | BN | Brown | |
| CL | Clock | S+ | Emitter-Line | RD | Red | |
| E/A | Output/Input programmable | ⏚ | Grounding | OG | Orange | |
| ⬡ | IO-Link | SnR | Switching Distance Reduction | YE | Yellow | |
| PoE | Power over Ethernet | Rx+/− | Ethernet Receive Path | GN | Green | |
| IN | Safety Input | Tx+/− | Ethernet Send Path | BU | Blue | |
| OSSD | Safety Output | Bus | Interfaces-Bus A(+)/B(−) | VT | Violet | |
| Signal | Signal Output | La | Emitted Light disengageable | GY | Grey | |
| BI_D+/− | Ethernet Gigabit bidirect. data line (A-D) | Mag | Magnet activation | WH | White | |
| ENₒR5422 | Encoder 0-pulse 0-0̄ (TTL) | RES | Input confirmation | PK | Pink | |
| | | EDM | Contactor Monitoring | GNYE | Green/Yellow | |

## 5.4 Diagnosis

| Indicator | Status | Meaning |
|---|---|---|
| Supply voltage indicator P | | Sensor ready for operation |
| | | No voltage supply |
| | | **Warning**<br>LEDs for switching status indicators A1, A2 and analog display O are still working properly |
| | | **Error**<br>LEDs for switching status indicators A1, A2 and analog display O are not working properly |
| | | Sensor ready for Bluetooth connection |
| Switching status indicator A1, A2 | | Switching outputs active |
| | | Switching outputs not active |
| Analog indicator O | | Object within set measuring range |
| | | Object outside set measuring range |
| Localization | | Localization function active |

= Not lit

= Permanently lit

= Flashing

## 5.5 Troubleshooting

| Error | Possible cause | Elimination |
|---|---|---|
| Warning | Warning signal | • Reduce distance between sensor and object<br>• Adjust angle of sensor to object<br>• Remove any contamination |
| | Undervoltage | • Increase voltage supply to min. 18 V DC |
| | Ambient light | • Adjust sensor orientation to interfering light source |
| | Temperature too high | • Mount the mounting bracket as a heat sink<br>• Reduce load on outputs |
| | Temperature too low | • Increase ambient temperature |
| Error | Short circuit | • Check the electrical wiring and eliminate the short circuit |
| | Temperature error | • Disconnect the sensor from the supply voltage and allow it to cool<br>• Mount the mounting bracket as a heat sink<br>• Reduce load on outputs |
| | Device error | • Disconnect the sensor from the supply voltage and restart it<br>• Replace the sensor |

## INFORMATION

**Required action in case of fault:**

1. Shut down the machine.
2. Analyze and eliminate the cause of error with the aid of the diagnostics information.
3. If the error cannot be eliminated, please contact wenglor's support department.
4. Do not operate in case of indeterminate malfunctioning.
5. The machine must be shut down if the error cannot be definitively explained or properly eliminated.

## ⚠ DANGER

**Risk of personal injury or property damage in case of non-compliance!**

The system's safety function is disabled. Personal injury and damage to equipment may occur.

→ Required action as specified in case of fault.

# 6 Settings

The sensor can be adjusted via teach-in, IO-Link, wTeach2 and weCon. The different setting options are outlined below.

## 6.1 Configuration with Push of Button / Teach-In

This section describes the settings that can be configured directly on the sensor using the button.

The settings can also be configured directly using the Enter key and without accessing the menu.

## 6.2 Analog Output

### Analog Output Function

The sensor reads out its measured value as a linear proportional current or voltage value. The characteristic curve can be set within the entire measuring range by teaching in.
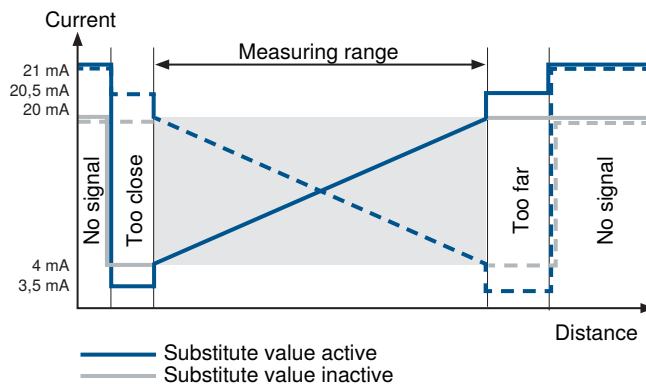


### Substitute Values (Current Output Only)

By means of substitute values, the sensor is able to provide more precise diagnosis as to whether the analog signal corresponds to a valid measured value within the measuring range.

No signal: 21 mA

### Rising Characteristic Curve

Object outside near measuring range: 3.5 mA

Object outside far measuring range: 20.5 mA

### Falling Characteristic Curve

Object outside near measuring range: 20.5 mA

Object outside far measuring range: 3.5 mA

The substitute values function can be deactivated via the menu, Bluetooth, or IO-Link.

### Teach-In

The teach-In function can be used to scale the analog output and assign the min./max. values to measured distances. By default, 4 mA/0 V corresponds to the minimum measuring range, and 20 mA/10 V corresponds to the maximum measuring range.

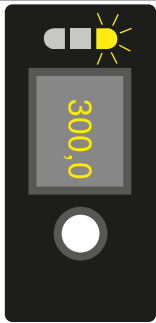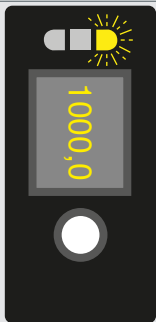| | Teach-In for 4 mA/0 V |
|---|---|
| **300,0** | 1. Adjust the sensor so that the light spot strikes the object to be measured.<br>2. Press and hold the Teach-in key or the Enter key for 2 seconds until O starts to flash slowly.<br>3. Release the Teach-in key or the Enter key.<br>4. The distance is taught in, and LED O flashes briefly twice in order to confirm successful teach-in. |
| | Teach-In for 20 mA/10 V |
| **1000,0** | 1. Adjust the sensor so that the light spot strikes the object to be measured.<br>2. Press and hold the Teach-in key or the Enter key for 5 seconds until LED O starts to flash rapidly.<br>3. Release the Teach-in key or the Enter key.<br>4. The distance is taught in, and LED O flashes briefly twice in order to confirm successful teach-in. |

## INFORMATION

Depending on whether the smaller distance value is assigned to 4 mA/0 V or 20 mA/10 V, either a rising or a falling analog characteristic curve results. If teach-in is conducted without an object or if an object is too far from the sensor, the analog value is set to the maximum value of 20 mA/10 V and the Power LED lights up yellow. If an object that is too close is taught in, the analog value is set to the minimum value of 4 mA/0 V and the Power LED also lights up yellow. If there is an error during teach-in preventing it from being carried out, this is indicated by a red LED.

# 7 Settings via Menu

This section describes the settings that can be configured using the built-in OLED display. The menu is controlled by pressing the Enter key.
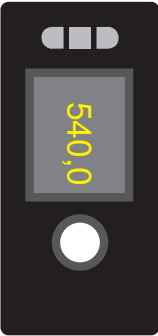


In Display mode, the current measured distance is shown.

## Menu Control

Pressing the Enter key navigates through the menu and applies settings.

| | |
|---|---|
| Short-press in Display mode | Jump to menu |
| Short-press | Next menu item |
| Press button for 2 sec. | Selection |
| Press button 5 sec. | Exits the menu, Display mode. |

## Menu Structure

The menu is divided into 2 sections. The Info menu shows various status messages from the sensor. The Info menu also opens the main menu where the settings can be configured.

### Info Menu
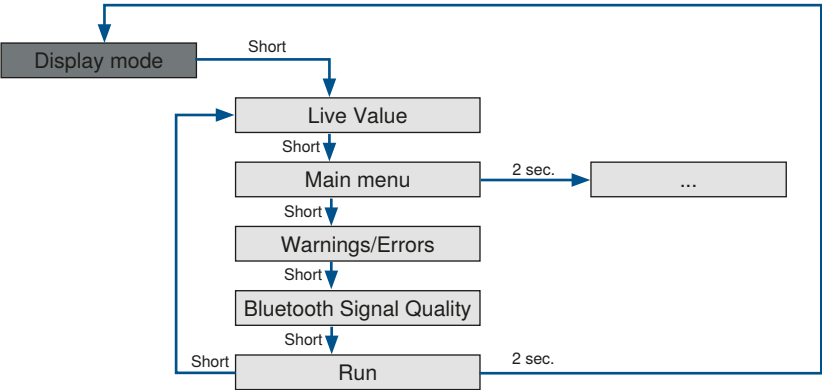


| Live Value | 653.20 ●○○○○ mm | This view is displayed after jumping to the Info menu. The current measured distance is displayed in combination with the measured value's unit. |
|---|---|---|
| Main Menu | Main Menu ○●○○○ | Jumps to main menu to apply settings. |

| | | |
|---|---|---|
| Warnings/Errors | ⚠ **Undervoltage**<br>○ ○ ● ○ ○ | This view shows warnings or errors. |
| Bluetooth Signal Quality | Bluetooth signal quality<br>○ ○ ○ ● ○ | This view shows the Bluetooth signal quality. |
| Display Mode | **Run**<br>○ ○ ○ ○ ● | Returns to Display mode. |

## Main Menu

The corresponding functions are described in the section.

Main menu —2 sec.→ **Teach-in** —2 sec.→ O analog —2 sec.→
- Teach 0 V
- Teach 4 ma
- Teach 10
- Teach 20 mA
- Teach 5 V
- Teach 12 maV

Short ↓
SSC1 switching —2 sec.→ SSC1 teach-in

Short ↓
Reference —2 sec.→ Referencing

Short ↓
Back

Short ↓

**Teach-in mode** —2 sec.→ O analog —2 sec.→
- Distance
- Tolerance

Short ↓
SSC1 switching —2 sec.→
- Foreground
- Background
- Window
- Jump
- Intensity

Short ↓
Back

Short ↓

**Pin function** —2 sec.→ E/A1 —2 sec.→
- SSC output
- Error output
- Warning output
- Laser input
- Teach input
- Deactivated

Short ↓
E3 —2 sec.→
- Laser input
- Teach input
- Deactivated

Short ↓
Back

Short ↓

**Circuit** —2 sec.→ A1 —2 sec.→
- NO
- NC

Short ↓
O analog —2 sec.→
- 0…10 V
- 4…20 mA

Short ↓
A1 —2 sec.→
- Supply volt. active
- 0 V active

Short ↓
E3 —2 sec.→
- Supply volt. active
- 0 V active

Short ↓
Back

Short ↓

**Polarity** —2 sec.→ A1 —2 sec.→
- PNP
- NPN
- Push-pull

Short ↓
Back

Short ↓

**Settings** —2 sec.→ Meas. value unit —2 sec.→
- Metric
- Imperial

Short ↓
Replacement values —2 sec.→
- Activated
- Deactivated

Short ↓
Bluetooth —2 sec.→
- Activated
- Deactivated

Short ↓
Language —2 sec.→
- German
- English
- Chinese

Short ↓
Rotate display —2 sec.→
- Activated
- Deactivated

Short ↓
Reset —2 sec.→ Reset

Short ↓
Back

# 8 Function Description

The functions described in the following section can be adjusted via wTeach or IODD per IO-Link, as well as via the weCon app per Bluetooth, and the basic functions via the Display menu.

## 8.1 Sensor Functions

| Function | Possible settings | Default |
|---|---|---|
| Exposure mode | With black or glossy objects, it may be useful to increase the exposure time. Decreasing the exposure time can be useful if the sensor is aimed at very bright objects. The longer the exposure time, the lower the speed of the sensor.<br><br>**Auto**<br><br>With the Adaptive Autoexposure function, the sensor automatically sets its exposure time or light pulse duration to the object to be detected up to a maximum value.<br><br>**Fix**<br><br>The exposure time is set via the fixed exposure time parameter, i.e., not automatically adjusted by the sensor | Auto |
| Fixed exposure time | Used to manually set a fixed exposure time.<br><br>**1…1,600 µs** | 400 µs |
| Maximum exposure time | Maximum exposure time in Auto mode.<br><br>**1...1,600 µs** | 400 µs |
| Measured value filter | A bigger filter improves the sensor's reproducibility and smooths the signal waveform. The higher the filter number, the longer the sensor's response time when the measured values change.<br><br>**0 = OFF**<br><br>**1…9** | 3 |
| Offset | The Offset function is used to change the momentary measured value to a specified value. The switching thresholds and the analog measuring ranges are adapted along with this value. The offset value is added to the current distance. | 0 µm |
| Offset specification | Value to which the current measured value is to be set by a corresponding offset. The offset is calculated automatically.<br><br>40,000...240,000 µm | 0 µm |
| Apply offset specification | The current measured value is changed to the offset specified value<br><br>1= apply | 0 |
| Distance range | A distance range in which signals are to be evaluated can be defined within the working range. Signals outside the set distance range are ignored and are not included in the signal evaluation. This means that ranges for which no usable signals are expected can be completely hidden.<br><br>This function can be used to suppress interfering signals, such as those produced by a glass disk, for instance.<br><br>**Min. distance: working range**<br><br>**Max. distance: working range**<br><br>**Note!** | Setting range |

| Function | Possible settings | Default |
|---|---|---|
| | • Objects outside the set distance range are evaluated as "No signal". | |
| | • If a distance range is set, a blind spot directly behind this range results. The sensor cannot detect any objects within the blind spot. The size of the blind spot depends on the reflectance of the interfering objects in the hidden area. | |
| Sensitivity | The sensor has a very high sensitivity and can detect objects, measuring the distance to them, even when the signal is very weak. In applications where the object to be detected yields even weaker signals, e.g., due to large inclinations, it can be helpful to further increase the sensitivity or to amplify the optical signal.<br><br>The higher the sensitivity, the more susceptible the sensor is to interference. The speed of the sensor is not reduced by the setting.<br><br>**Standard**<br><br>Corresponds to the default setting<br><br>**High**<br><br>Gain by factor 2<br><br>**Maximum**<br><br>Gain by factor 4 | Standard |
| Emitted light | The sensor's laser can be switched on or off.<br><br>**On**<br><br>Laser on<br><br>**Off**<br><br>Laser off<br><br>The sensor no longer supplies a measured value.<br><br>**Note!**<br><br>• If an input is set as a laser-off input, the emitted light can also be switched on and off via the input.<br><br>• If the laser is switched off, the sensor behavior corresponds to the status "No signal." | On |
| Localization | The supply voltage indicator of the sensor can be switched to flashing green. This allows the sensor to be easily located in a plant.<br><br>**On**<br><br>The supply voltage LED flashes green.<br><br>**Off**<br><br>LEDs in normal function. | Off |
| Measured value unit | The measured distance can be output in micrometers or mils.<br><br>**Micrometer**<br><br>Distance values output in µm.<br><br>**Mil**<br><br>Distance values read out in mil. | micrometer |
| Bluetooth | The Bluetooth interface can be switched on/off.<br><br>**On**<br><br>**Off** | On |
| Bluetooth Password Function | The Bluetooth function can be password protected to prevent unauthorized access.<br><br>**On** | Off |

| Function | Possible settings | Default |
|---|---|---|
| | **Off** | |
| | **Note!** | |
| | Only the Bluetooth function is protected. Communication is possible via IO-Link or the OLED menu at any time. | |
| Bluetooth Password | Enter a Bluetooth password. To access the device using the Bluetooth app, enter this password in the app. | – |
| | **Note!** | |
| | If the password has been forgotten, a new password can be assigned via IO-Link. | |

## 8.2 Display Functions

| Function | Possible settings | Default |
|---|---|---|
| Language | Selecting the display language | English |
| | **German** | |
| | **English** | |
| | **Chinese** | |
| Rotate display | Rotates the display 180°. | Off |
| | **On** | |
| | **Off** | |

## 8.3 Input/Output Functions (E/A)

### 8.3.1 Pin Function

The pin function is used to define the function of pins I/O1 and I3, as these can be used for different functions.

| Pin | Possible settings | Default |
|---|---|---|
| E/A1 | **Switching output** | Error output |
| | Switching point SSC1 is assigned to the switching output. | |
| | **Error output** | |
| | The error output switches if one of the assigned errors occurs; see table Status messages [▶ 38] | |
| | **Warning output** | |
| | The warning output switches if one of the assigned warnings occurs; see table Status messages [▶ 38]. | |
| | **Laser-off input** | |
| | See E3 for an explanation | |
| | **Teach-in input** | |
| | See E3 for an explanation | |
| | **Deactivated** | |
| | The pin is deactivated. | |
| E3 | **Laser-off input** | Laser off Input |

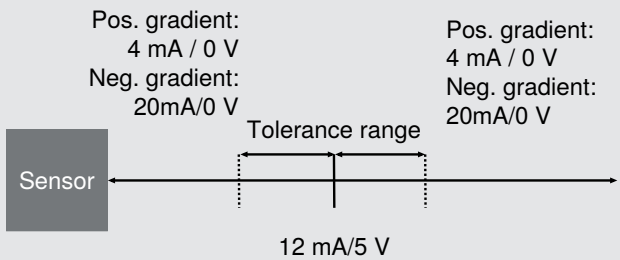| Pin | Possible settings | Default |
|---|---|---|
| | The sensor's emitted light is deactivated as long as the input is activated. The sensor then does not send a measured value and sets the status to "No signal". | |
| | **Teach-In input** | |
| | Teach-in | |
| | The outputs (switching outputs/analog output) can be set by following the same procedure as with the Teach-in key (see Configuration with Push of Button / Teach-In [▶ 20]). An activated input corresponds to a pressed Teach-in key. | |
| | **Locking** | |
| | If 18...30 V DC is continuously applied to the teach-in input, the teach-in key is locked and protected against inadvertent changes, like the input signal. | |
| | **Deactivated** | |
| | The pin is deactivated. | |

## 8.4 Output Functions

The output functions are used to set the physical outputs.

**Digital Outputs**

| Function | Possible settings | Default |
|---|---|---|
| Polarity | **PNP** | PNP |
| | **NPN** | |
| | **Push-pull** | |
| Circuit | **NO** | NO |
| | Light switching (Normally Open) | |
| | The output is high when the condition has been satisfied, depending on settings (switching point, warning, error). | |
| | **NC** | |
| | Dark switching (normally closed) | |
| | The output is low when the condition has been fulfilled depending on the setting (switching point, warning, error). | |
| On-delay | **0…10,000 ms** | 0 ms |
| Off-delay | **0…10,000 ms** | 0 ms |

**Analog Outputs**

| Function | Possible settings | Default |
|---|---|---|
| Teach-in | Starts the teach-in process. | |
| Teach-in mode | **Distance** | Distance |
| | A distance is taught in to the analog limit values, and the distance is output as a linearly proportional current or voltage value. | |
| |  | |
| | 4 mA / 0 V      20 mA/0 V<br>20mA / 10V      4 mA/10 V | |
| | **Tolerance** | |

| Function | Possible settings | Default |
|---|---|---|
| | A distance is taught in to the measuring range, serving as the measurement reference, for 5 V or 12 mA. The tolerance range is set around this value.<br><br>Pos. gradient:<br>4 mA / 0 V<br>Neg. gradient:<br>20mA/0 V<br><br>Pos. gradient:<br>4 mA / 0 V<br>Neg. gradient:<br>20mA/0 V<br><br>Tolerance range<br><br>Sensor<br><br>12 mA/5 V | |
| 0 V / 4 mA | In Distance teach-in mode<br><br>In Distance teach-in mode, the 0 V or 4 mA value is assigned to a distance within the measuring range.<br><br>**Measuring range** | 40,000 µm |
| 10 V / 20 mA | In Distance teach-in mode<br><br>In Distance teach-in mode, the 10 V or 20 mA value is assigned to a distance within the measuring range.<br><br>**Measuring range** | 240,000 µm |
| 5 V / 12 mA | In Distance teach-in mode<br><br>In Tolerance teach-in mode, the 5 V or 12 mA value is assigned to a distance within the measuring range.<br><br>**Measuring range** | 140,000 µm |
| Tolerance range | In Distance teach-in mode<br><br>The tolerance range is symmetrical around the 5 V / 12 mA point and defines the range while the measurement is taken.<br><br>1,000...240,000 µm<br><br>Note!<br><br>If the tolerance range extends beyond the limits of the measuring range, the corresponding analog values or Substitute values for are output outside the measuring range. | 100,000 µm |
| Tolerance characteristic | In Distance teach-in mode<br><br>The characteristic indicates whether the analog value increases or decreases as the distance increases.<br><br>**Positive slope**<br><br>The analog value increases as the distance increases.<br><br>**Negative slope**<br><br>The analog value decreases as the distance increases. | Positive slope |
| Analog mode | **Current output**<br><br>4...20 mA<br><br>**Voltage output**<br><br>0...10 V | 4...20 mA |
| Analog Replacement values | The substitute values described in the section Settings – Analog output can be activated or deactivated.<br><br>**Enabled**<br><br>Sensor outputs substitute values.<br><br>**Deactivated**<br><br>Sensor does not use substitute values. | Enabled |

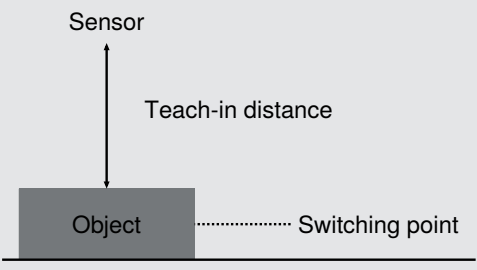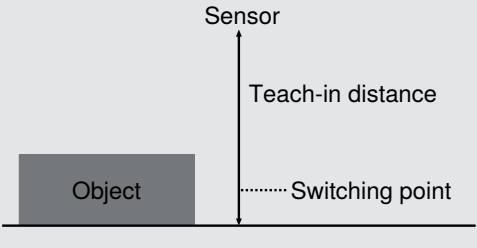| Function | Possible settings | Default |
|---|---|---|
| | **Note!** | |
| | Function can only be used for current output. | |

## 8.5 Input Functions

The input functions are used to set the physical inputs.

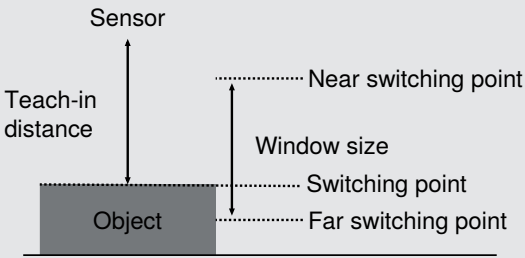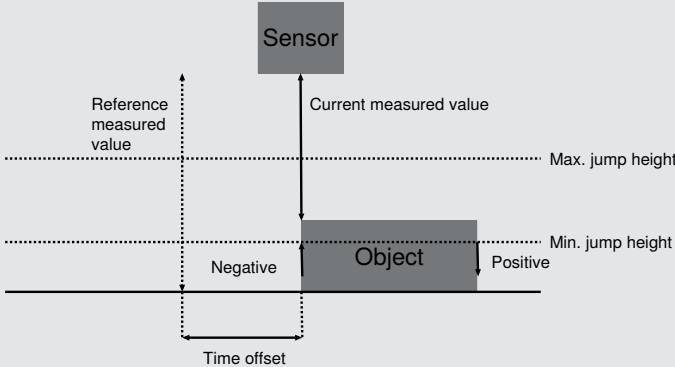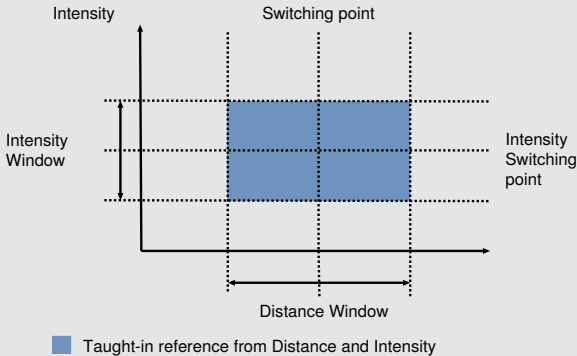| Function | Possible settings | Default |
|---|---|---|
| Input mode | **Supply Voltage Active** | Supply voltage active |
| | Function is triggered as soon as supply voltage is applied to the input. | |
| | **Supply Voltage Inactive** | |
| | Function is triggered as soon as 0 V is applied to the input or the input is opened. | |

## 8.6 Switching Point Functions (SSC1/SSC2)

The switching point functions are used to set the two switching points, SSC1 and SSC2.

SSC1 and SSC2 initially only available via IO-Link. If E/A1 is configured as a switching output, SSC1 is assigned to it.

| Function | Possible settings | Default |
|---|---|---|
| Teach-in | Starts the teach-in process. | |
| Teach-in mode | **Foreground Teach-In** | Foreground teach-in |
| | Sensor | |
| | Teach-in distance | |
| | Object ·············· Switching point | |
| | **Background Teach-In** | |
| | Sensor | |
| | Teach-in distance | |
| | Object ········· Switching point | |
| | **Window Teach-In** | |

| Function | Possible settings | Default |
|---|---|---|
| | <br><br>**Jump Detection**<br><br>In this mode, there is no switch to an absolute measured value, but rather to a measured value jump occurring between 2 measurements.<br><br><br><br>**Distance and Intensity**<br><br>In this mode, the intensity of the received signal is also evaluated for distance. The sensor is taught in a reference that consists of a switching point for the distance and a switching point for the intensity. As soon as the sensor detects a deviation in distance or intensity, this is registered via the output.<br><br><br><br>**Note!**<br>The teach-in function is necessary to ensure that the sensor works properly. | |
| Switching point | 40,000...240,000 µm<br>**Note!**<br>If a distance range has been set, the switching point can be set within the set distance range only. | 240,000 µm |
| Hysteresis mode | Hysteresis is the difference between the switch-on and switch-off point.<br>**Auto** | Auto |

| Function | Possible settings | Default |
|---|---|---|
| | The hysteresis is automatically calculated by the sensor so that it can be adjusted to best suit the respective situation. After a teach-in or changing the switching point, the hysteresis is recalculated and updated automatically under the Hysteresis parameter. The information given on the data sheet corresponds to the set switching point, e.g., switching point at 100 mm, hysteresis per data sheet < 0.5% hysteresis < 0.5 mm<br><br>**Fix**<br><br>The hysteresis is set to a fixed value under the Hysteresis parameter. This value is not adjusted automatically when teaching in or changing the switching point. A small hysteresis is recommended so that flat objects can be detected against a background. A larger hysteresis is recommended to ensure stable detection when conditions are variable. | |
| Hysteresis | Absolute value of the hysteresis in hysteresis mode Fix<br><br>3 µm...200,000 µm | 700 µm |
| Near switching point window | In teach-in mode, window teach-in<br><br>Distance from the set center of the window to the window's switching point that is close to the sensor.<br><br>The window can be set so that it extends from the sensor's minimum setting range to its maximum setting range. The possible minimum and maximum settings result from the center of the window set in a particular instance. | 30 mm |
| Far switching point window | In teach-in mode, window teach-in<br><br>Distance from the set center of the window to the window's switching point that is far away from the sensor.<br><br>The window can be set so that it extends from the sensor's minimum setting range to its maximum setting range. The possible minimum and maximum settings result from the center of the window set in a particular instance. | 30 mm |
| Jump height min | In teach-in mode, jump detection<br><br>The min. jump height specifies the measured value jump from which a jump event should be detected.<br><br>In the "Automatic" setting, the sensor automatically calculates the smallest possible jump.<br><br>0 = Automatic<br><br>5 µm...200,000 µm | Automatic |
| Max. jump height | In teach-in mode, jump detection<br><br>The max. jump height specifies the measured value jump up to which a jump event should be detected.<br><br>In the "No restriction" setting, there is no limitation of the max. jump height. A change from a valid measured value to "No measured value" is evaluated as a negative jump.<br><br>4294967295 = No limit<br><br>5 µm...200,000 µm | no restriction |
| Jump direction | In teach-in mode, jump detection<br><br>**Positive**<br><br>A jump is detected when the measured value jumps to a higher value, i.e. the contrast value becomes brighter.<br><br>**Negative**<br><br>A jump is detected when the measured value jumps to a lower value, i.e. the contrast value becomes darker.<br><br>**Both** | Negative |

| Function | Possible settings | Default |
|---|---|---|
| | A jump is detected for both positive and negative. | |
| Cycle Offset | In Teach-In mode, Jump Detection | 50 |
| | The cycle offset indicates which time-shifted reference measured value to use for comparison with the current measured value in order to detect the jump. | |
| | 1...256 Cycles | |
| Jump pulse duration | In teach-in mode, jump detection | 0 |
| | **0 = hold** | |
| | The output remains active until the next jump in the opposite direction has been detected. | |
| | **1…10,000 ms** | |
| | If a jump is detected, the output is activated with the corresponding pulse length. | |
| Distance window | In teach-in mode, distance + intensity | 700 μm |
| | Distance from set switching point (center of window) to window limits. | |
| | The distance window is symmetrical around the switching point. | |
| | 3 μm...10,000 μm | |
| Intensity switching point | In teach-in mode, distance + intensity | 30,000 |
| | Intensity switching point in digits | |
| | **1…1,000,000** | |
| Intensity window | In teach-in mode, distance + intensity | 4% |
| | From set intensity switching point (center of window) to window limits. | |
| | The intensity window is symmetrical around the switching point. | |
| | **1…50%** | |

# 8.7    Differential and Thickness Measurement

In this operating mode, 2 sensors work together to calculate a difference or thickness from the individual measurement results.

This saves time by eliminating the need to program the control unit, and enables the system to immediately calculate and provide a value. This value can then be used for the switching function, or output via analog output. In addition, the calculated difference or thickness output as absolute value via IO-Link.

## Mechanical Layout

Differential Measurement
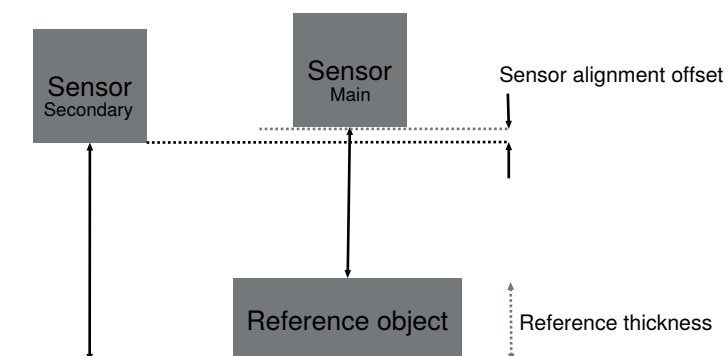
Thickness Measurement
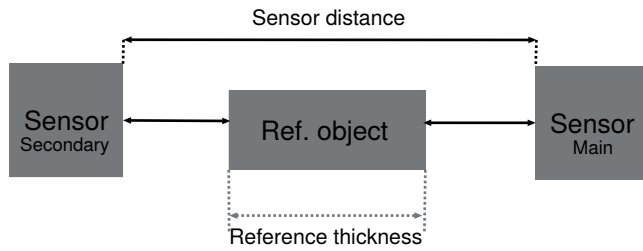


We recommend positioning the sensors in such a way that there is no area between the sensors which is not covered by the sensors' measuring range (Fig. 1 and 2). If this is the case, the object to be measured must be wider than the area not covered (Fig. 3).

The sensors shall be aligned so that the transmitting beams hit the windshield of the opposite sensor. It must be ensured that it does not directly hit the emitter or receiver.



Fig. 1

Fig. 2

Fig. 3
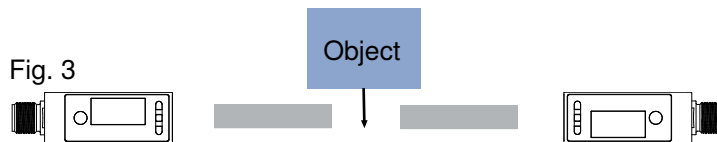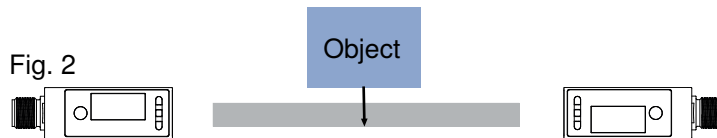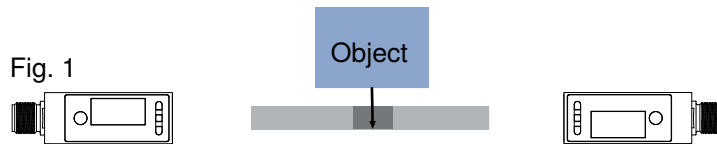
Working range

## Wiring

With Adapter

The ZC4G004 adapter can be used for simple wiring. Here, only the sensors need to be connected as shown. The sensors are automatically parameterized for the respective operating mode as soon as the sensors are connected. In this case, the main sensor is set to the "Thickness measurement" operating mode. The operating mode must be changed accordingly when performing a differential measurement.

Sensor Main

Controller

Sensor Secondary
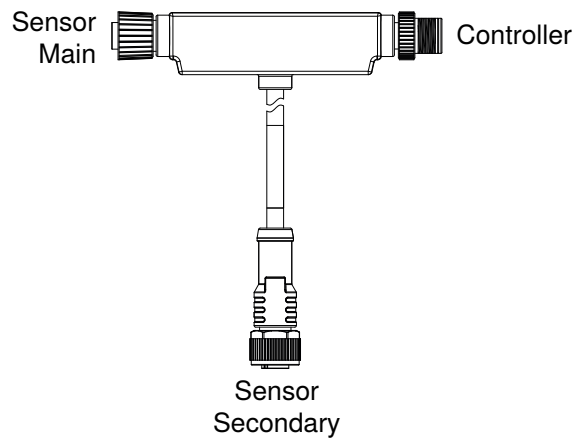
The connections of the adapter can be extended with connection cables. Please note that 5-pin connection cables must be used for the connections of the sensors.

Direct Wiring

As an alternative to using the adapter, the sensors can also be wired directly, via the connection terminals, or to a control unit. To do so, the sensors must be connected according to the following connection diagram. Here, the sensor operating mode must be set manually.
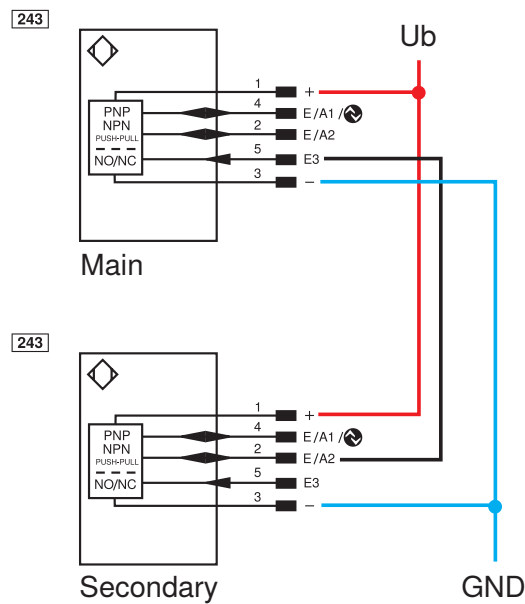


The example shows an application using two digital sensors. In this case, pins 2 and 4 on the main can be used to set the switching points in relation to the calculated difference or thickness. Two analog sensors or a combination of digital and analog sensors can also be used. In this case, the calculated thickness can then be tapped on the main sensor's analog output as an analog signal.

## ⚠ NOTICE

Sensors with different measuring ranges can also be combined with each other. The respective working ranges must be observed during assembly.

A combination of red and blue laser versions is also possible. This combination is recommended if the sensors interfere with each other when there is no object due to the installation situation.

## Referencing

To perform the thickness/ differential measurement, the system must be referenced for the mechanical layout and the wiring.

The sensors automatically calibrate the distance to one another so that measurement results can be calculated for the respective setup. Referencing can be performed by Teach-in or Enter key, via OLED menu, Bluetooth or via IO-Link.

The reference object must be placed in the measuring system, depending on the mechanical layout. To reference using the Teach-in key, press and hold this key for 10 seconds until both LEDs begin to flash. Then release the button. The LEDs flash twice briefly as confirmation. The sensors are now referenced.



## Outputs

If a sensor is in Main Thickness/Difference mode of operation, the calculated thickness or difference is used for output at the outputs.

SSC1/SSC2

All settings can be carried out identically to stand-alone operation. However, the switching points do not correspond to a distance, but to the thickness/difference. The switching points are set via separate parameters. All other settings are carried out with the general parameters of SSC1/SSC2.

Analog output

In this operating mode, the analog output only works with the tolerance mode. The reference value corresponds to 12 mA or 5 V on the analog output. The tolerance range and characteristics can be set via separate parameters.

## Settings

| Function | Possible settings | Default |
|---|---|---|
| Mode of operation | **Stand Alone** | Automatic |
| | The device functions as a stand-alone device. | |
| | **Secondary** | |
| | The sensor provides measurement data for a main device. | |
| | **Main Thickness** | |
| | The sensor performs a thickness measurement using the connected secondary. | |
| | **Main Difference** | |
| | The sensor performs a differential measurement using the connected secondary. | |
| | **Automatic** | |
| | This setting is used to enable automatic detection of the ZC4G004 adapter, when in use, and to preset the operating mode according to the connection. The main sensor is set to Thickness mode. | |

| Function | Possible settings | Default |
|---|---|---|
| Referencing | Start of the referencing process | |
| | To do so, the reference object must be placed in the measuring system, depending on the mechanical layout, and referencing started. | |
| | With an analog sensor, 5V / 12mA is applied automatically to the analog output after referencing. Changes, in comparison to the reference thickness, are now output accordingly. | |
| Sensor alignment offset (difference) | When referencing, the offset is calculated using the specified reference thickness. | 0 µm |
| Sensor distance (thickness) | When referencing, the sensor distance is calculated using the specified reference thickness. | 480,000 µm |
| Reference thickness | The reference thickness corresponds to the true thickness of the reference object. This thickness is used by the sensor to calculate the absolute value that is output by the main sensor via IO-Link. | 0 µm |
| | For analog main sensors, the reference thickness is assigned the analog value 12 mA or 5 V. | |
| Switching point | Switching point in relation to a thickness or difference used for the function of SSC1 and SSC2. | |
| Tolerance range | The tolerance range is arranged symmetrically around the 12 mA/5 V value and defines the range by changing the analog value linearly with the measured value. | 1,000...200,000 µm |
| | 200,000 µm | |
| Tolerance characteristic | **Positive slope** | Positive slope |
| | The analog value increases as the thickness increases. | |
| | **Negative slope** | |
| | The analog value falls as the distance increases. | |

## 8.8 Condition Monitoring Functions

### 8.8.1 Status Message Function

The sensor provides various status messages. Due to the process data structure, four status messages can be transmitted as individual process data.

These parameters can be used to set the status messages that are transmitted via the process data.

| Function | Possible settings | Default |
|---|---|---|
| Message 1 | See table "Status Messages" [▶ 38] | Warning signal |
| Message 2 | See table "Status Messages" [▶ 38] | Ambient light |
| Message 3 | See table "Status Messages" [▶ 38] | Temperature too high |
| Message 4 | See table "Status Messages" [▶ 38] | Short circuit |

### 8.8.2 Warning/Error Output Function

The status messages used to trigger the collective message can be defined for the warning output and the error output respectively. The status messages are OR-linked so that the output is activated when one of the defined status messages is activated.

| Function | Possible settings | Default |
|---|---|---|
| Warning output | See table "Status Messages" | Signal warning, optics dirty, ambient light, temperature too high, temperature too low, undervoltage, interference in the working range |
| Error output | See table "Status Messages" | Object too close, object too far, no signal, device error, over-temperature, short circuit |

## Status Messages

| Warning | |
|---|---|
| Undervoltage | The supply voltage is too low. |
| Warning signal | The object reflects too little light. |
| Ambient light | Object detection is impeded by ambient light. |
| Overexposure | The sensor signal is overexposed. |
| Temperature too high | The sensor's internal temperature is high. |
| Temperature too low | The sensor's internal temperature is low. |
| Emitted light off | The sensor's emitted light is switched off. |

| Error | |
|---|---|
| Short circuit | A short circuit has occurred on at least one pin. |
| No signal | The sensor is not receiving a signal. |
| Object too close | The object is below the setting range or the set measuring range. |
| Object too far | The object is above the setting range or the set measuring range. |
| Temperature error | Temperature is outside permissible range. To protect the emitting unit, the laser is switched off. |
| Device error | A hardware error has occurred. For safety reasons, the laser is switched off. |
| Laser error | There is an error in the laser module. For safety reasons, the laser is switched off. |

## 8.8.3  Simulation Functions

This function simulates the behavior of the sensor regardless of the current status and measured value. This can be used to check whether a plant in which the sensor is integrated reacts correctly to the data supplied by the sensor and processes them accordingly.

If a measured value is specified, the sensor behaves as if the specified measured value corresponds to the actual measured value. This means that the behavior of the outputs and status messages is simulated according to the specified measured value.

In addition, the individual outputs and status messages can be simulated separately from the measured value.

| Function | Possible settings | Default |
|---|---|---|
| Simulation mode | **On**<br>**Off** | Off |
| Test measured value | Current measured value<br>min...max. measuring range | Current measured value |
| Output O test | According to the measured value<br>4...20 mA | According to the measured value |
| SSC1 Test | According to the measured value<br>**On** | According to measured value |

| Function | Possible settings | Default |
|---|---|---|
| | **Off** | |
| SSC2 Test | According to the measured value | According to mea-sured value |
| | **On** | |
| | **Off** | |
| Status messages test | Tests the individual status messages according to the measured value | According to measured value |
| | **On** | |
| | **Off** | |

## INFORMATION

Output A1 is used for IO-Link communication in this function and cannot be simulated.

Simulation mode ends automatically as soon as the power supply is interrupted.

# 9 Bluetooth

These sensors have an integrated Bluetooth interface. This interface can be used to configure and parameterize devices using a smartphone and the wenglor "weCon" app. In addition, process data is sent to the app, where it is displayed in a clear, concise manner.

## 9.1 weCon Installation

The wenglor app can be downloaded free of charge from the Google Play Store and Apple App Store. Download the app and follow the installation instructions.



Scan the code below to access the wenglor app directly.

## 9.2 Establishing Connection with Sensor

Open the weCon app on your smartphone.

When the app is opened, all wenglor sensors with Bluetooth interface and within range are set to Pairing mode.

This mode is indicated by the flashing blue LED on the sensors.

Pairing mode is used to pair the app with a corresponding sensor.

Once the app is opened, a list of all sensors within range is shown.
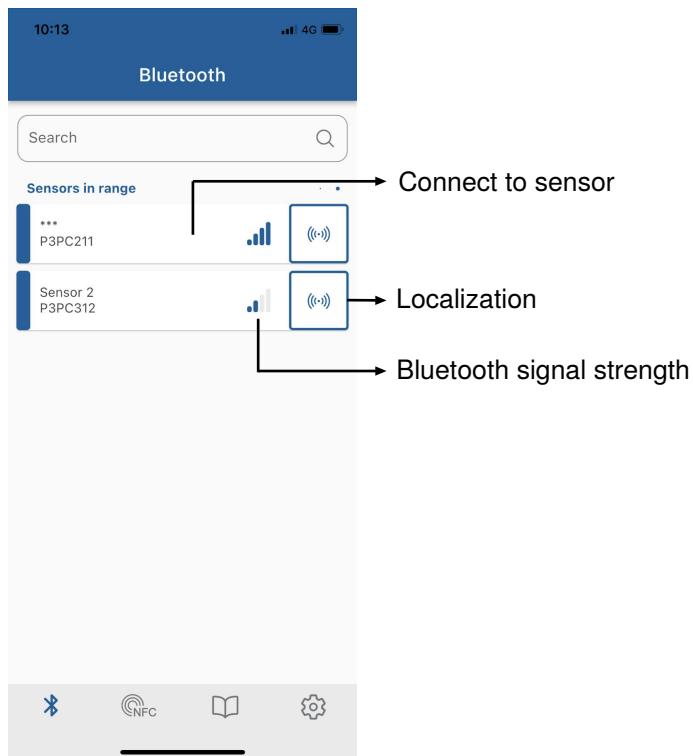


If too many sensors of the same type are fitted within the Bluetooth range, the sensor's supply voltage LEDs can be switched to flashing green by pressing the "Localization" button. This simplifies identification.

Press the "Back" button to open the sensor list again. Pressing the "Connect with sensor" button establishes a connection to the sensor and opens the user interface.

The blue LED will continuously illuminate from now on, indicating that the sensor is paired, and Pairing mode will deactivate.

## 9.3 Using the weCon App

The sensor parameters are configured using the "Configuration" tab. A detailed description of the individual parameters can be found in section "Function overview".
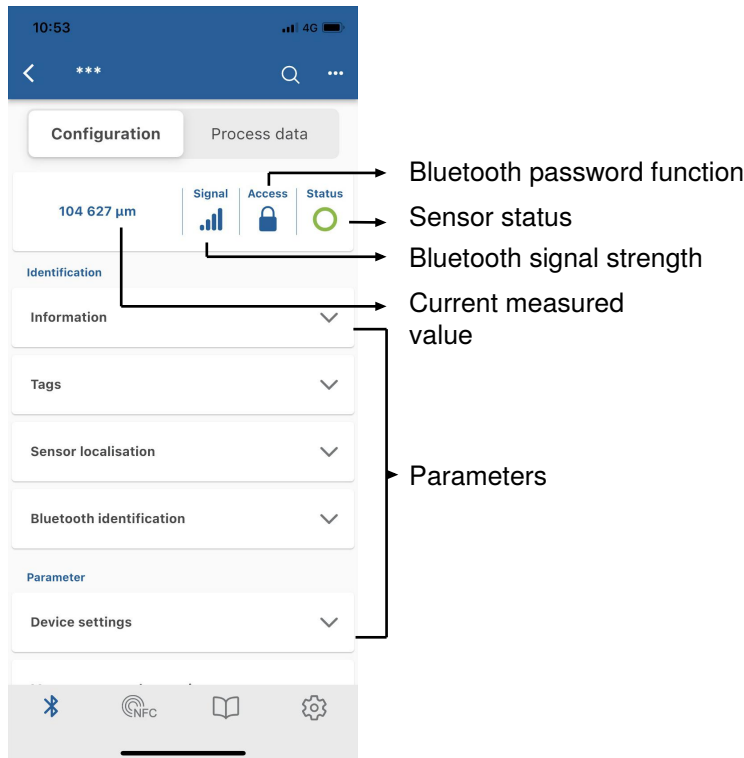


The "Process Data" tab shows the current measured value, visualizing this value over time in a diagram. The axis scaling can be adjusted in the diagram settings.
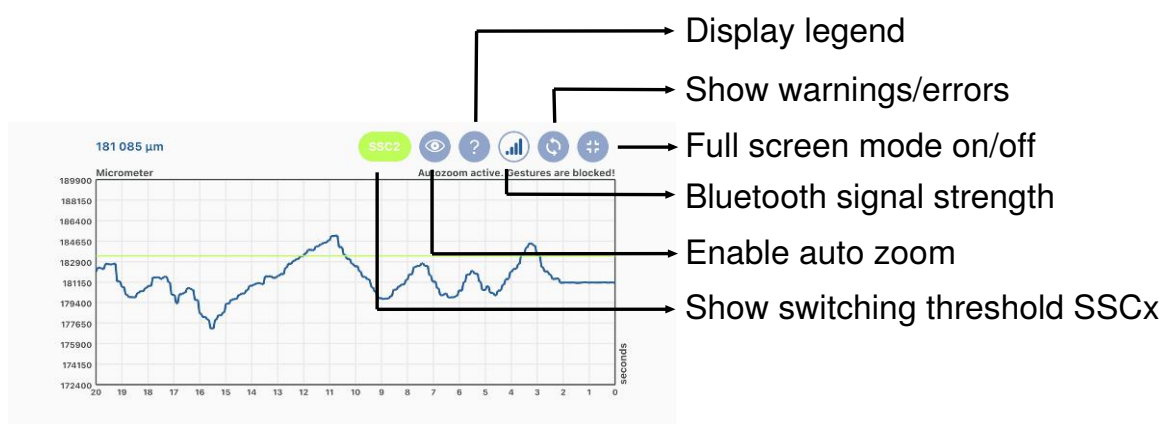




**NOTICE**

The Bluetooth range is approx. 10 m. If the sensor is encapsulated in a system or set up close to obstacles, the range may decrease accordingly.

# 10    IO-Link

## 10.1    Parameters

The parameters that can be configured via IO-Link are given in the functional description in the section Function description [▶ 25].

## 10.2    Condition Monitoring/Process Data

The data described in the following section can be read or written cyclically via IO-Link/process data.

### 10.2.1    Process Data In

| Data | Meaning |
|---|---|
| Measured value | Measured distance in micrometers or mil. |
| | As the sensor cannot determine a measured value in the following error cases, substitute values are read out: |
| | No signal: 0x7FFFFFFC / 2147483644 |
| | Object too close: 0x80000008 / −2147483640 |
| | Object too far: 0x7FFFFFF8 / 2147483640 |
| Scale | Scaling of the measured value to the base length unit; -6 corresponds to µm. |
| SSC1 | Switching point 1 |
| SSC2 | Switching point 2 |
| Warning | Collective warning in the event of one of the warning status messages (see table "Status messages") in the error output function) |
| Error | Collective warning in the event of one of the error status messages (see table "Status messages") in error output function. |
| Message 1 | Status message 1 read out see Status Message Function [▶ 37] |
| Message 2 | Status message 2 read out see Status Message Function [▶ 37] |
| Message 3 | Status message 3 read out see Status Message Function [▶ 37] |
| Message 4 | Status message 4 read out see Status Message Function [▶ 37] |

### 10.2.2    Process Data Out

| Data | Meaning |
|---|---|
| Emitted light | Transmit signal on/off |
| Localization | Sensor flashes for easy sensor location |
| Teach-in SSC1 | Starts the teach-in process for SSC1 |
| Teach-in SSC2 | Starts the teach-in process for SSC2 |

### 10.2.3    Events

Events are diagnostic information that is standardized by IO-Link and exchanged between the IO-Link master and the device. The following events are supported:

| Name | Event code | Type | Specification |
|---|---|---|---|
| Maintenance necessary: Clean | 0x8C40 | Notification | IO-Link |
| Device error – unknown error | 0x1000 | Error | IO-Link |
| Short circuit – check installation | 0x7710 | Error | IO-Link |
| Device temperature too high: Remove heat source | 0x4210 | Warning | IO-Link |

| Name | Event code | Type | Specification |
|------|-----------|------|---------------|
| Device temperature too low: Isolate device | 0x4220 | Warning | IO-Link |
| Temperature error: Overload | 0x4000 | Error | IO-Link |
| Supply voltage too low – check tolerances | 0x5111 | Warning | IO-Link |

| Name | Event code | Type | Specification |
|------|-----------|------|---------------|

# 11     Maintenance Instructions

| ⚠️ | **NOTICE** |
|---|---|
| | This wenglor product is maintenance-free. |
| | Cleaning and inspection of the plug connections at regular intervals are advisable. |
| | Do not clean the product with solvents or cleaning agents that could damage the product. |
| | The product must be protected against contamination during initial start-up. |

# 12    Proper Disposal

wenglor sensoric GmbH does not accept the return of unusable or irreparable products. Respectively valid national waste disposal regulations apply to product disposal.

# 13     Declarations of Conformity

Declarations of conformity can be found on our website at www.automationdirect.com in the product's separate download area.