

UMS123U035 UMS303U035 UMS603U035

High-Performance Distance Sensor



Operating Instructions

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1. General

1.1 Information Concerning these Instructions

- These instructions apply to the product with ID code MS123U035, UMS303U035 und UMS603U035.
- They 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.wenglor.com in the product's separate download area.



NOTE!

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

1.2 Explanations of Symbols

- Safety precautions and warnings are emphasized by means of symbols and attention-getting 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:



ATTENTION-GETTING 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 attention-getting words, as well as the scope of the associated hazards, are listed below.



DANGER!

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



WARNING!

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



CAUTION!

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

**ATTENTION!**

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

**NOTE!**

A note draws attention to useful tips and suggestions, as well as information regarding efficient, error-free use.

1.3 Limitation of Liability

- The product has been developed in consideration of the current state-of-the-art and applicable standards and guidelines. Subject to change without notice.
- A valid declaration of conformity can be accessed at www.wenglor.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 replacement 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

The product is based on the following functional principle:

Functional Principle

For example, these Ultrasonic Sensors emit pulsed ultrasonic waves at a certain frequency using air as a transmitting medium. The sensors evaluate transit time of the ultrasound reflected from the object. Parameters can be taught into the sensors using either teach-in keys, via an input or via IO-Link. The output is switched when the preselected switching point is reached. The measured value can be read out as a voltage or amperage value (0 to 10 V / 4 to 20 mA), or in digital format (IO-Link).

This product can be used in the following industry sectors:

- Automotive industry
- Food industry
- Packaging industry
- Pharmaceuticals industry
- Clothing industry
- Plastics industry
- Consumer goods industry
- Paper industry
- Electronics industry
- Glass industry
- Printing industry
- Special machinery manufacturing
- Heavy machinery manufacturing
- Logistics
- Woodworking industry
- Steel industry
- Aviation industry
- Construction industry
- Chemicals industry
- Agriculture Industry
- Alternative energy
- 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 is not suitable for use in potentially explosive atmospheres.
- The product may only be used with accessories supplied or approved by wenglor, or combined with approved products. A list of approved accessories and combination products can be accessed at www.wenglor.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 must have uninterrupted 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. Non-observance may result in loss of the CE marking and the guarantee may be rendered null and void.

- Modification of the product is impermissible.
-

2.5 General Safety Precautions

**NOTE!**

- These instructions are an integral part of the product and must be kept on hand for the entire duration of its service life
- Read the operating instructions carefully before using the product
- Protect the sensor against contamination and mechanical influences

2.6 Approvals and protection class



3. Technical Data

| Order Number | | | |
|---|------------------------|----------------|----------------|
| | UMS123U035 | UMS303U035 | UMS603U035 |
| Technical Data | | | |
| Ultrasound Data | | | |
| Working range | 100 to 1200 mm | 200 to 3000 mm | 300 to 6000 mm |
| Measuring range | 1100 mm | 2800 mm | 5700 mm |
| Max. reproducibility | 1 mm | 2 mm | 5 mm |
| Linearity error | 4 mm | 4 mm | 20 mm |
| Resolution | 0.1 mm | 0.3 mm | 1 mm |
| Ultrasonic frequency | 225 kHz | 120 kHz | 75 kHz |
| Aperture angle | < 12° | < 14° | < 14° |
| Switching hysteresis | 5 mm | 15 mm | 30 mm |
| Service life (ambient temp.=+25° C) | 100,000 hours | | |
| Electrical Data | | | |
| Current consumption (operating voltage = 24 V) | < 30 mA | < 50 mA | < 50 mA |
| Switching frequency | 7 Hz | 3 Hz | 1,5 Hz |
| Response time | < 72 ms | < 167 ms | < 334 ms |
| Supply power | 18 to 30 V DC | | |
| Temperature range | -30 to 60° C | | |
| Number of switching outputs | 2 | | |
| Switching output voltage drop | < 2,5 V | | |
| Switching current, PNP switching output | 100 mA | | |
| Analog output | 0 to 10 V / 4 to 20 mA | | |
| Synchronous operation | Up to 40 sensors | | |
| Multiplex | Up to 16 sensors | | |
| Short-circuit proof | Yes | | |
| Protected against polarity reversal | Yes | | |
| Overload-proof | Yes | | |
| IO-Link version | 1.0 | | |
| Interface | IO-Link | | |

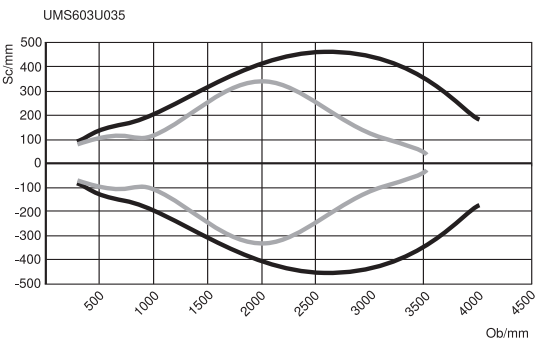
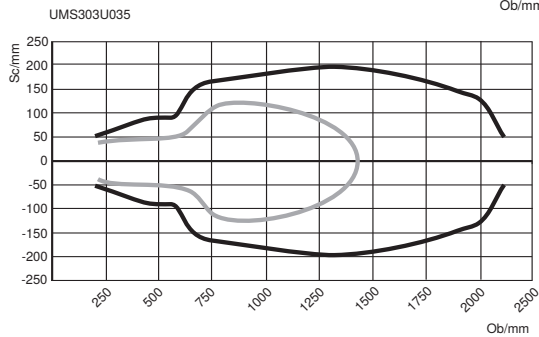
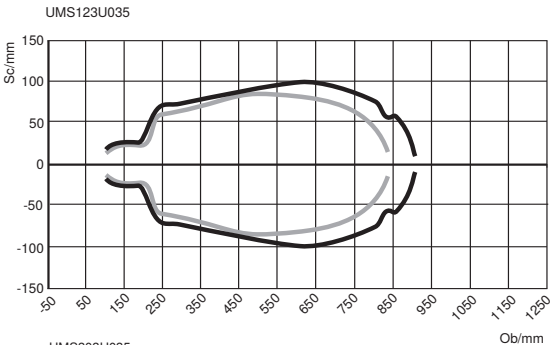
| Order Number | UMS123U035 | UMS303U035 | UMS603U035 |
|-----------------------------|----------------|------------|------------|
| Technical Data | | | |
| Protection class | III | | |
| Mechanical Data | | | |
| Setting method | Teach-in | | |
| Housing material | Plastic | | |
| Protection | IP 67 | | |
| Connector type | M12x1, 4/5-pin | | |
| Function | | | |
| Selectable menu language | Yes | | |
| Password protection | Yes | | |
| Error output | ✓ | | |
| PNP, can be set to NC or NO | ✓ | | |
| IO-Link | ✓ | | |
| Analog output | ✓ | | |

The warm-up phase lasts roughly 30 minutes. At the beginning of the warm-up phase, linearity error and reproducibility may deviate from the specified values. During the course of the warm-up phase, values improve in accordance with an exponential function until the specified technical data have been achieved. The sensor works with internal temperature compensation in order to reconcile fluctuating air temperatures. Externally ascertained temperature values can also be specified via the IO-Link interface.

3.1 Sonic Cone Diagrams

3.1.1 Measurement on a rod with a diameter of 25 mm

Characteristic curves show the position of the center or the front edge of the measured object (Ø 25 mm rod) at the time of switching.

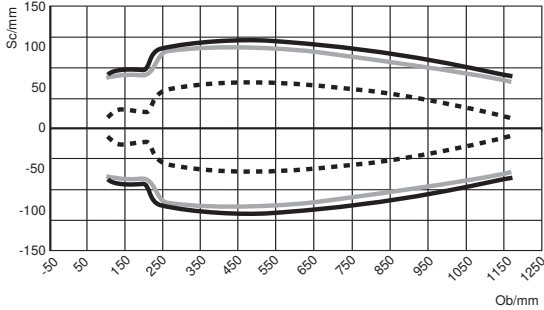


- Standard sonic cone (center of the measured object)
- Extra-narrow sonic cone (center of the measured object)

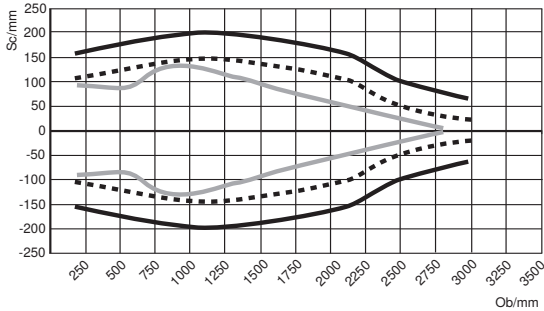
3.1.2 Measurement on a 100 × 100 mm plate

Characteristic curves show the position of the center or the front edge of the measured object (100 × 100 mm plate) at the time of switching.

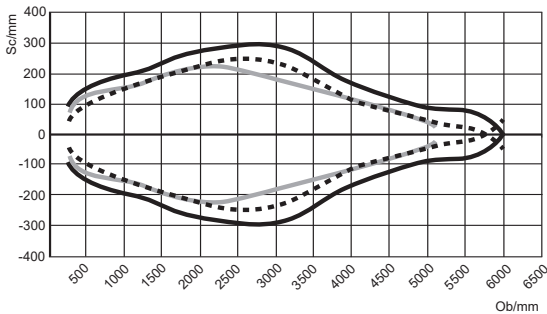
UMS123U035



UMS303U035



UMS603U035



- Standard sonic cone (center of the measured object)
- Extra-narrow sonic cone (center of the measured object)
- - - Standard sonic cone (front edge of the measured object)

3.2 Reproducibility

| Selected Filter | Reproducibility in mm | | |
|--------------------|-----------------------|------------|------------|
| | UMS123U035 | UMS303U035 | UMS603U035 |
| Filter 0 (default) | 3 | 5 | 7 |
| Filter 1 | 3 | 5 | 7 |
| Filter 2 | 3 | 5 | 7 |
| Filter 3 | 2 | 4 | 6 |
| Filter 4 | 2 | 4 | 6 |
| Filter 5 | 2 | 4 | 6 |
| Filter 6 | 1 | 2 | 5 |
| Filter 7 | 1 | 2 | 5 |

3.3 Response Time

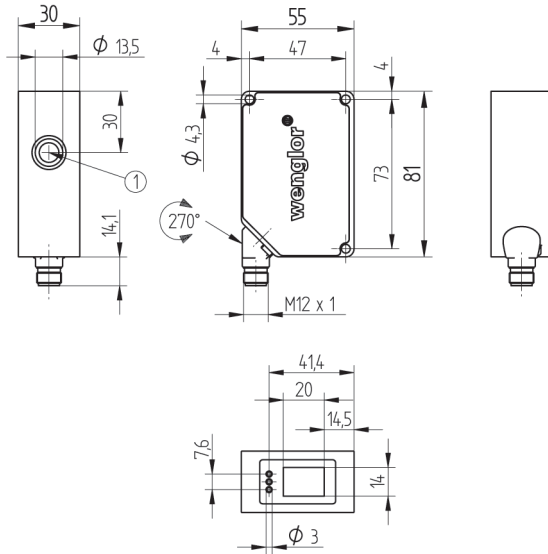
| Selected Filter | Response Time in ms | | |
|--------------------|---------------------|------------|------------|
| | UMS123U035 | UMS303U035 | UMS603U035 |
| Filter 0 (default) | 72 | 167 | 334 |
| Filter 1 | 100 | 167 | 334 |
| Filter 2 | 143 | 239 | 478 |
| Filter 3 | 186 | 313 | 626 |
| Filter 4 | 228 | 385 | 770 |
| Filter 5 | 264 | 455 | 910 |
| Filter 6 | 313 | 500 | 1000 |
| Filter 7 | 325 | 642 | 1284 |

3.4 Switching Frequency

| Selected Filter | Switching Frequency in Hz | | |
|--------------------|---------------------------|------------|------------|
| | UMS123U035 | UMS303U035 | UMS603U035 |
| Filter 0 (default) | 7 | 3 | 1,5 |
| Filter 1 | 5 | 3 | 1,5 |
| Filter 2 | 3,5 | 2,1 | 1,05 |
| Filter 3 | 2,7 | 1,6 | 0,86 |
| Filter 4 | 2,2 | 1,3 | 0,65 |
| Filter 5 | 1,9 | 1,1 | 0,55 |
| Filter 6 | 1,6 | 1 | 0,5 |
| Filter 7 | 1,3 | 0,78 | 0,39 |

3.5 Housing Dimensions

UMS123U035



3.6 Wiring Diagram



Legend

| | |
|----------|--|
| + | Supply Voltage + |
| - | Supply Voltage 0 V |
| ~ | Supply Voltage (AC Voltage) |
| A | Switching Output (NO) |
| Ā | Switching Output (NC) |
| V | Contamination/Error Output (NO) |
| ∇ | Contamination/Error Output (NC) |
| E | Input (analog or digital) |
| T | Teach Input |
| Z | Time Delay (activation) |
| S | Shielding |
| RxD | Interface Receive Path |
| TxD | Interface Send Path |
| RDY | Ready |
| GND | Ground |
| CL | Clock |
| E/A | Output/Input programmable |
| | IO-Link |
| PoE | Power over Ethernet |
| IN | Safety Input |
| QSSD | Safety Output |
| Signal | Signal Output |
| BI_D +/- | Ethernet Gigabit bidirect. data line (A-D) |
| ENaRS422 | Encoder 0-pulse 0-0̇ (TTL) |

| | |
|--------|--------------------------------|
| PT | Platinum measuring resistor |
| nc | not connected |
| U | Test Input |
| Ū | Test Input inverted |
| W | Trigger Input |
| W- | Ground for the Trigger Input |
| O | Analog Output |
| O- | Ground for the Analog Output |
| BZ | Block Discharge |
| AWV | Valve Output |
| a | Valve Control Output + |
| b | Valve Control Output 0 V |
| SY | Synchronization |
| SY- | Ground for the Synchronization |
| E+ | Receiver-Line |
| S+ | Emitter-Line |
| ⊥ | Grounding |
| SnR | Switching Distance Reduction |
| Rx +/- | Ethernet Receive Path |
| Tx +/- | Ethernet Send Path |
| Bu± | Interfaces-Bus A(+)/B(-) |
| La | Emitted Light disengageable |
| Mag | Magnet activation |
| RES | Input confirmation |
| EDM | Contacteur Monitoring |

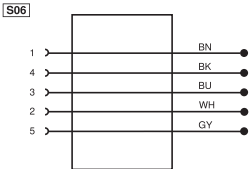
| | |
|------------------------------------|---------------------|
| ENaRS422 | Encoder A/Ā (TTL) |
| ENbRS422 | Encoder B/B̄ (TTL) |
| ENa | Encoder A |
| ENb | Encoder B |
| AMIN | Digital output MIN |
| AMAX | Digital output MAX |
| AOK | Digital output OK |
| SY In | Synchronization In |
| SY OUT | Synchronization OUT |
| Q.LT | Brightness output |
| M | Maintenance |
| rsv | reserved |
| Wire Colors according to IEC 60757 | |
| BK | Black |
| BN | Brown |
| RD | Red |
| OG | Orange |
| YE | Yellow |
| GN | Green |
| BU | Blue |
| VT | Violet |
| GY | Grey |
| WH | White |
| PK | Pink |
| GNYE | Green/Yellow |

3.7 Accessory Products

wenglor can provide you with suitable connection technology for your product.

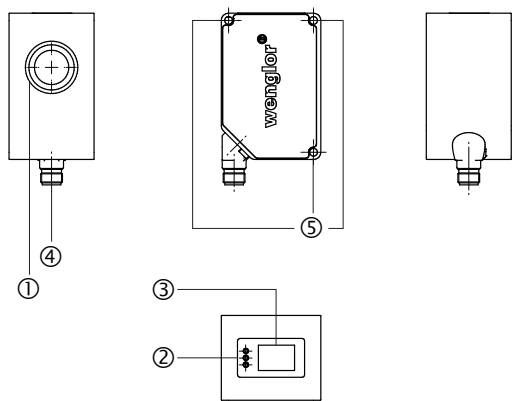
Suitable mounting technology no. 340

Suitable connection technology no. 35



IO-Link master
PNP-NPN converter BG2V1P-N-2M

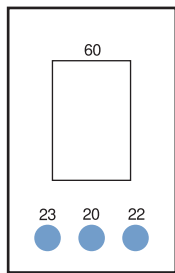
3.8 Layout



- ① = Transducer
- ② = Control keys
- ③ = Display
- ④ = Connector plug
- ⑤ = Mounting holes

3.9 Control Panel

X2



- 20 = Enter Button
- 22 = Up Button
- 23 = Down Button
- 60 = Display

3.10 Scope of Delivery

- Ultrasonic sensor
- Quick-start guide
- Mounting screws

4. Transport and Storage

4.1 Transport

Upon receipt of shipment, inspect the goods 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 condition 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



ATTENTION!

Risk of property damage in case of improper storage!

The product may be damaged.

- Comply with storage instructions.
-

5. Installation and Electrical Connection

5.1 Installation

- Protect the product against 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.
- If the object has smooth surfaces, the angle between the axis of the sound waves and the surface of the object should be $90^{\circ} \pm 3^{\circ}$. The angle can be considerably larger in the case of rough object surfaces.
- The active surface of the sensor may not contact any other machine parts.



NOTE!
Observe the blind spot.

In the area between the sensor’s active surface and the beginning of its working range, correct functioning of the sensor is not assured. No objects may be located in this area.

| | Object position | | | Switching position / switching LED | Error output / error LED | Measured value, IO-Link |
|-------------------------|-----------------|---|---|------------------------------------|--------------------------|-------------------------|
| Working range | | x | | Defined | Defined | Defined |
| Blind spot | x | | | Undefined | Undefined | Undefined |
| Above the working range | | | x | Defined | Defined | Defined |



ATTENTION!
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 Electrical Connection

- An IQ-Link master with port Class A must be used, as for port Class A pin 5 is not connected.
- Connect the sensor to 18...30 V DC (see section „3.4 Wiring Diagram“ on page 15).



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 only be connected by appropriately qualified personnel.

6. Functions Overview

6.1 Default Settings

| | | UMS123U035 | UMS303U035 | UMS603U035 |
|----------------|----------------------|------------------|------------------|------------------|
| Pin Function | A1 | Switching output | Switching output | Switching output |
| | E/A2 | Error output | Error output | Error output |
| Outputs | Switching hysteresis | 5 mm | 15 mm | 30 mm |
| | Window width | 25 mm | 50 mm | 100 mm |
| | NO/NC | NO | NO | NO |
| | On-delay | 0 ms | 0 ms | 0 ms |
| | Off-delay | 0 ms | 0 ms | 0 ms |
| | Pulse | 0 ms | 0 ms | 0 ms |
| Analog | U/I | I | I | I |
| | 4 mA | 100 mm | 200 mm | 300 mm |
| | 20 mA | 1200 mm | 3000 mm | 6000 mm |
| Offset | Preset offset value | 0 mm | 0 mm | 0 mm |
| Operating Mode | | Normal | Normal | Normal |
| Detection Mode | | Best signal | Best signal | Best signal |
| Filter | | 0 | 0 | 0 |
| Cone | | Standard | Standard | Standard |
| Sensitivity | Threshold | 0 | 0 | 0 |
| Display | Mode | Digital | Digital | Digital |
| | Intensity | Screensaver | Screensaver | Screensaver |
| Language | | English | English | English |
| Password | Activate | Off | Off | Off |

6.2 Function Definitions

| Designation | Function | Page |
|-------------------|---|--------------------|
| Run | Switch to display mode | 23 |
| Pin Function | Configure function for E/A2 | 24 |
| A1/A2 Switch | Configure output function | 24 |
| E/A2 Switch/Error | Configure input and output functions for A2 | 28 |
| Analog | Configure function of analog output | 29 |
| Offset | Adjust offset | 30 |
| Operating Mode | Select operating mode (synchronization/multiplex) | 33 |
| Select Multiplex | Address/number of multiplex users | 34 |
| Detection Mode | Signal selection | 34 |
| Filter | Enter filter settings | 35 |
| Cone | Select sonic cone | 35 |
| Sensitivity | Adjust sensitivity | 35 |
| Display | Select display characteristics | 36 |
| Language | Select desired menu language | 37 |
| Info | Read out information regarding the sensor | 37 |
| Reset | Restore default settings | 37 |
| Password | Protection against unauthorized changes to settings | 38 |
| E/A Test | Test input/output | 39 |

6.3 Menu Structure

- The desired menu language must be selected after initial start-up, and after each reset (see [section „7.16 Language“ on page 37](#))
- You can switch to the configuration menu by pressing any key



NOTE!

If no settings are adjusted in the configuration menu for a period of 20 seconds, the sensor is automatically returned to the display mode. The sensor accesses the last used menu view when a key is once again activated. If a selection is entered, it becomes active when the configuration menu is exited.

The keys are used for navigation, and for configuring settings. The functions of the navigation keys vary from menu to menu. The functions of the keys in the display are depicted as follows:

- ▲ : Navigate up.
- ▼ : Navigate down.
- ◀ | ▶ : Selection is acknowledged with the enter key.
- ◀ : Back: move up one level within the menu.
- ⏮ : Run: switch to the display mode.



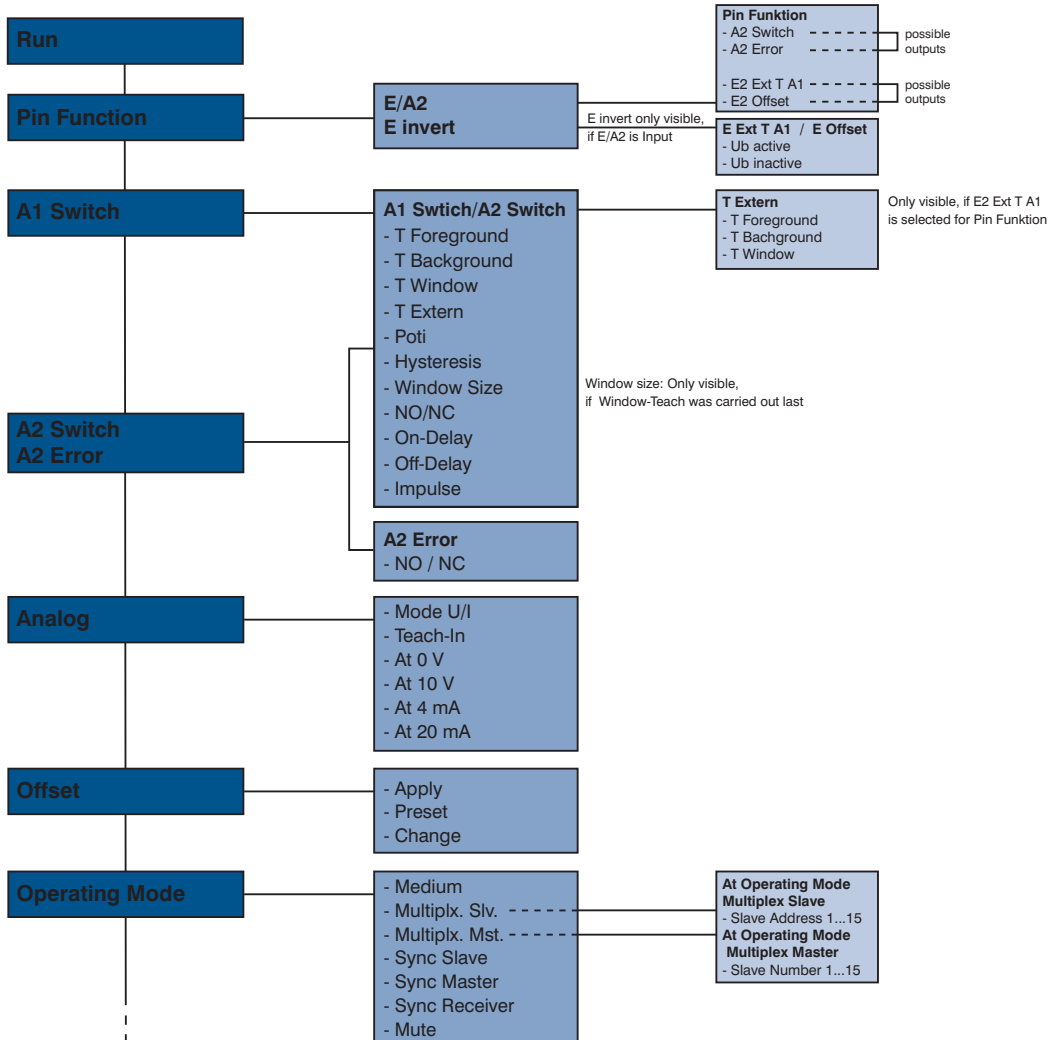
ATTENTION!

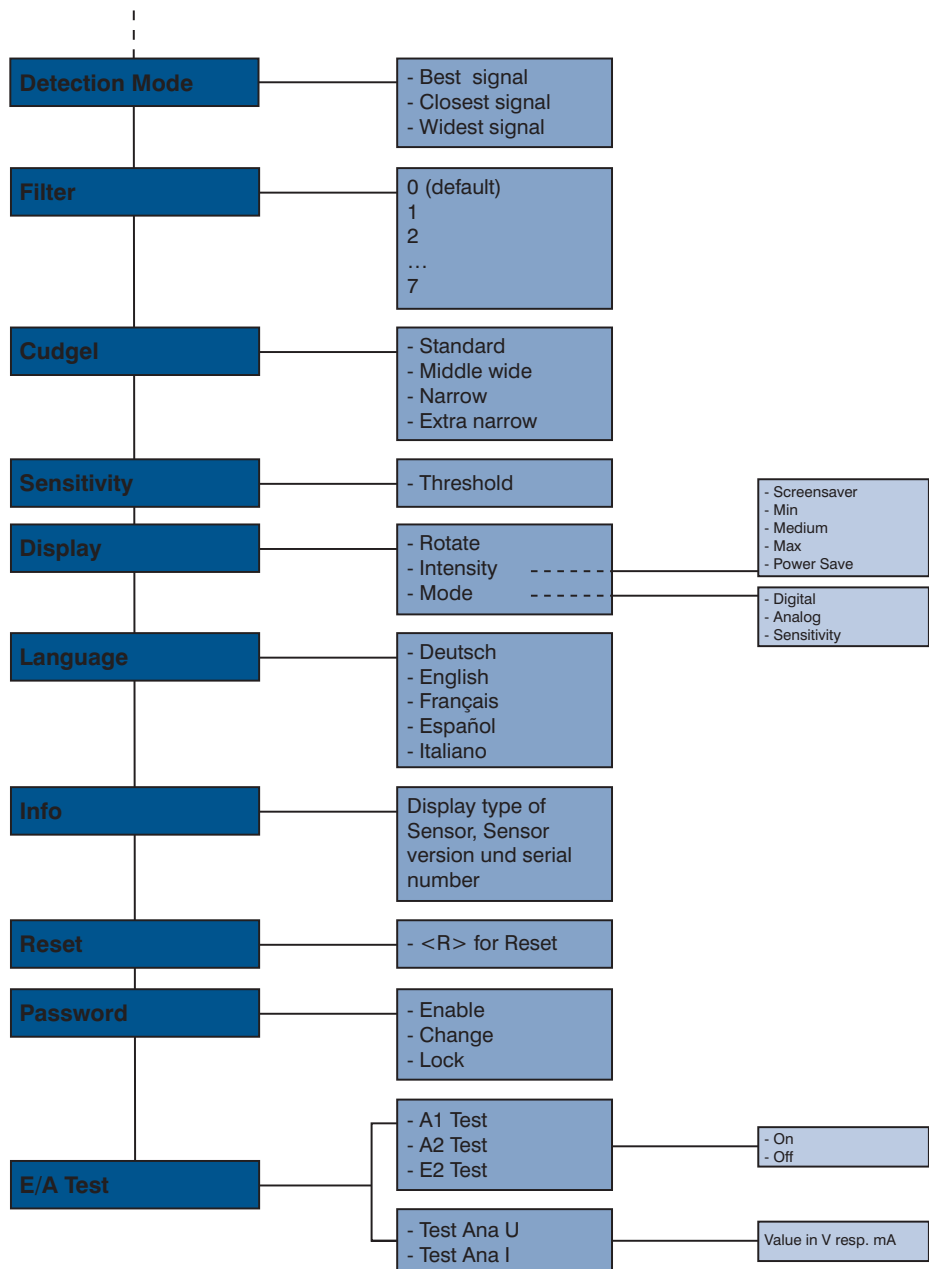
Risk of property damage if sharp objects are used!

The keys may be damaged.

- Do not use sharp objects in order to enter settings.

The sensor's configuration menu is laid out as follows:





A2 test and/or E2 test is only visible after prior selection of the corresponding Pin function.

7. Settings

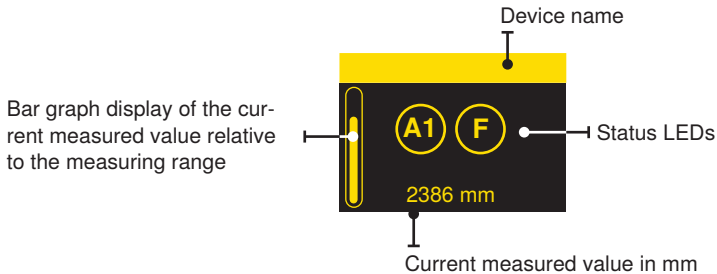
7.1 Causes for Triggering of Error Indication (display)



- Not enough ultrasound is reflected
- Very small objects, or objects which do not reflect sound well (sound-absorbing objects), are located within the working range
- Incorrect installation
- Object is outside of the working range
- Powerful sources of ultrasound within the axis of the sound waves
- Strong air turbulence

7.2 Run

The sensor is switched to the display mode when the **enter key** is pressed.



The set function of the pins is shown as symbol in the “Display” menu:

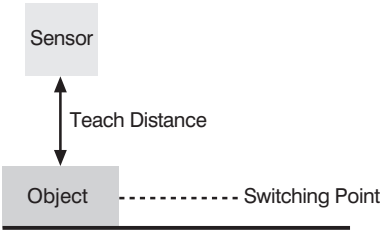
| | |
|-----------|-------------------------------|
| (T-1) | Teach input for A1 |
| (A1) (A2) | Switching output |
| (IN) | Input for applying the offset |
| (F) | Error output |

7.3 Pin Function

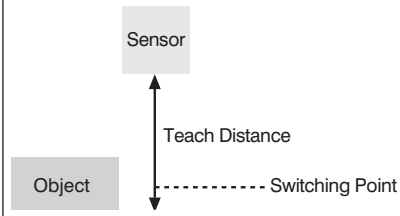
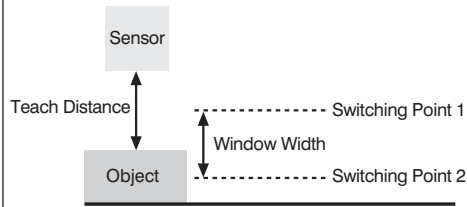
The **pin function** is used to specify the function assigned to **pin E/A2**. Various functions can be assigned to the pin.


| Function | Description |
|-------------------|---|
| E/A2 | Configuration of Pin E/A2 |
| Pin Function E/A2 | Press the ▲ and ▼ keys in order to configure pin E/A2 as: <ul style="list-style-type: none">• A switching output• An input for applying offset• An error output• A teach-in input for A1 |
| Invert E | |
| ◀ Back | |
| | |
| | |
| Invert E | Invert the input |
| | Invert E is only visible when E/A2 is an input. |
| | |

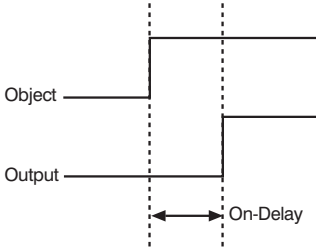
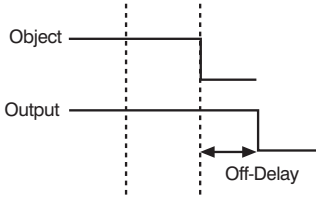
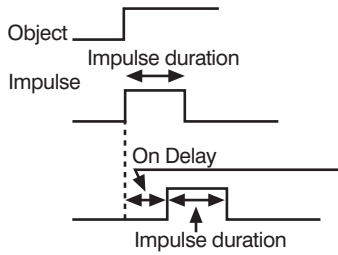
7.4 A1/A2 Switch

| Function | Description |
|--------------|---|
| T Foreground | Foreground Teach-In |
| A1 Switch | Distance to the object is taught in by pressing the T key : <ul style="list-style-type: none">• Align the sensor to the object• Briefly press the T key → The switching distance to the object is set• If necessary, readjust the switching distance with the help of the "Potentiometer" menu item. <p>Teach-in is performed while the sensor's sonic cone is aligned to the object. The switching distance is then automatically set to a distance which is slightly greater than the clearance between the sensor and the object. The sensor is thus switched for all objects whose distance to the sensor is equal to or less than the distance to the object used for the teach-in procedure.</p>  <p>The diagram illustrates the teach-in process. A grey box labeled 'Sensor' is positioned above another grey box labeled 'Object'. A vertical double-headed arrow between them is labeled 'Teach Distance'. A horizontal dashed line extends from the right side of the 'Object' box, labeled 'Switching Point'.</p> |
| T Foreground | |
| 1007 mm | |
| ○ 770 mm | |
| | |

* Press and hold the + or – key in order to scroll quickly through the numbers.

| | |
|---|---|
| T Background A1 Switch T Background H: 2874 mm O 2704 mm | Background Teach-In Distance to the background is taught in by pressing the T key , and can thus be suppressed: <ul style="list-style-type: none"> Align the sensor to the background (e.g. conveyor belt) Briefly press the T key → The background is suppressed <p>Teach-in is performed while the sensor's sonic cone is aligned to the background. The switching distance is then automatically set to a distance which is slightly less than the clearance between the sensor and the background. The sensor is thus switched whenever an object is located between the background and the sensor.</p>  |
| T Window A1 Switch T Window H: 2874 mm O 2705 mm | Window Teach-In A tolerance window is taught in by pressing the T key : <ul style="list-style-type: none"> Align the sensor to the object Briefly press the T key → A tolerance window is set up around the measured distance. Window width and hysteresis are adjustable (see section „7.4 A1/A2 Switch“ on page 24). If the object is located within the window width, the sensor is switched. The lower and the upper switching thresholds are displayed alternately while the window is being taught in. <p>There are two switching points in the case of window teach-in. The distance between the two switching points is called the window. The size of the window is designated "window width". The sensor is switched when an object is within the window.</p>  |

| | | | | | | | | | | | | | | | | | |
|--|------------|---|--|--|--|------------|------------|------------|------------|-------------------|------|-------|-------|-------------------|--------|--------|---------|
| T External | | External Teach-In | | | | | | | | | | | | | | | |
| A1 Switch | ▲ | The ▼ and ▲ keys can be used to specify whether “T Foreground”, “T Back-ground” or “T window” is executed during external teach-in. This menu item is only visible if the teach-in input has been selected for A1 under Pin Function . | | | | | | | | | | | | | | | |
| ○ T Foreground | ▶ | | | | | | | | | | | | | | | | |
| ○ T Background | | | | | | | | | | | | | | | | | |
| ○ T Window | ▼ | | | | | | | | | | | | | | | | |
| Potentiometer | | Readjusting Switching Distance | | | | | | | | | | | | | | | |
| A1 Switch | + | Switching distance can be readjusted by pressing the + or – key.* | | | | | | | | | | | | | | | |
| Poti | ▶ | | | | | | | | | | | | | | | | |
| 1007 mm | – | | | | | | | | | | | | | | | | |
| ○ 770 mm | | | | | | | | | | | | | | | | | |
| Hysteresis | | Adjusting Switching Hysteresis | | | | | | | | | | | | | | | |
| A1 Switch | + | <div>The hysteresis value is adjusted by pressing the + or – key.*</div> <table><tr><td></td><td>UMS123U035</td><td>UMS303U035</td><td>UMS603U035</td></tr><tr><td>Minimum value: XY</td><td>5 mm</td><td>15 mm</td><td>30 mm</td></tr><tr><td>Maximum value: XY</td><td>105 mm</td><td>315 mm</td><td>630 mm</td></tr></table> | | | | | UMS123U035 | UMS303U035 | UMS603U035 | Minimum value: XY | 5 mm | 15 mm | 30 mm | Maximum value: XY | 105 mm | 315 mm | 630 mm |
| | UMS123U035 | | | | | UMS303U035 | UMS603U035 | | | | | | | | | | |
| Minimum value: XY | 5 mm | | | | | 15 mm | 30 mm | | | | | | | | | | |
| Maximum value: XY | 105 mm | | | | | 315 mm | 630 mm | | | | | | | | | | |
| Hysteresis | ▶ | | | | | | | | | | | | | | | | |
| 5 mm | – | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| Window Width | | Setting Window Width | | | | | | | | | | | | | | | |
| A1 Switch | + | <div>(only adjustable after window teach-in)</div> <div>Window width is selected by pressing the + or – key.*</div> <table><tr><td></td><td>UMS123U035</td><td>UMS303U035</td><td>UMS603U035</td></tr><tr><td>Minimum value: XY</td><td>0 mm</td><td>0 mm</td><td>0 mm</td></tr><tr><td>Maximum value: XY</td><td>200 mm</td><td>600 mm</td><td>1200 mm</td></tr></table> | | | | | UMS123U035 | UMS303U035 | UMS603U035 | Minimum value: XY | 0 mm | 0 mm | 0 mm | Maximum value: XY | 200 mm | 600 mm | 1200 mm |
| | UMS123U035 | | | | | UMS303U035 | UMS603U035 | | | | | | | | | | |
| Minimum value: XY | 0 mm | | | | | 0 mm | 0 mm | | | | | | | | | | |
| Maximum value: XY | 200 mm | | | | | 600 mm | 1200 mm | | | | | | | | | | |
| Window Width | ▶ | | | | | | | | | | | | | | | | |
| 50 mm | – | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| NC/NO | | Selecting the Output Function | | | | | | | | | | | | | | | |
| A1 Switch | NO | <div>The NO (normally open) or NC (normally closed) output function is selected by pressing the NO or the NC key. The respective circuit diagram is displayed.</div> | | | | | | | | | | | | | | | |
| | ▶ | | | | | | | | | | | | | | | | |
| | NC | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| <div>NO</div>  | | <div>NO: The output is deactivated as soon as an object reaches the switching point.</div> <div>NC: The output is activated as soon as an object reaches the switching point.</div> | | | | | | | | | | | | | | | |

| On-Delay | | Adjusting On-Delay |
|---------------------------------|---|--|
| A1 Switch On-Delay 10 ms | + | An on-delay can be selected within a range of 0 to 10,000 ms by pressing the + or – key.* |
| | ▶ | |
| | – | On-delay is an adjustable extension of response time. |
| | |  |
| Off-Delay | | Adjusting Off-Delay |
| A1 Switch Off-Delay 10 ms | + | An off-delay can be selected within a range of 0 to 10,000 ms by pressing the + or – key.* |
| | ▶ | |
| | – | Off-delay is an adjustable extension of drop-off time. |
| | |  |
| | | Off-delay is disabled if a pulse duration has been selected. If this is the case, “Pulse” appears at the control panel. |
| Pulse | | Adjusting Pulse Duration |
| A1 Switch Pulse 10 ms | + | Pulse duration defines how long the output signal remains in the activated state. A pulse length can be selected within a range of 0 to 10,000ms by pressing the + or – key.* After the selected pulse duration has elapsed, the output signal is returned to the “deactivated” state. |
| | ▶ | |
| | – | |
| | |  |
| | | Function can be combined with On-Delay. |

* Press and hold the + or – key in order to scroll quickly through the numbers.

7.5 E/A2


After selecting the pin function, one of the following menus appears.

7.5.1 A2 Switch

Settings for A2 Switch are entered in the same way as for A1 Switch (see section „7.4 A1/A2 Switch“ on page 24).

7.5.2 A2 Error

If **output 2** is selected as an error output in the **Pin Function** menu (see section „7.3 Pin Function“ on page 24), **A2 Error** appears as an entry in the tree menu. This output can be configured with the **NO/NC** function. **Output 2** switches as soon as an error is detected.

| Function | Description |
|--|--|
| NO/NC | Configuring the Error Output |
| A2 Error | The error output is configured as normally open or normally closed by pressing the NO or the NC key. |
| NC | |
|  | |

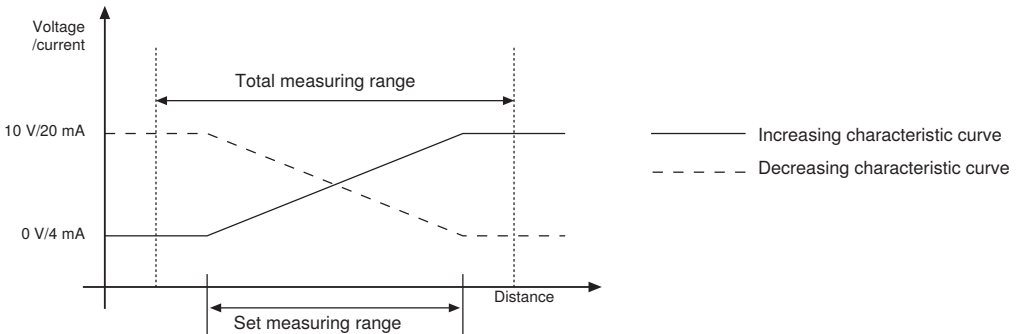
7.5.3 I Input


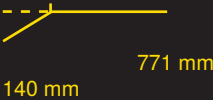
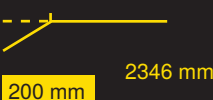
If **Pin E/A2** (see section „7.3 Pin Function“ on page 24) is used as an input for **external teach-in A1** or as an **offset** input, it can be set up as either an inverted or a non-inverted input.

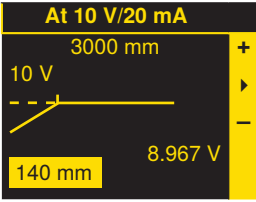
| Function | Description |
|---------------------------------|--|
| With Active Operating Voltage | Used as an Inverted Input |
| Pin Function | The input is normally connected to 0 V supply voltage. The input's function is triggered by applying a voltage of greater than 7 V. |
| Operating Voltage Active | |
| Operating Voltage Inactive | |
| With inactive operating voltage | Used as an Inverted Input |
| Pin Function | The input is normally connected to supply voltage of greater than 7 V. The input's function is triggered by applying a voltage of less than 7 V. |
| Operating Voltage Active | |
| Operating Voltage Inactive | |

7.6 Analog

The measuring range for the analog output can be freely selected within the specified working range with rising or falling characteristic curve. The width of the selected measuring range for the analog value must amount to at least 10% of the maximum possible measuring range. For example, the selected measuring range of the UMS123U035 must be set to at least 110 mm.



| Function | Description |
|---|--|
| U/I mode Analog 4.20 mA  Ana Out | U/I mode Analog Output as Current or Voltage Output The analog output is configured as a voltage or a current output by pressing the U or the I key. The corresponding symbol appears at the display. |
| U/I Teach-In 3000 mm 20 mA  140 mm 771 mm | U/I Teach-In Teaching in Distances which correspond to Upper and Lower Voltage/Amperage Values The momentary distance is assigned to a voltage value of 10 V or a current value of 20 mA by pressing the 10 V or the 20 mA key. The momentary distance is assigned to a voltage value of 0 V or a current value of 4 mA by pressing the 0 V or the 4 mA key. If necessary, the assigned distances can be readjusted with the help of the At 0 V/4 mA or At 10 V/20 mA menu items. |
| At 0 V/4 mA 3000 mm 20 mA  200 mm 2346 mm | At 0 V/4 mA Distance at 0 V/4 mA The distance assigned to either 0 V or 4 mA is adjusted by pressing the + or the - key. |

| At 10 V/20 mA | Distance at 10 V/20 mA |
|--|---|
|  | The distance assigned to either 10 V or 20 mA is adjusted by pressing the + or the – key. |

7.7 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 changed along with this value.
 Use of offset can be activated via the menu, externally via **pin E/A2** or via the IO-Link interface.

Via the Menu

| Function | Description |
|--|---|
| Apply* | Using the “Preset” Value as a Distance |
| Offset Apply 0 mm 2845 mm | T The value specified under the Preset menu item can be activated as the displayed distance by pressing the T key . After pressing the Z key , the offset is reset and actual distance is displayed. Z |
| Preset* | Teaching In an Offset Value |
| Offset Preset 2846 mm 2845 mm | T The current distance can be entered as a preset value for offset by pressing the T key . The preset value for offset can be set to 0 by pressing the Z key (the offset value is activated under the Apply menu item). Z |
| Change* | Changing the Selected Offset Value Step by Step |
| Offset Aendern 0 mm | + The preset value for offset in the Preset menu item can be increased or decreased step by step by pressing the + or the – key. – |

| | |
|---------|---|
| Offset | T |
| Apply | ▶ |
| 0 mm | |
| 2845 mm | Z |

* The momentarily selected preset value for offset is displayed in line 3 (0 mm).
 The current distance is displayed in line 4 (2845 mm).

Via Pin E/A2

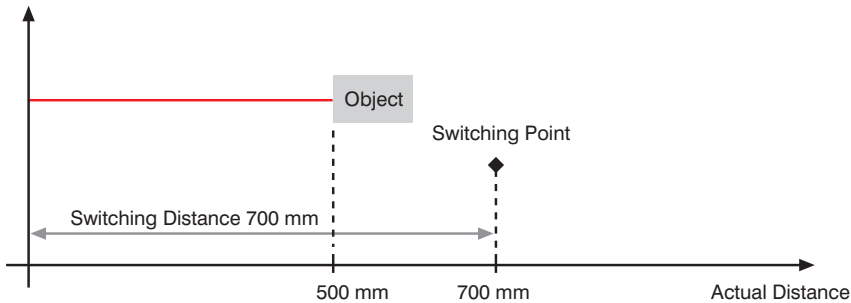
Offset adjustment can be applied via **pin E/A2** by means of an external trigger sensor (corresponds to **Apply** → **T** in the **Offset** menu). **E/A2** must be configured as an input by adjusting **Offset** (see section „7.8 Adjusting Offset“ on page 31)

In order to apply the offset adjustment, a voltage of greater than 7 V must be applied to the input pin. A positive edge is triggered as a result. The value selected under the Preset menu item is used as the current distance in this case.

7.8 Adjusting Offset

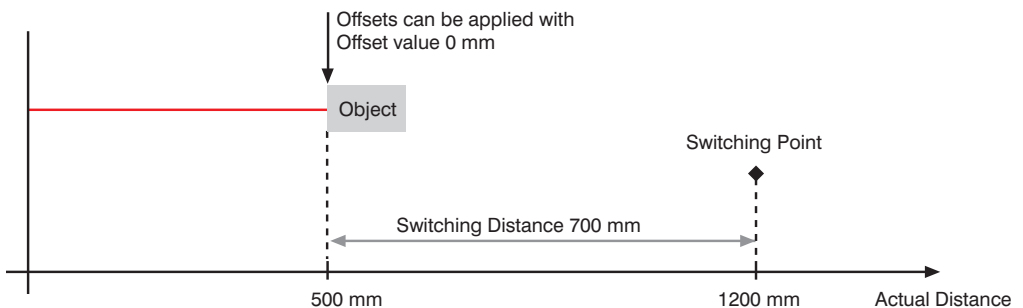
Without offset:

In the diagram shown here, the sensor measures a distance of 500 mm. The switching point is 200 mm further at a distance of 700 mm.

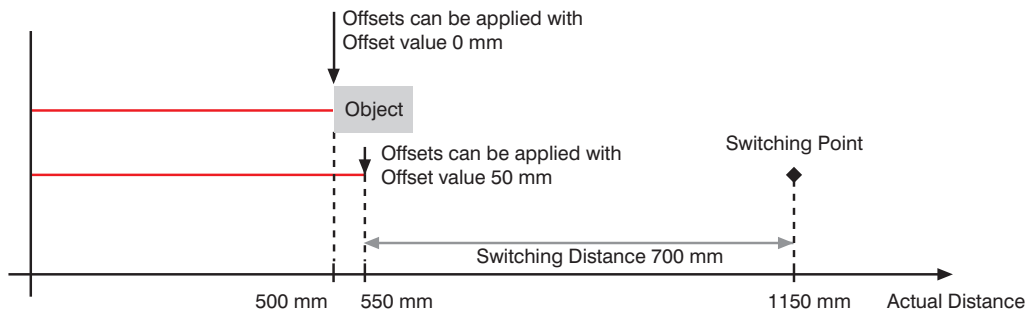


With offset:

In the diagram shown here, the sensor measures a distance of 500 mm. After applying offset with a value of 0 mm, the measured value obtained at 500 mm becomes 0 mm. The actual distance of the switching point is shifted as a result.



In the diagram shown here, the sensor measures a distance of 500 mm. The switching point is 200 mm further at a distance of 700 mm. After applying offset, the switching point is shifted to 1200 mm. If a preset offset value of 50 mm is selected, measured value 0 is shifted from 500 mm to 450 mm. The switching point is then at a distance of 1150 mm.



7.9 Setting the Operating Mode

| Function | Description |
|--|---|
| Normal | Setting the Operating Mode |
| <ul style="list-style-type: none"> ○ Operating mode ○ Normal ○ Multiplex Slave ○ Multiplex Master ○ Sync Slave ○ Sync Master ○ Sync Receiver ○ Muted | <p>The sensor is set to the normal operating mode when shipped from the factory.</p> <p>Synchronous slave: The sensor is in the synchronous slave operating mode. Signals are transmitted simultaneously to all slaves from the master via pin 5, so that a larger detection area can be scanned by means of several sensors. Up to 40 sensors can be operated synchronously.</p> <p>Synchronous master: The sensor is in the synchronous master operating mode. It automatically transmits pulses via pin 5 to all interconnected slaves, so that ultrasonic pulses are emitted simultaneously.</p> <p>Synchronous receiver: The sensor is in the synchronous receiver operating mode. The slave receives data from the master via pin 5, indicating when it will emit ultrasonic signals. The sensor is only capable of receiving ultrasonic pulses, but it can't emit any. In this way, objects can be detected which deflect ultrasonic signals from the sensor such that it is incapable of receiving any reflected sound waves. One or more sensors positioned as synchronous receivers make it possible to receive sound waves of this sort. Operation as a Through-Beam Sensor is also possible. However, the synchronous receiver indicates only 50% of the measured value.</p> <p>Multiplex slave: The sensor is in the multiplex slave operating mode. Staggered signals are transmitted to the slaves simultaneously from the master via pin 5, so that they emit synchronous ultrasonic pulses one after the other. Reciprocal influence can thus be ruled out. Up to 15 sensors can be operated in the multiplex slave mode with a single sensor in the multiplex master mode.</p> <p>Multiplex master: The sensor is in the multiplex master operating mode. It automatically transmits pulses via pin 5 to all interconnected slaves. The more slaves are operated, the slower measured value recording becomes.</p> <p>Muted: The sensor's ultrasonic emitter is switched off.</p> |

7.10 Select Multiplex

The multiplex operating mode is selected with this function. If the **multiplex slave** or **multiplex master** operating mode is selected, this menu item appears in order to facilitate slave address selection or entry of the number of multiplex users. Up to 15 sensors can be operated in the multiplex slave mode with a single sensor in the multiplex master mode.

| Function | Description |
|-----------------------------|---|
| Address | Setting the Multiplex Slave Address |
| Operating Mode Address 1 | <div><div><div>+</div><div>▶</div><div>—</div></div><div>If the multiplex slave operating mode has been selected, a unique user address within a range of 1 to 15 must be selected for each multiplex slave. The multiplex slaves are addressed by the multiplex master in the order indicated by the assigned addresses. The multiplex user address is entered with the help of the + and – keys.</div></div> |
| Number | Setting the Number of Multiplex Users |
| Operating Mode Number 2 | <div><div><div>+</div><div>▶</div><div>—</div></div><div>If the multiplex master operating mode has been selected, the number of interconnected multiplex slaves must be entered. The number of multiplex users is set within a range of 1 to 15 with the help of the + and – keys.</div></div> |

7.11 Select Detection Mode

The detection mood makes it possible to select which signal within the measuring range will be used for evaluation.

| Function | Description |
|--|---|
| Detection Mode | Selecting the Detection Mode |
| <div><div><div>○ Best Signal</div><div>○ Closest Signal</div><div>○ Furthest Signal</div></div><div><div>▲</div><div>◀</div><div>▼</div></div></div> | <div><div>The desired detection mode is selected by pressing the ▲ and ▼ keys, and is acknowledged by pressing the enter key ◀ .</div><div><div>Best signal: The signal with the greatest signal strength is used.</div><div>Closest object: The signal reflected by an object which is within the measuring range and is closest to the sensor is used.</div><div>Furthest object: The signal reflected by an object which is within the measuring range and is furthest the sensor is used.</div></div></div> |

7.12 Filter Selection

| Function | Description |
|--|---|
| Filter | Filter Selection |
| Filter <input type="radio"/> 0 <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | <p>Any filter ranging from 0 (lowest) to 7 (highest) can be selected by pressing the ▲ or ▼ key.</p> <p>The filter functions makes use of several measurements so that the measurement results are protected against any influence resulting from interference signals.</p> <p>Note: Selecting a higher filter results in a proportional reduction of the maximum switching frequency.</p> |

7.13 Select Sonic Cone

| Function | Description |
|--|---|
| Cone | Select Sonic Cone |
| Cone <input type="radio"/> Standard <input type="radio"/> Medium Width <input type="radio"/> Narrow <input type="radio"/> Extra Narrow | <p>The desired sonic cone is selected by pressing the ▲ or ▼ key, and is acknowledged by pressing the enter key ↵.</p> <ul style="list-style-type: none"> • Standard • Medium Width • Narrow • Extra Narrow |

7.14 Set Sensitivity

This function is used to set the sensor's sensitivity to various objects.

| Function | Description |
|---|---|
| Sensitivity | Set Sensitivity |
| Sensitivity Threshold 100 (1508) 2845 mm | <p>The threshold value can be set within a range of 000 to 1000 and dictates the sensor's sensitivity. The higher the threshold is set, the more sensitive the sensor becomes to influence resulting from interfering objects in the measuring field.</p> <p>Influence due to reflections from objects can be reduced in this way. The threshold value can also be combined with the detection mode (see section „7.11 Select Detection Mode“ on page 34)</p> |

7.15 Display

| Function | Description |
|---|---|
| Rotate | Rotating the Display |
| Mode ○ Intensity ○ Rotate Display | The display is rotated 180° by pressing the enter key . The display can be returned to its original position by pressing the same key once again. |
| Intensity | Adjusting Display Brightness |
| Display ○ Screensaver ○ Min ○ Normal | After pressing the ▲ or ▼ key, the menu appears immediately with the selected brightness setting (min., normal or max.). If the “Energy Saving” setting is selected, the display is switched off after 30 seconds. In the screensaver mode, the pixels are inverted every 40 seconds in order to prevent premature aging of the display. Selection is acknowledged by pressing the enter key. |
| Modus | Selecting the Display Mode |
| Display ○ Digital ○ Analog ○ Sensitivity | <p>The display mode is selected by pressing the ▲ or ▼ key and selection is acknowledged by pressing the enter key.</p> <p>Selectable modes include:</p> <ul style="list-style-type: none">• Digital: Display of distance and switching statuses of the digital inputs/outputs• Analog: Display of distance and the analog value of the analog output• Sensitivity: Display of distance and amplitude |

7.16 Language

The desired menu language can be selected in the **Language** menu.

| Function | Description |
|---|--|
| Language | Selecting the Display Language |
| Language ○ Deutsch ○ English ○ Francais ○ Espanol ○ Italiano | <p>The desired menu language is selected by pressing the ▲ or ▼ key, and is acknowledged by pressing the enter key ↵.</p> <p>The desired language appears in the menus as soon as it has been selected.</p> <p>Selectable languages:</p> <ul style="list-style-type: none"> • Deutsch • English • Francais • Espanol • Italiano <p>The display language must be selected after initial start-up, and after each reset.</p> |

7.17 Info

The following information regarding the sensor is displayed in the **Info** menu:

- Sensor type
- Sensor version
- Serial number

7.18 Reset

The sensor can be returned to its default settings in the **Reset** menu.

| Function | Description |
|-----------------------------------|--|
| Reset | Default Settings |
| Reset Press <R> to Reset | <p>All of the selected sensor settings are returned to their default values by pressing the R key.</p> |

7.19 Password

Password protection prevents inadvertent changes to selected settings.

| Function | Description |
|-----------------|--|
| Activate | Activating or Deactivating the Password Function |
| Password | Password protection can be activated or deactivated with the ▲ and ▼ keys. When password protection is activated, operation of the sensor is disabled after supply power has been interrupted, and is enabled once again after entering the correct password. |
| ○ Inactive | |
| ○ Active | |
| Change | Password Entry for Enabling |
| Password | A password within a range of 1 to 9999 can be selected using the + and – keys. Selection is acknowledged by pressing the enter key. |
| Change | |
| 0 | |
| Disable | Disabling the Sensor |
| Password | Disabling the sensor inhibits its operation immediately, if Activate Password is set to on. |
| Activate | |
| Change | |
| Disable | |

NOTE!

If the password function has been activated, the password must be entered each time supply power is interrupted. After pressing any key, the menu is automatically switched to the password entry mode.

After the password has been correctly entered, the entire menu is enabled and the sensor can be operated. The password function is deactivated upon shipment from the factory. It must be assured that the selected password is noted before any changes occur. If the password is forgotten, it has to be overwritten with a master password. The master password can be requested by e-mail from support@wenglor.com.



7.20 E/A Test (test inputs/outputs)

This functions changes the outputs manually, regardless of the sensor's momentary measured value. This makes it possible to monitor, for example, whether or not outputs are correctly connected to a controller, or if there's a disturbance in the cable which is distorting the analog value. It's also possible to test whether or not voltage is being applied to the input pin.

The test is ended automatically when the test menu is exited.

| Function | Description |
|---------------------------|--|
| Test A1/A2 | Testing Switching Output A1/A2 |
| E/A-Test ○ On ○ Off | <p>The output can be switched on and off, regardless of its settings, by pressing the ▲ and ▼ keys. In this way it can be determined, for example, whether or not the outputs are correctly connected to a controller.</p> |
| Test Analog U/I | Testing the Analog Output |
| | By pressing the + or – key, a voltage/current can be selected for the analog output, regardless of its settings. In this way it can be determined, for example, whether or not the analog output is correctly connected to a controller. |
| Test Input | The input is tested |
| E/A-Test ○ Input E | <p>If a voltage > 7 V DC is applied at the input irrespective of the settings, it is displayed whether the input is activated or not. This allows you to check whether the input e.g. at a control is correctly connected.</p> |

8. IO-Link interface

Process and parameters data can be found at www.wenglor.com in the product's separate download area:

Process Bytes

The output status is the status of the switching and error output.

The result is the distance value in tenths of millimeters for UMS123U035 and in millimeters for UMS202U035 and UMS603U035.

9. Maintenance Instructions



NOTE!

- This wenglor sensor is maintenance-free.
- It's advisable to clean the transducer and the display, and to check the plug connections at regular intervals.
- Do not clean the sensor with solvents or cleansers which could damage the product.
- The product must be protected against contamination during initial start-up.

10. EU Declaration of Conformity

The EU declaration of conformity can be found on our website at www.wenglor.com in the product's separate download area.

11. Appendix

11.1 Change Index, Operating Instructions

| Version | Date | Description/Change |
|---------|----------|---|
| 1.0.0 | 06.02.14 | Initial version of the operating instructions |
| 1.1.0 | 09.04.19 | Further Information on Installation (blind spot) |
| 1.2.0 | 23.10.19 | Complement: Table "3.3 Response Time" and "3.4 Switching Frequency" |
| 1.3.0 | 27.05.21 | Update temperature range |
| 1.4.0 | 17.11.23 | Update "3.1 Sonic Cone Diagrams" on page 10 |
| 1.5.0 | 31.01.24 | Update "3.1 Sonic Cone Diagrams" on page 10 |