

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		

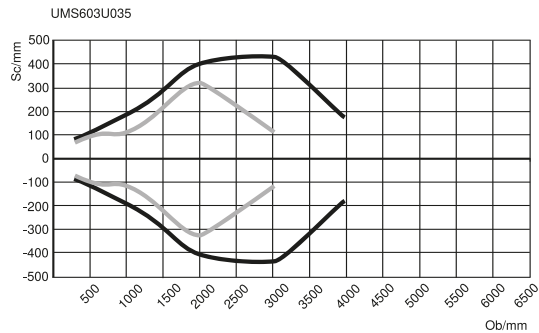
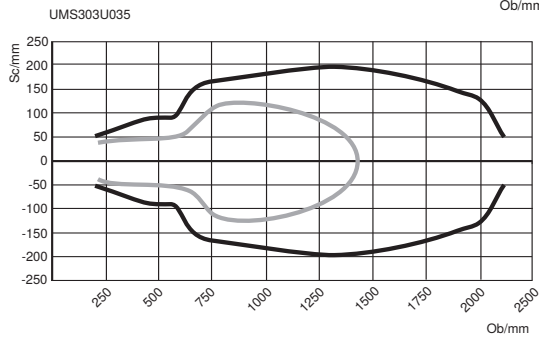
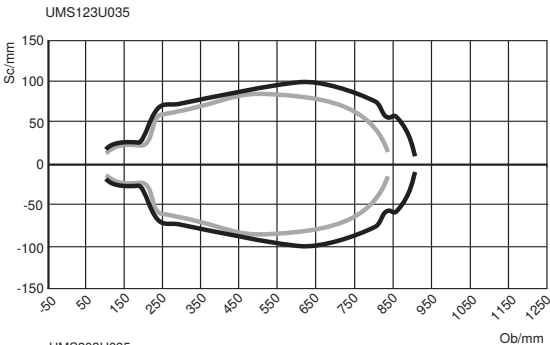
Order Number	UMS123U035	UMS303U035	UMS603U035
Technical Data			
Protection class	III		
Mechanical Data			
Setting method	Teach-in		
Housing material	Plastic		
Protection	IP 67		
Connector type	M12x1, 4/5-pin		
Function			
Selectable menu language	Yes		
Password protection	Yes		
Error output	✓		
PNP, 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.

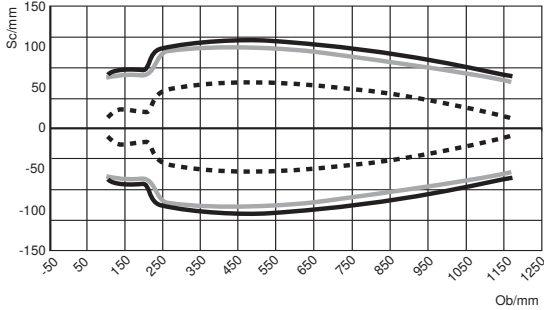


- Standard sonic cone (center of the measured object)
- Extra-narrow sonic cone (center of the measured object)

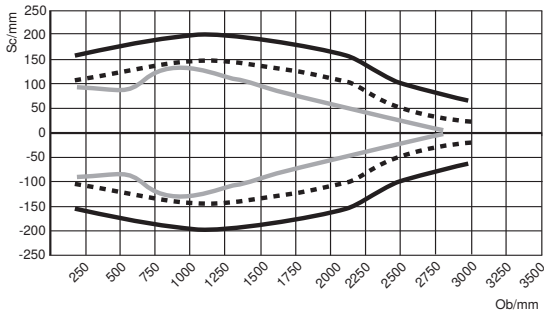
3.1.2 Measurement on a 100 × 100 mm plate

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.

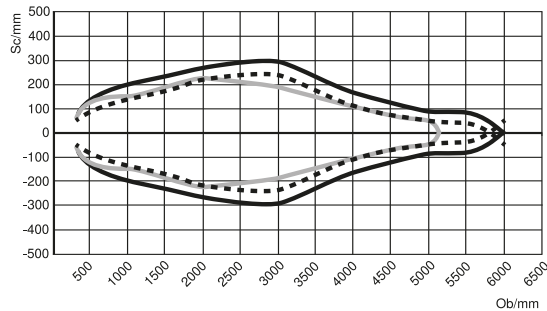
UMS123U035



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

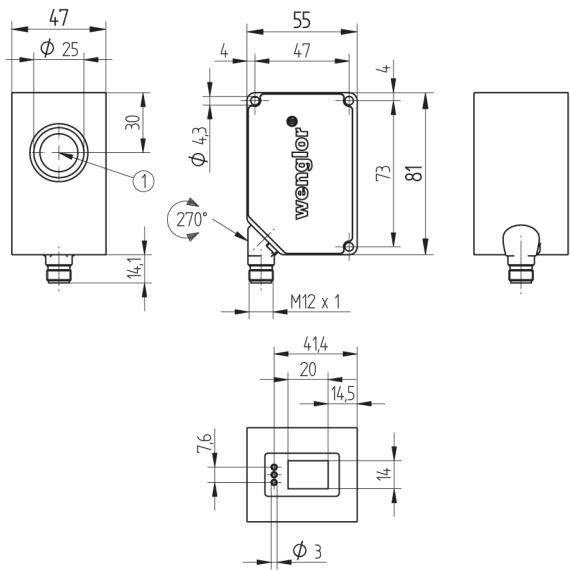
3.3 Response Time

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

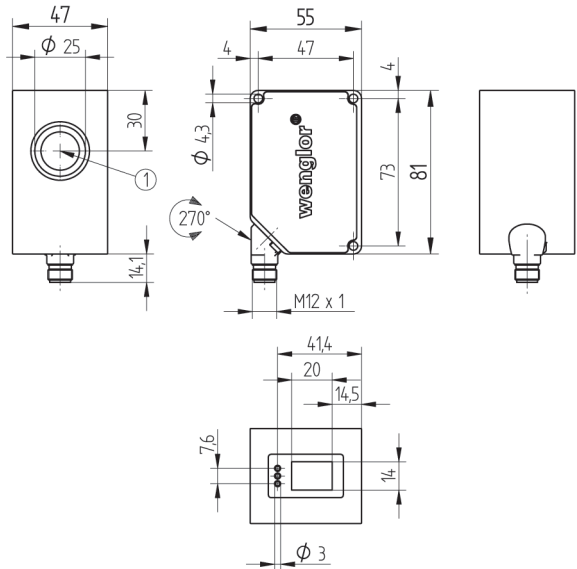
3.4 Switching Frequency

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

UMS303U035



UMS603U035

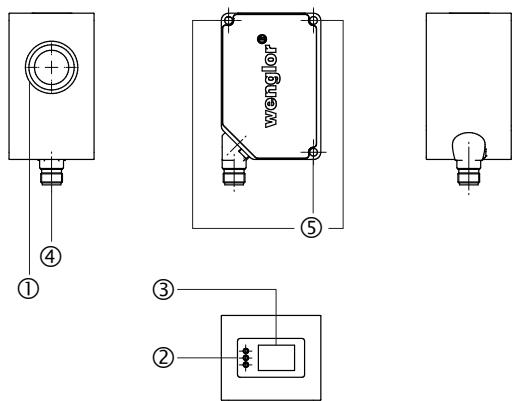


① = Sensing Face

3.6 Wiring Diagram



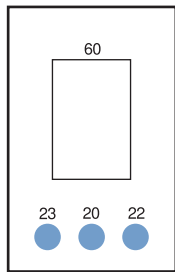
3.8 Layout



- 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° ±3°. 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.



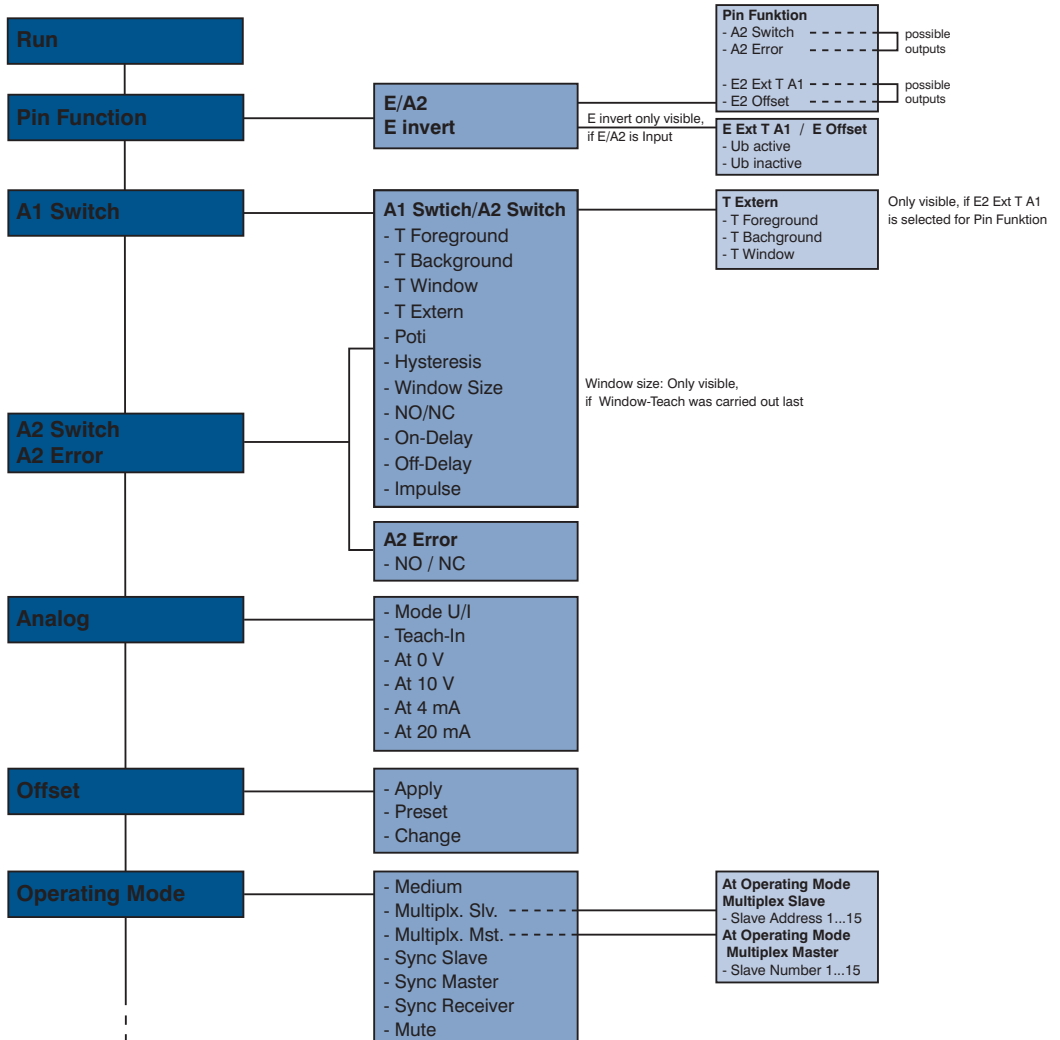
ATTENTION!

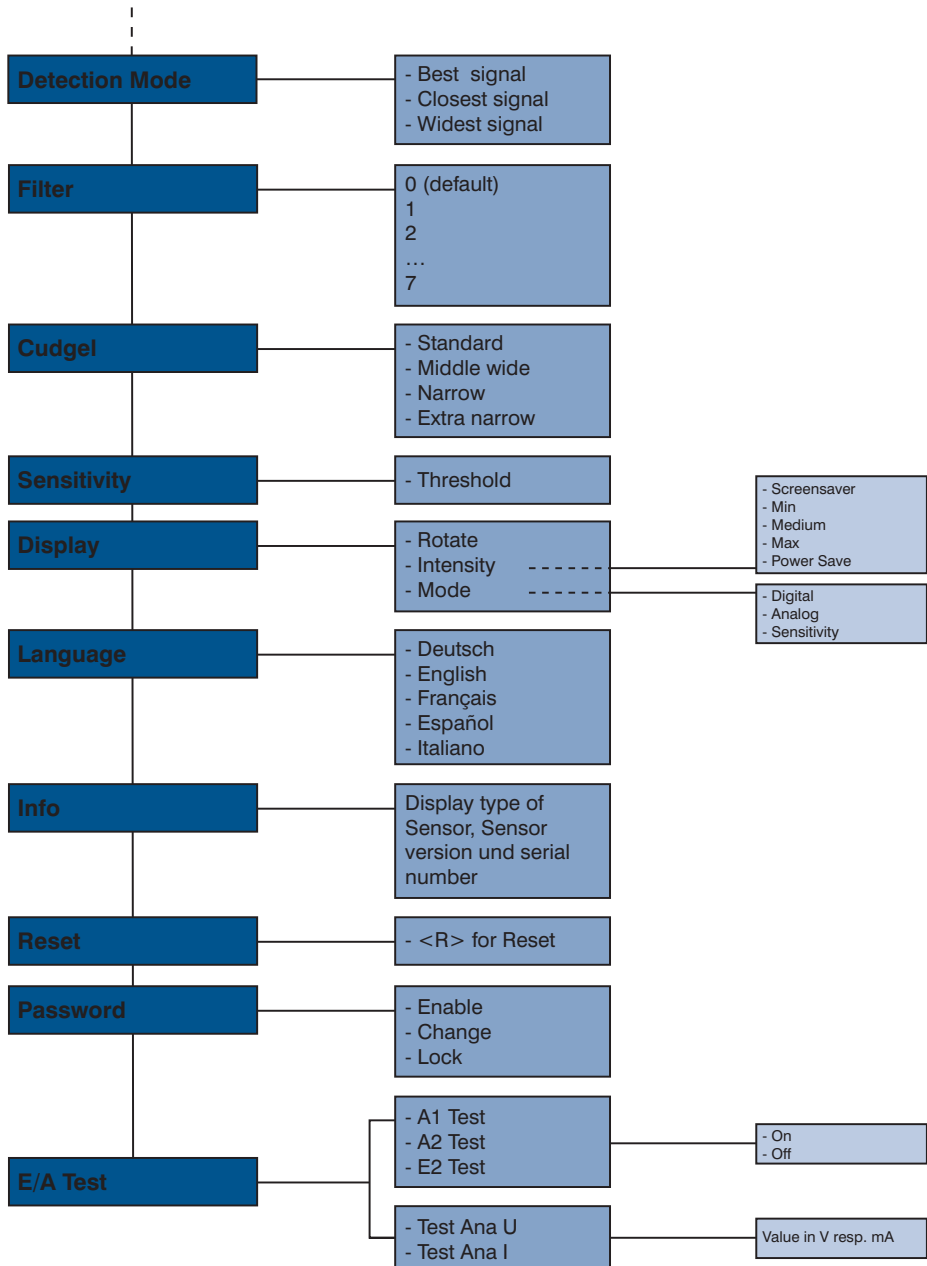
Risk of property damage if sharp objects are used!

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

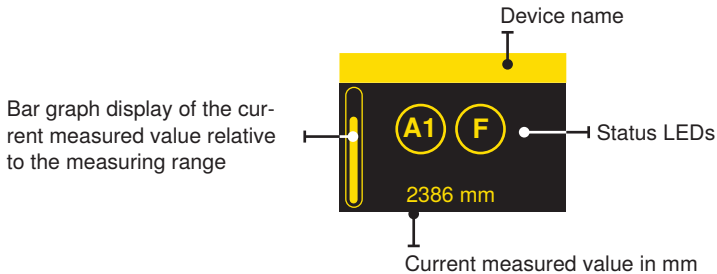
7.1 Causes for Triggering of Error Indication (display)



- 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:

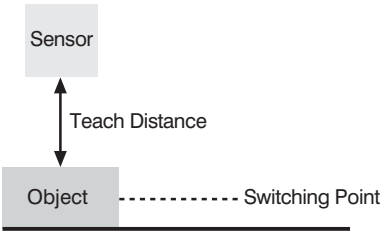
(T-1)	Teach input for A1
(A1) (A2)	Switching output
(IN)	Input for applying the offset
(F)	Error output

7.3 Pin Function

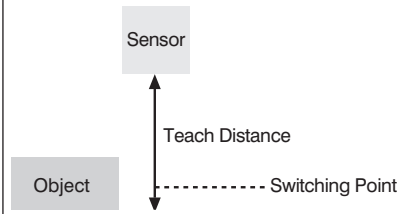
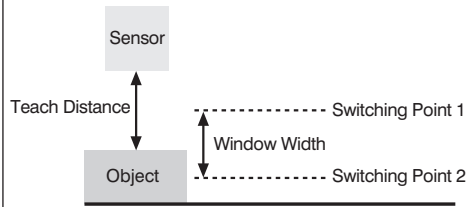
The **pin function** is used to specify the function assigned to **pin E/A2**. Various functions can be assigned to the pin.

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: • 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.

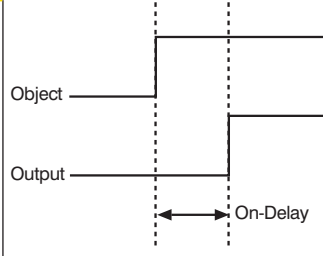
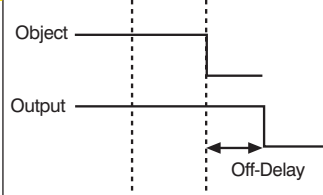
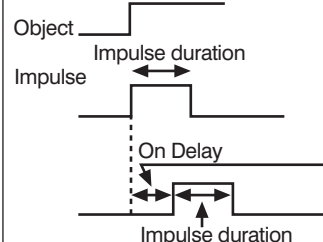
7.4 A1/A2 Switch

Function	Description
T Foreground	Foreground Teach-In
A1 Switch	Distance to the object is taught in by pressing the T key : • 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. 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.  The diagram illustrates the teach-in process. A grey box labeled 'Sensor' is positioned above a grey box labeled 'Object'. A vertical double-headed arrow between them is labeled 'Teach Distance'. A dashed horizontal line extends from the right side of the 'Object' box, labeled 'Switching Point'.
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: - Align the sensor to the background (e.g. conveyor belt) - Briefly press the T key → The background is suppressed 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. 
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 : - 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. 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. 

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	+	The hysteresis value is adjusted by pressing the + or – key.*			
Hysteresis	▶				
5 mm	–				
Window Width		Setting Window Width			
A1 Switch	+	(only adjustable after window teach-in) Window width is selected by pressing the + or – key.*			
Window Width	▶				
50 mm	–				
NC/NO		Selecting the Output Function			
A1 Switch	NO	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.			
	▶				
	NC				
		NO: The output is deactivated as soon as an object reaches the switching point. NC: The output is activated as soon as an object reaches the switching point.			

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 NC  NO NC	The error output is configured as normally open or normally closed by pressing the NO or the NC key.

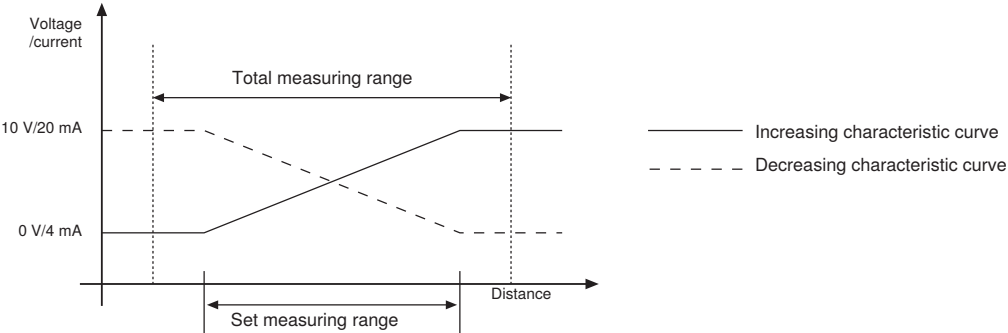
7.5.3 I Input

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.

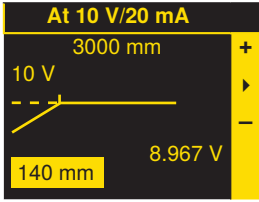
Function	Description
With Active Operating Voltage	Used as an Inverted Input
Pin Function ○ Operating Voltage Active ○ Operating Voltage Inactive	The input is normally connected to 0 V supply voltage. The input's function is triggered by applying a voltage of greater than 7 V.
With inactive operating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

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 Output as Current or Voltage Output
Analog 4.20 mA  Ana Out	U 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. I
U/I Teach-In 3000 mm 20 mA --- 140 mm 771 mm	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.
At 0 V/4 mA 3000 mm 20 mA --- 200 mm 2346 mm	Distance at 0 V/4 mA 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. 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

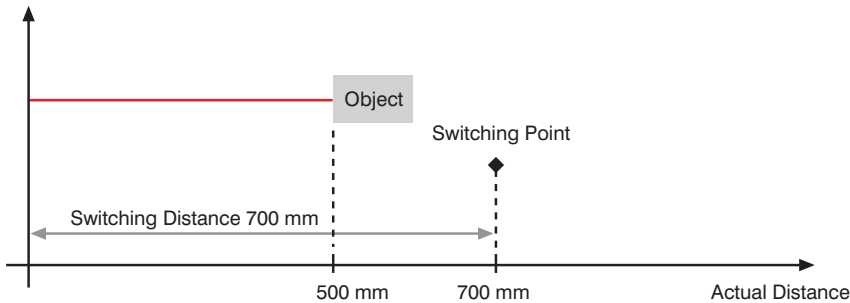
Offset adjustment can be applied via **pin E/A2** by means of an external trigger sensor (corresponds to **Apply** → **T** in the **Offset** menu). **E/A2** must be configured as an input by adjusting **Offset** (see section „7.8 Adjusting Offset“ on page 31)

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

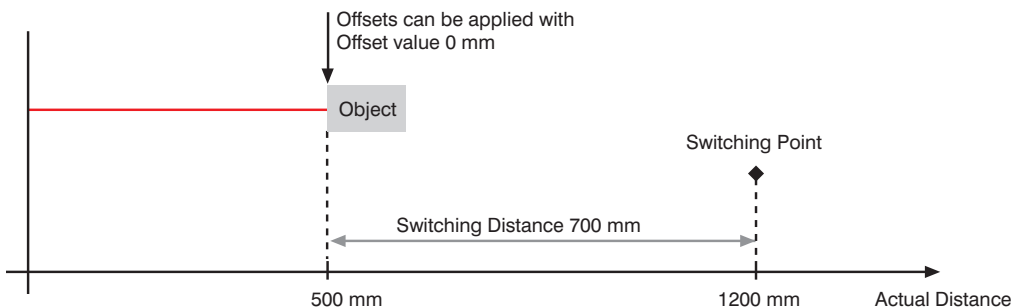
Without offset:

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.

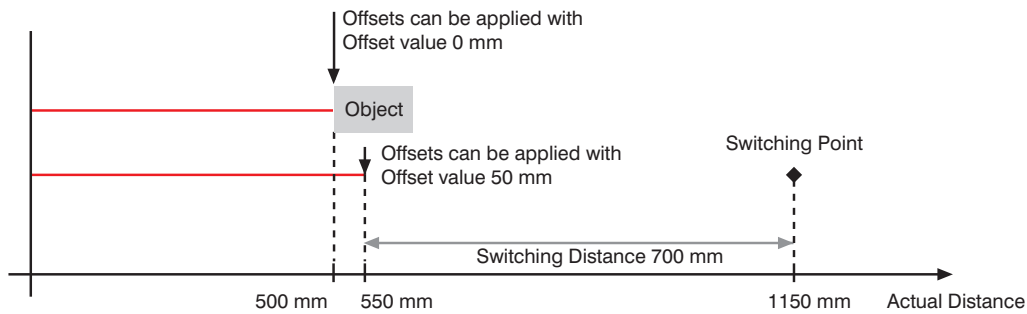


With offset:

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
○ Operating mode ○ Normal ○ Multiplex Slave ○ Multiplex Master ○ Sync Slave ○ Sync Master ○ Sync Receiver ○ Muted	The sensor is set to the normal operating mode when shipped from the factory. 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. 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. 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. 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. 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. Muted: The sensor's ultrasonic emitter is switched off.

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	+ ▶ — 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.
Number	Setting the Number of Multiplex Users
Operating Mode Number 2	+ ▶ — 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.

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
○ Best Signal ○ Closest Signal ○ Furthest Signal ▲ ◀ ▼	The desired detection mode is selected by pressing the ▲ and ▼ keys, and is acknowledged by pressing the enter key ◀ . Best signal: The signal with the greatest signal strength is used. Closest object: The signal reflected by an object which is within the measuring range and is closest to the sensor is used. Furthest object: The signal reflected by an object which is within the measuring range and is furthest the sensor is used.

7.12 Filter Selection

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

7.13 Select Sonic Cone

Function	Description
Cone	Select Sonic Cone
Cone ☐ Standard ☐ Medium Width ☐ Narrow ☐ Extra Narrow	The desired sonic cone is selected by pressing the ▲ or ▼ key, and is acknowledged by pressing the enter key ↵. • 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	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. 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)

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	The display mode is selected by pressing the ▲ or ▼ key and selection is acknowledged by pressing the enter key. Selectable modes include: • 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	▲ ◀ ▼ Selectable languages: • Deutsch • English • Francais • Espanol • Italiano The display language must be selected after initial start-up, and after each reset.

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	R ▶ All of the selected sensor settings are returned to their default values by pressing the R key.

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	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.
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	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.

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