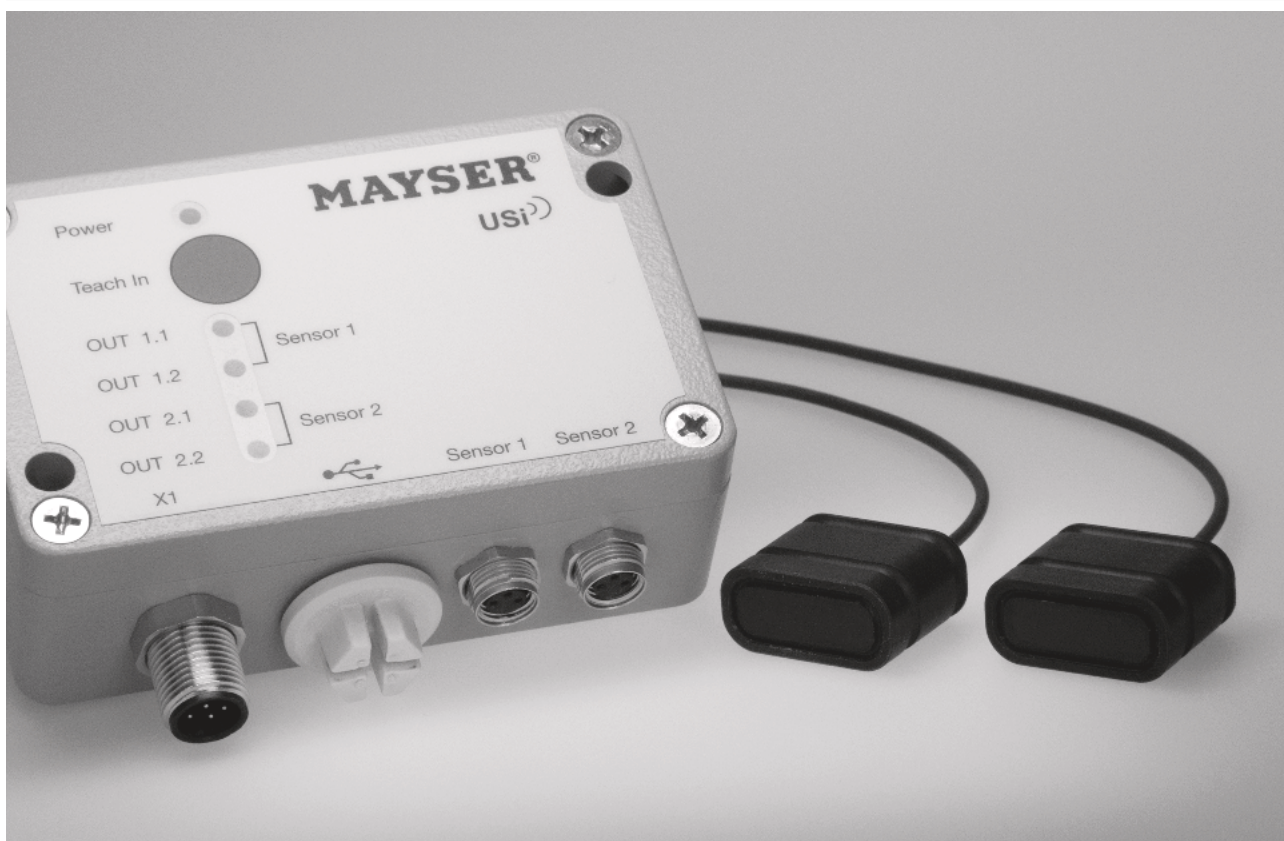




Product information



Ultrasonic Industrial Sensor USi

	Master	Slave
USi-PP	1005632 *	1005633 *
USi-IP	1005899 *	1005900 *
USi-UP	1005901 *	1005902 *

* plus Sensor 1005264

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Important information

Read through the product information carefully. It contains important information on operation, safety and maintenance of the product. Retain the product information for later reference.

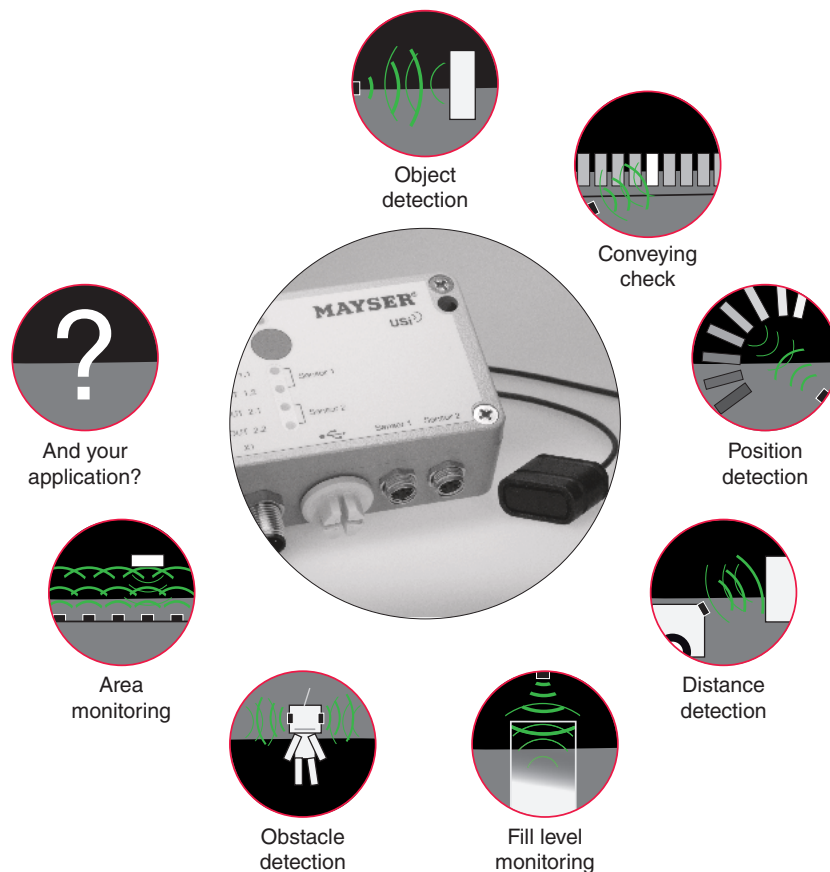
Always observe the safety instructions on the following pages under **ATTENTION**. Only use the product for the purpose described in the product information.

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One USi – countless possibilities

The ultrasonic industrial sensor USi is an extremely versatile sensor. The range of possible applications is almost unlimited. Here is a small selection:



Free positioning, flexible parameterisation and a high protection type – there seem to be no limits for the USi. Only the use as a protective device is excluded.

Optimised for Medium air

The ultrasonic industrial sensor USi is designed for industrial use in the medium air. In this instance the USi works accurately and with high repeatability.

The USi is impervious to

- Dirt build-up, dirt accumulation on the transducer surface
- Humidity and condensation
- Airflow

If necessary, the transmission intensity can even be adjusted:

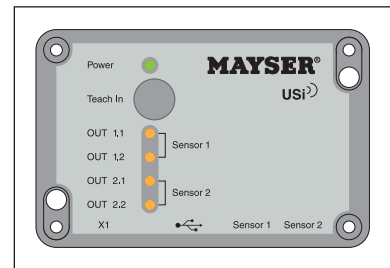
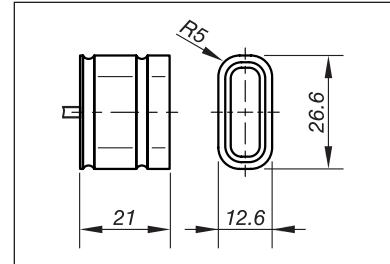
- lower, in order to prevent transverse reflections at short distances
- higher, in order to detect small objects at long distances

Special features of the USi

Separate sensory system

The Ultrasonic transducer and the signal processing are two separate units. The advantages:

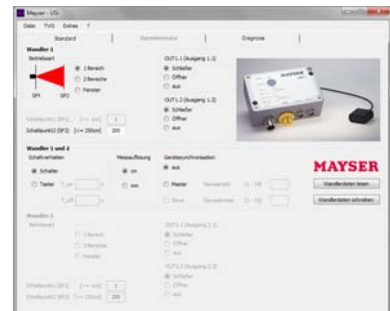
- + very small sensors (ultrasonic transducers) for maximum flexibility.
- + robust signal evaluation unit in aluminium die casting for maximum performance.
- + only one signal evaluation unit for two sensors.



Simple parameter assignment

Parameter assignment of the USi is quick and easy with the parameter assignment software (optional).

Connect the USi to the computer with the USB cable, start the software, alter the parameters with mouse and keyboard and transfer all settings to the USi with one single mouse-click – it could hardly be any easier.

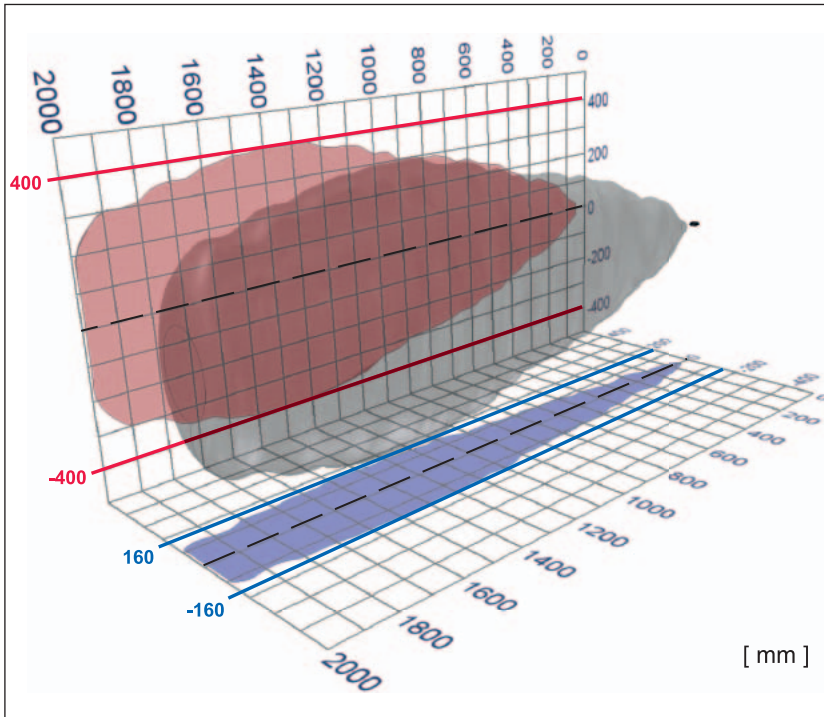


Real teach in

Whereas with other sensors “teach in” simply means teaching in the switch point, the USi takes a holistic approach to “teach in”: the complete environment within the detection field is taught in.

Special sound field geometry

The sonic lobe of the USi is very elliptic – a clear advantage, if detection is required in confined environments.



Note:

The representations refer to the USi in the condition as supplied. Measurement object: steel rod with Ø 10 mm. If parameters have been changed or if a different measurement object is used, the representations will change accordingly.

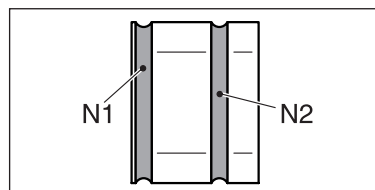
Mobile sensor system

The USi can even detect objects which approach or move away from it at relatively high speed. The USi easily copes with speeds of up to 2 m/s. Conversely this means that the USi is suitable for applications on mobile equipment.



Freedom of installation

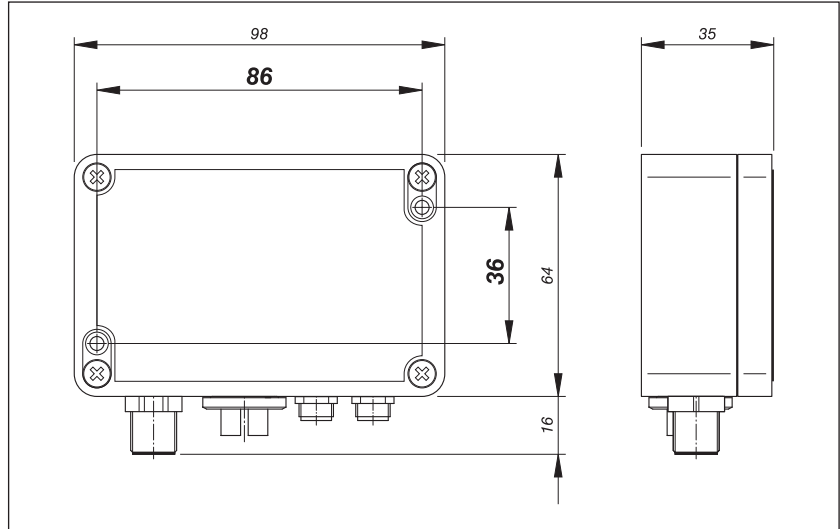
Attachment of the sensor (ultra-sonic transducer) is solved pragmatically. Both the position and the type of mounting fixture can be freely selected as long as one condition is met: the sensor may only be fixed via the O-Rings (optional) which lie in the grooves N1 and N2.



At the same time, the O-Rings are used for acoustic decoupling.

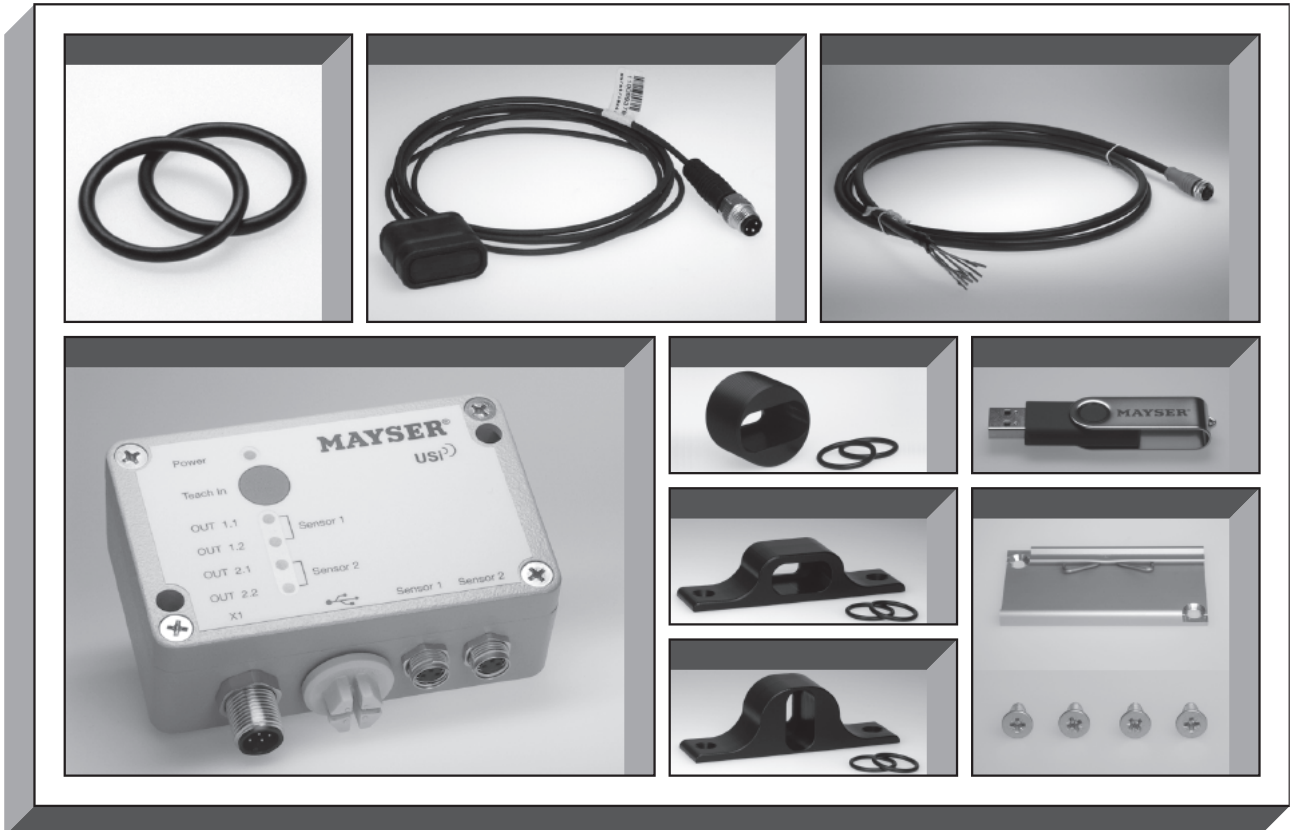
The evaluation unit can be mounted in any position both by surface installation and with the mounting rail adapter (optional) on a 35 mm mounting rail as per IEC 60715.

Subject to technical modifications.



Modular principle

Possible applications for the USi are as varied as life itself. It is therefore only logical that the sensor system is not offered in rigid sets but as a flexible modular system.



It is therefore possible to deliver exactly what you need for your application. Nothing more, but also nothing less.

Subject to technical modifications.

How the USi works

Multitool

The USi is not just an ultrasonic sensor. It is a reflex switch, a reflex barrier and a sonic barrier in one. Connected with further USis, a multisensor system can even be set up. And disturbance variables are less daunting with the diagnostic function of the parameter assignment software (optional).

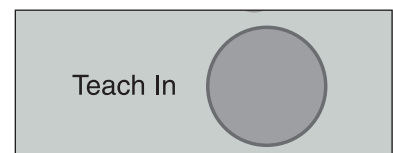
Tool	Configuration	Operation
Reflex switch	Standard	Objects are detected as present or absent.
Reflex barrier	1 sensor and 1 object which represents the limit of the reflex barrier	If the taught-in object is detected, the reflex barrier is free.
Sonic barrier	2 sensors and parameter assignment software (optional)	Sensors are aligned frontally with each other. One sensor is set as a transmitter and the other as a receiver.
Analogue distance measurement	USi-IP or USi-UP	An analogue current signal (IP) or voltage signal (UP) is present at output 1.1.
Multisensor	1 USi master and up to 24 USi slaves	The master synchronises all connected slaves. Mutual interference is thus excluded.
Diagnostics equipment	Parameter assignment software (optional)	The diagnostic function facilitates trouble-shooting if a USi is affected by interference variables.

1 button – 4 functions

Four functions can be carried out with just one button.

1. Teach in environment (teach in)
2. Adjusting switch points
3. Logoff/logon sensor
4. Restore factory settings

The LEDs are used for display and navigation through the various menus.



4 outputs

Up to four outputs are available per evaluation unit.

	Sensor 1	Sensor 2
Switch point SP1	OUT 1.1	OUT 2.1
Switch point SP2	OUT 1.2	OUT 2.2

The outputs are preset as normally open contacts. With the parameter assignment software (optional), they can also be operated as normally closed contacts or switched "off" completely.

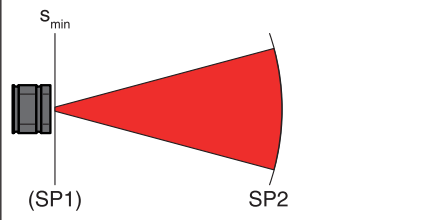
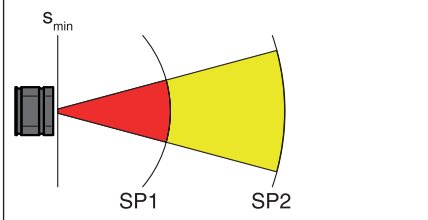
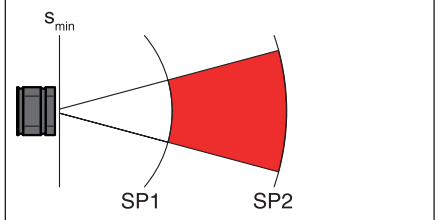
Subject to technical modifications.

Do you need a change-over contact? – No problem.
Simply combine the two outputs which are assigned to a sensor, e.g. OUT 1.1 as normally open contact and OUT 1.2 as normally closed contact.

Type	Outputs		
	Digital	Analogue	Total
USi-PP	PNP	-	4× PNP
USi-IP	PNP	4 to 20 mA	3× PNP 1× I [A]
USi-UP	PNP	0 to 10 V	3× PNP 1× U [V]
	Detect	Measure	

3 operating modes

The USi offers three operating modes:

Operating mode “1 Range” Detect + Measure	Operating mode “2 Ranges” Detect	Operating mode Window Detect + Measure
 <p>(SP1) SP2</p>	 <p>SP1 SP2</p>	 <p>SP1 SP2</p>
<p>Standard operating mode</p> <p>The detection field extends virtually from the sensor to the switch point SP2.</p>	<p>If switch point SP1 selection is larger than 1 cm, the USi-PP automatically changes to operating mode “2 Ranges”.</p> <p>The sensor-distant detection field (yellow) from SP1 to SP2 could then be used as a pre-warning field.</p>	<p>As for operating mode “2 Ranges,” except the sensor-proximal detection field (white) up to switch point SP1 is suppressed.</p> <p>If switch point SP1 is selected larger than 1 cm, USi-IP and USi-UP automatically change to operating mode Window</p> <p>In the case of USi-PP, the operating mode Window with the parameter assignment software (optional) can be selected.</p>

Which is the right one for your application?
Remember: two sensors per evaluation unit can be evaluated. This leaves scope for unusual applications such as “Operating mode 4 Ranges”

And all this with flexible switch point pre-settings from 10 to 2500 mm, where switch point SP1 is always smaller than SP2.

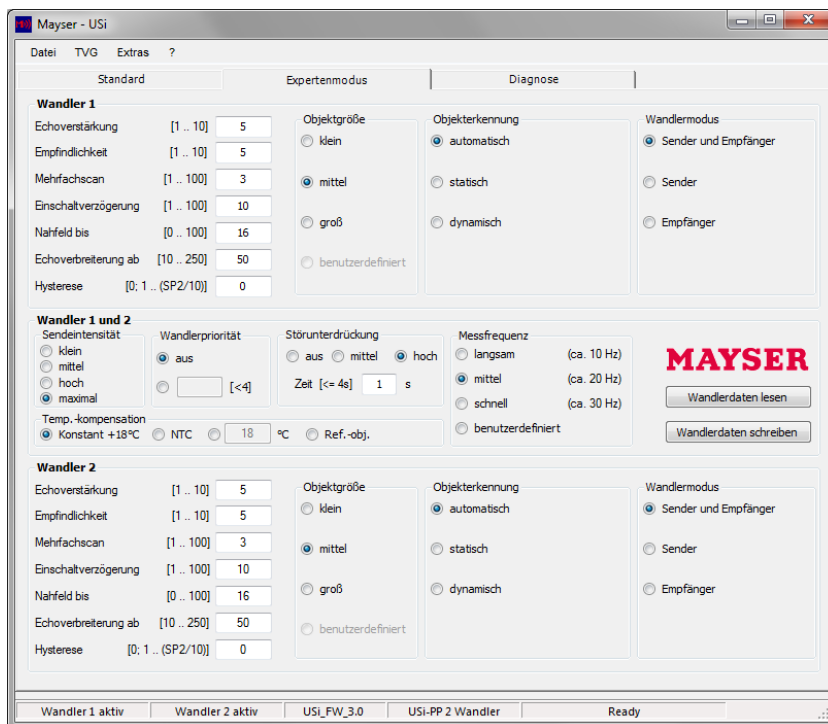
Flexibility goes a decisive step further: both sensors can be parameterised independently of each other. Naturally conveniently via one and the same interface of the parameter assignment software (optional).

Subject to technical modifications.

Parameterisation with a clear structure

The parameter assignment software (optional) is clearly structured and clearly divided into the areas standard, expert mode and diagnostics.

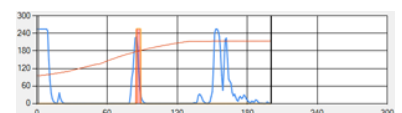
In the **Standard** tab, you can change the basic settings. In the **Expert mode** tab, you can directly configure the individual parameters.



The **Diagnostics** tab helps you to find and estimate disturbance variables as well as configure special applications: visualisation of the complete measurement distance serves as both feedback and help at the same time.

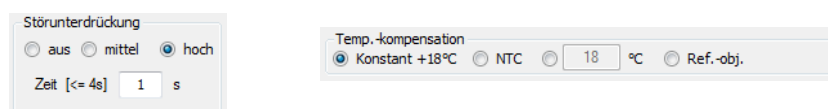
All settings can be carried out quickly and intuitively and stored on the computer. Or you can upload settings already saved from the computer.

Sounds easy? Well, it is!



Built-in intelligence

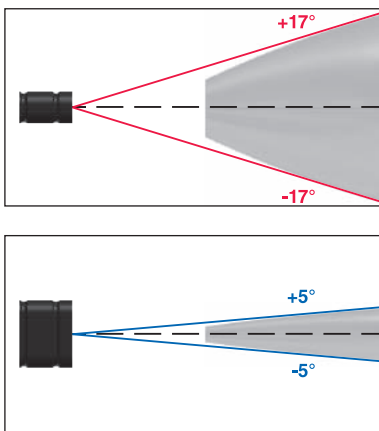
Unobtrusively integrated intelligence makes the USi an understated ultrasonic sensor. Included in the features of the USi are automatic **interference suppression**, time-varied gain (**TVG**) of the input signal and continuous **temperature compensation**.



Subject to technical modifications.

Technical data

The “type” information refers to the USi in the condition supplied to the customer. If parameters are changed, these values change. The thereby potential bandwidth is indicated by “... to ...”










ATTENTION!

Strong fluctuations in temperature within very short periods of time cannot counter balance the integrated temperature compensation.

USi-PP / USi-IP / USi-UP	
Testing basis	IEC 60947-5-2, IEC 60204-1
Connecting voltage U_s	
Voltage tolerance	DC 15 to 30 V, reverse polarity protection
Rated current	typically 80 mA (40 to 150 mA)
Power consumption	< 2.5 W (without load)
Detection functions	
Ultrasonic frequency	103 kHz
Measurement frequency	typically 20 Hz (2 to 250 Hz)
Measurement distance, max.	
Switch	typically 2000 mm (10 to 2500 mm)
Sensor (USi-IP / -UP)	typically 2000 mm (100 to 2500 mm)
Blind zone	
Switch	10 mm
Sensor (USi-IP / -UP)	100 mm
Opening angle	
horizontal	±17°
vertical	±5°
Object detection	
Size (min.)	typically 10 mm (up to 1 mm)
Speed (max.)	typically 2 m/s (up to 2.5 m/s)
Times	
Reaction time t_a	typically 150 ms (3 to 500 ms)
Reactivation time t_w	typically 500 ms (3 to 50000 ms)
Switch frequency	typically 1.5 Hz (0.02 to 111 Hz)
Outputs	
Type: short-circuit-proof	NO contact, NC contact, off
Output 1.1 (OUT 1.1)	USi-PP: Power FET PNP
	USi-IP: DC 4 to 20 mA
	USi-UP: DC 0 to 10 V
Outputs 1.2 to 2.2	Power FET PNP
Switching current (max.)	200 mA per output
Switching voltage (max.)	DC 30 V
Mechanical operating conditions	
IEC 60529: protection class	Evaluation Unit Sensor
Weight	IP65 IP69K
max. humidity (23 °C)	250 g 25 g
Operating temperature	99%
Storage temperature	-25 to +80 °C
Dimensions (W × H × D mm)	-40 to +85 °C
	98 × 80 × 35 12.6 × 26.6 × 21

Subject to technical modifications.

Parts list

	Designation	Part number
	USi-PP Master evaluation unit, Master can be used as a stand-alone unit	1005632
	Slave can be used as a stand-alone unit	1005633
	USi-IP Master evaluation unit, Master can be used as a stand-alone unit	1005899
	Slave can be used as a stand-alone unit	1005900
	USi-UP Master evaluation unit, Master can be used as a stand-alone unit	1005901
	Slave can be used as a stand-alone unit	1005902
	Sensor ultrasonic transducer ps/mt/18x4/m with 1.5 m cable	1005264
	Extension cable for ultrasonic transducer sensor cut-to-size including M8 socket and M8 plug Length: 1.5 m	1005903
	O-Ring set 18x2.5 mm, consisting of: 2x O-Ring 18.0 x 2.5 mm, for clamping version	7502819
	O-Ring set 17.5x2 mm, consisting of: 2x O-Ring 17.5 x 2.0 mm, for integrated version	7502820

Subject to technical modifications.

	Designation	Part number
	Enclosure Set M30 for ultrasonic transducer, consisting of: 1× M30 enclosure 2× O-Ring 14.0 × 2.0 mm	7502704
	Enclosure set horizontal for ultrasonic transducer, consisting off: 1× Enclosure horizontal 2× O-Ring 17.5 × 2.0 mm	7502905
	Enclosure set vertical for ultrasonic transducer, consisting of: 1× Enclosure vertical 2× O-Ring 17.5 × 2.0 mm	7502906
	Mounting rail adapter set for USi, for evaluation unit on 35 mm mounting rail, consisting of: 1× Aluminium adapter 4× screws SK M5×10 self-cutting	7502767
	Unit cable M12x8 / USi, cut-to-size incl. lead ferrules and ready-to-connect shielding braid Length: 2 m	1005433
	Parameter assignment software for USi 1× on USB flash drive	7502768