UT309523

Sensor ultrasonic
Diffuse-reflection sensor

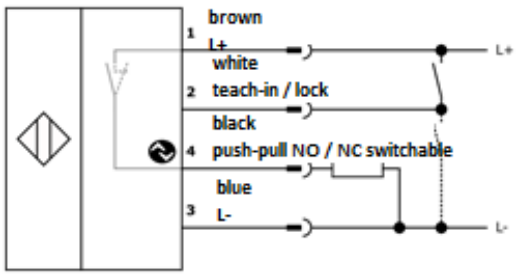
- **setting via teach-In**
- **3 different teach modes**
- **push-pull switching output**
- **connector M12**

IO-Link interface
Make contact / break contact switchable

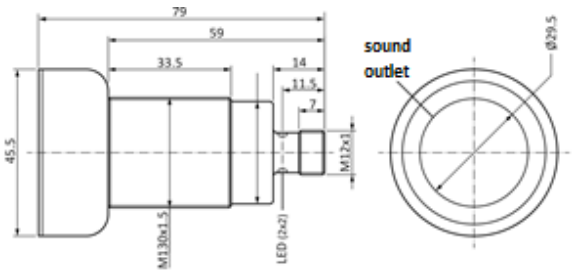
TECHNICAL DATA

scanning range	600 … 6000mm
operating voltage U_B	18 … 30V DC
switching output	push-pull, no/nc switchable
output current (max. load)	100mA
short-circuit proof	+
reverse polarity protected	+
voltage drop	2.0V DC
switching frequency	2Hz
current consumption (without load)	45mA
standard measuring plate	200 x 200mm
resolution	1mm
repeat accuracy	4mm
hysteresis	5 … 50mm (adjustable via IO-Link)
mounting distance (sensor to sensor)	1,400mm
setting	teach-in
carrier frequency	80kHz
protection class	III
insulation dielectric strength	500V
degree of protection (EN 60529)	IP 67
housing material	brass nickel plated
temperature (operation)	-25 … +70°C
temperature drift	0.2%/K (uncompensated)
connection	M12 connector 4-pin
connection accessories	z.B. **VK200325**

Connection



Dimensional drawing



Approved use

The ultrasonic diffuse-reflection sensors are used as part of a higher-level overall system for the contactless detection of objects.

Function

The ultrasonic diffuse-reflection sensors operate on the principle of time-of-flight measurement. The device sends a pulse train, which is then reflected by an object. The device detects the reflected wave and measures the time that has elapsed between the transmission and reception processes. From this time, the distance between sensor and object is determined. The results correspond to the specified values, the switching output is set accordingly.

Mounting

The diffuse-reflection sensor can be mounted in any position; however, a vibration-free or vibration-dampening assembly must be observed. Also protect the device against mechanical stresses such as shocks or impacts.

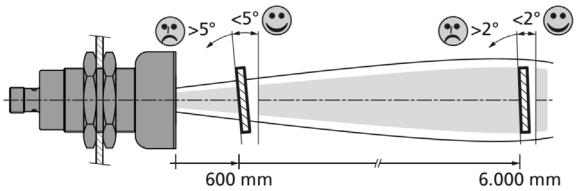
The transducer surface as well as the field of the detection beam must be kept free mandatorily. You need to pay attention on having no disturbing objects between the sensor and the target object within the detection beam. It is otherwise possible that the interfering object causes faulty switching. Also avoid positioning two or more ultrasonic sensors opposite each other.

Temperature

The speed of sound in air depends on the temperature. Operation outside the specified ambient temperature is not allowed. A temperature compensation can be switched on via IO-Link.
When temperature compensation is activated, the sensor requires about 15 minutes of warm-up time after a cold start; only then are the measured values reproducible.

Transmission angle of the object in diffuse mode

Objects with a smooth surface are reliably detected up to a tilting angle of approx. 5° at 600mm and approx. 2° at 6,000mm scanning distance reliably scanned. The max. allowed tilting angle increases on objects with a rough or heavy structured (granular) surface.

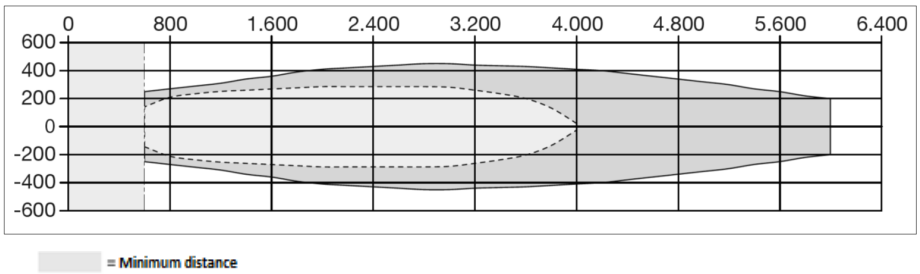


Blind range in touch mode

The range of 0 ... 600mm in front of the sensor corresponds to the ultrasonic typical blind range.
Distance measurements are not possible in the blind range!

The maximum scanning distance is 6,000mm.
Operation as a reflex barrier can be selected via IO-Link. To do this, set the value 1 to the desired distance from the reference surface. The selected distance may vary by about 5mm. All objects that interrupt the sound between the sensor and the reference surface are detected. The blind area may be disregarded in this case.

Detection beams



——— Plate 200 x 200mm
- - - - - - Round bar Ø 25mm

Cleaning

For cleaning a soft cloth moistened with soapy water is recommended.

Commissioning and setting

The switching points are taught in and the switching output is switched via the connection of the white wire (PIN 2) with the operating voltage (PIN1).

After 20 seconds, the teach process is aborted (time out function).

Make sure that the object to be detected is always within the adjustable distance limits (600 … 6000mm).

In normal operation, connect the teach line to 0V to avoid interference.

1. **Teach-in of a switching window**
    1. Position the object at the switching limit 1.
    2. Connect the white wire to the operating voltage for between 0.1 and 2 seconds. The LED flashes with approx. 1Hz.
    3. Position the object at the switching limit 2.
    4. Connect the white wire to the operating voltage for between 0.1 and 2 seconds.
    5. The switching output is active at a distance between switching limit 1 and switching limit 2.

2. **Teaching an object with background suppression (2-point teach)**
    1. Position the object at the desired position.
    2. Connect the white wire to the operating voltage for between 2 and 4 seconds. The LED is blinking with approx. 1Hz.
    3. Remove the object from the detection lobe so that the sensor is positioned on the background.
    4. Connect the white wire to the operating voltage for between 0.1 and 2 seconds.
    5. The switching threshold lies centrally between the object and the background.

3. **Automatic teach-in (Auto-Teach)**
    1. Position the sensor on the background.
    2. Connect the white wire to the operating voltage for between 4 and 6 seconds. The LED is blinking with approx. 2Hz.
    3. In the next 4 to 8 seconds, pass as many objects as possible past the sensor at the desired distance.
    4. The switching threshold is between the object and the background.

4. **Change switching function (no / nc)**
    1. Connect the white wire to the operating voltage for longer than 6 seconds.
    2. The switching output now works with the inverted function.

5. **LED display after each teach process**

    If the status LED is blinking twice, the teach process was successful and the sensor is working with the new values.
    If the status LED is blinking four times, the teach process has been aborted or the time window of 20 seconds has been exceeded. The sensor operates with maximum switching distance as a normally open contact.

On the following page, the descriptions are shown again graphically.

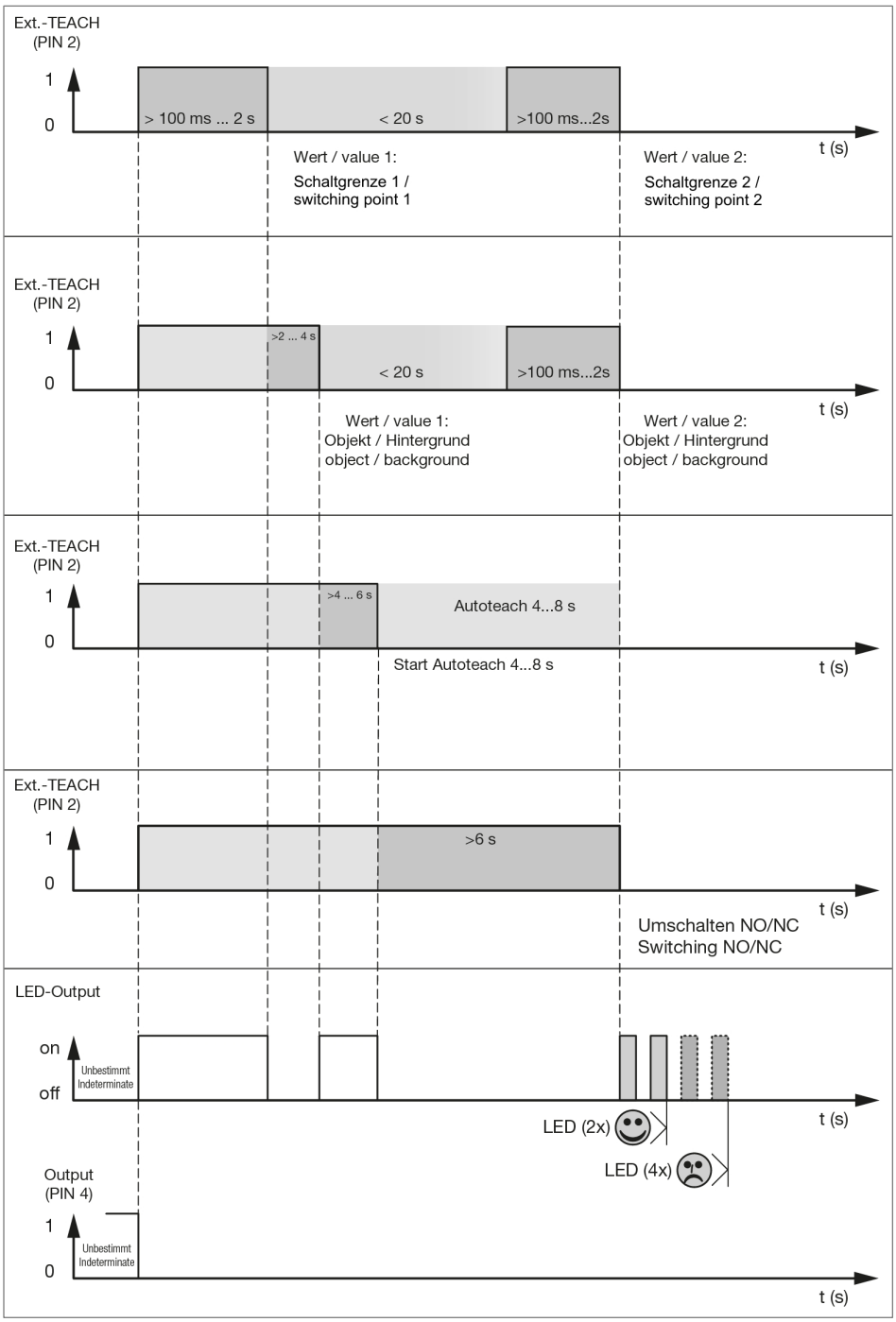
1. Teach-in of a switching window

2. Teaching an object with background suppression (2-point teach)

3. Automatic teach-in (Auto-Teach)

4. Change switching function (no / nc)

5. LED display after each teach process



Note: Resetting to the factory setting is only possible via IO-Link.

SAFETY INSTRUCTION:

Before commissioning, please make sure that all safety instructions listed in the product documentation, if applicable, have been observed!

In case of direct impact on personal safety, the use of these products is prohibited.