UT309520

Ultrasonic sensors
Pushbutton

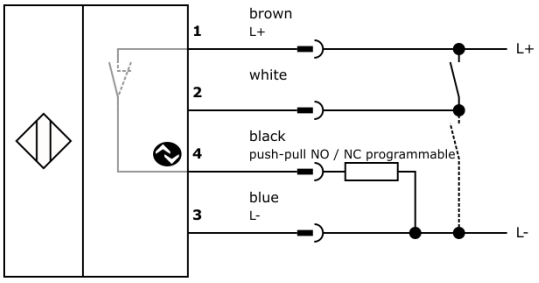
- **Setting via teach-in**
- **3 different teach modes**
- **Push-pull switching output**
- **M12-connector**

IO-Link interface
Normally open contact / normally closed contact switchable

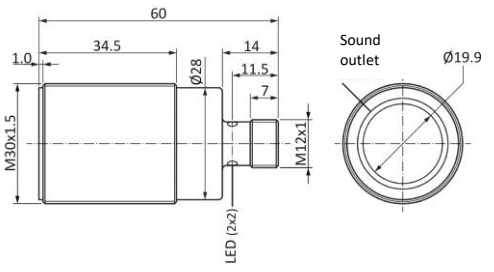
TECHNICAL DATA

Scanning range	300 … 3;000mm
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	3Hz
Current consumption (without load)	45mA
Standard measuring plate	200 x 200mm
Resolution	1mm
Repeatability plate	2mm
Hysteresis	5 … 50mm (adjustable via IO-Link)
Mounting distance (sensor to sensor)	500mm
Setting	Teach-In
Carrier frequency	125kHz
Protection class	III
Isolationsspannungsfestigkeit	500V
Protection class (EN 60529)	IP 67
Material (housing)	Brass nickel plated
Temperature (operation)	-25 … +70°C
Temperature drift	0.2%/K (uncompensated)
Connection	M12-connector 4-pin
Connection accessories	e.g. **VK200325**

Connection



Dimensional drawing



Intended use

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

Function

The ultrasonic diffuse-reflection sensors work on the principle of time-of-flight measurement. The device transmits 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. This time is used to determine the distance between the sensor and the object. If the results correspond to the specified values, the switching output is set accordingly.

Mounting

The sensor may be mounted in any position. Make sure that it is mounted in a vibration-free and vibration-damping manner. Also protect the device against mechanical loads such as shocks or impacts.

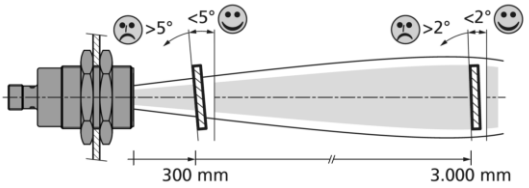
It is imperative that the transducer surface as well as the area of the detection lobe are kept free. Make sure that there are no interfering objects between the sensor and the target object inside the lobe. Otherwise, it is possible that the interfering object will cause false switching. Also avoid 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 scanned up to a tilting angle of approx. 5° at 300mm and approx. 2° at 3,000mm scanning range. The maximum permissible tilting angle increases for objects with rough or highly structured (grained) surfaces.

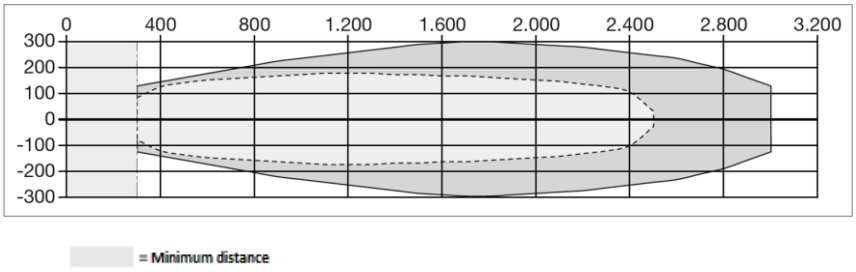


Blind range in touch mode

The range of 0 … 300mm 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 3,000mm.
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.

Sound cone



Cleaning

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

Commissioning and setting

The teach-in of the switching points as well as the switching of the switching output takes place 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 scanning range limits (300 ... 3,000mm). 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. **Teach-in of 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 flashes with approx. 1Hz.
    3. Take the object out of the detection lobe so that the sensor is aligned with the background.
    4. Connect the white wire to the operating voltage for between 0.1 and 2 seconds.
    5. The switching threshold is centered between object and background.

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

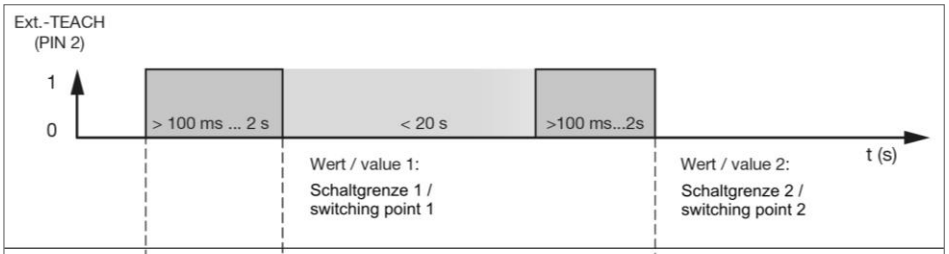
4. **Change switching function (no / nc)**
    1. Connect the white wire to the operating voltage for longer than 6 seconds.
    2. The switching output now works with the inverted function.

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

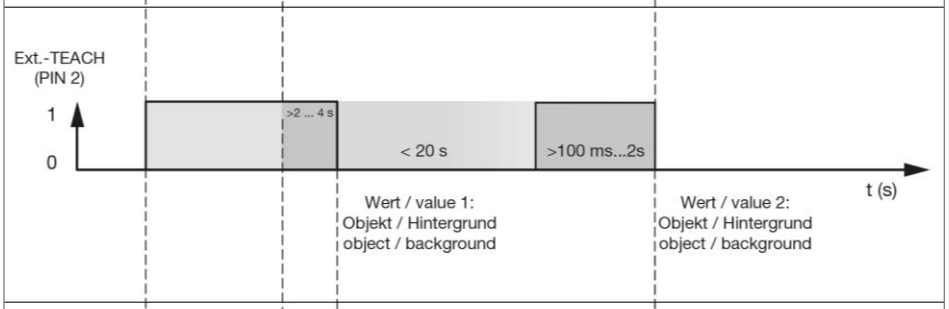
    If the status LED is flashing twice, the teach process was successful and the sensor is working with the new values.
    If the status LED is flashing four times, the teach process has been aborted or the time window of 20 seconds has been exceeded. The sensor operates with maximum measuring range.

On the following page the descriptions are shown again graphically.

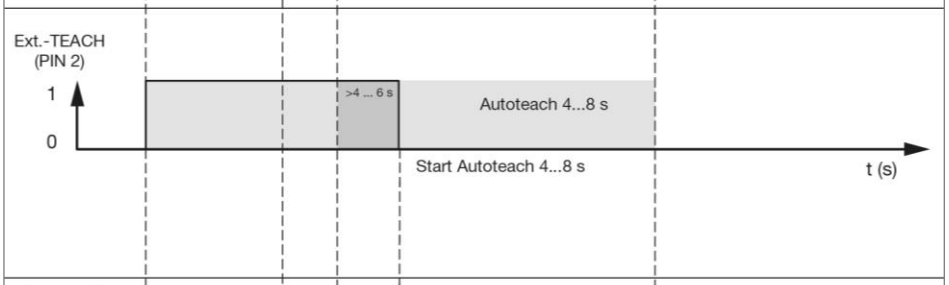
1. Teach-in of a switching window



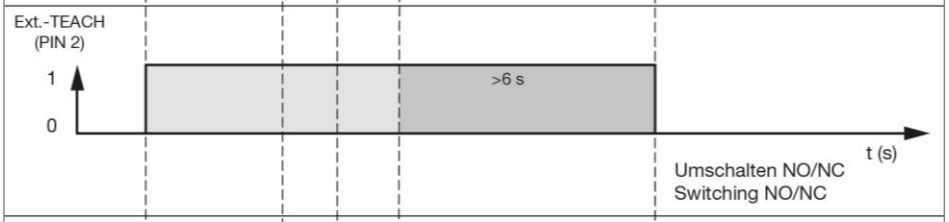
2. Teach-in of an object with background suppression (2-point teach)



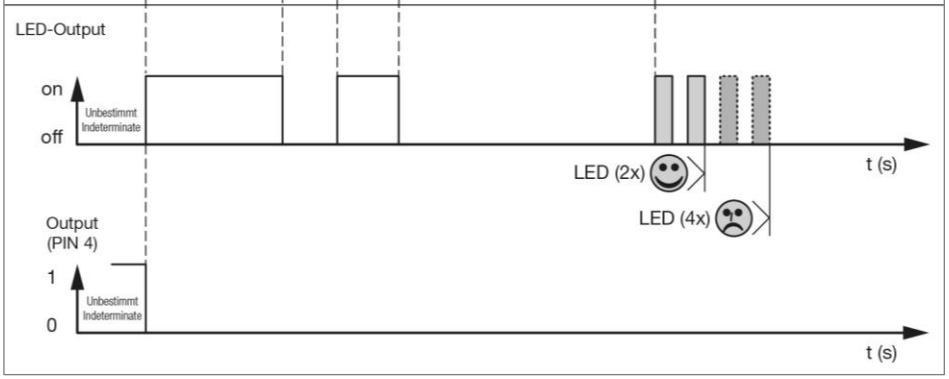
3. Automatic teach-in (Auto-Teach)



4. Change switching function



5. LED display after each teach process



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

SAFETY INSTRUCTIONS:

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.