

**UT089570**

sensor ultrasonic  
diffuse-reflection sensor

- / setting via teach-in**
- / 3 different teach modes**
- / push-pull switching output**
- / connector M8**

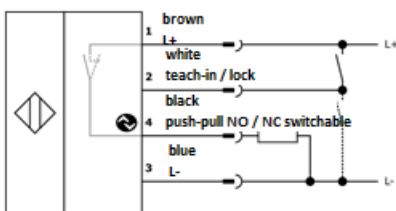


**IO-Link-interface**  
**Make contact / break contact switchable**

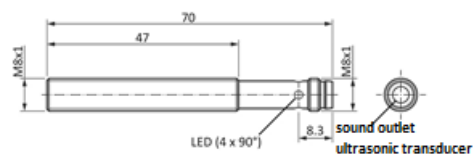
**TECHNICAL DATA**

scanning range	20 ... 100mm
operating voltage $U_B$	18 ... 30V DC
switching output	push-pull, no/nc switchable
output current (max. load)	150mA
short-circuit proof	+
reverse polarity protected	+
voltage drop	2.0V DC
switching frequency	20Hz
current consumption (without load)	30mA
standard measuring plate	20 x 20mm
resolution	0.1mm
repeat accuracy	0.3mm
hysteresis	1 ... 5mm (adjustable via IO-Link)
mounting distance (sensor to sensor)	60mm
setting	teach-in
carrier frequency	484kHz
protection class	III
insulation dielectric strength	500V
degree of protection (EN 60529)	IP 67
housing material	brass nickel plated
temperature (operation)	0 ... +50°C
temperature drift	0.2%/K (uncompensated)
connection	M8 connector 4-pin
connection accessories	e.g. <b>VK200375</b>

**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.

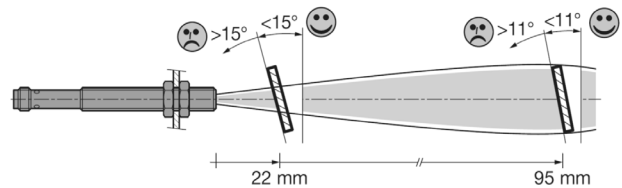
**Temperature**

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 scanned up to an angle of inclination of approx. 15° at 22mm and approx. 11° at 95mm scanning range. 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 ... 20mm in front of the sensor corresponds to the ultrasonic typical blind range.

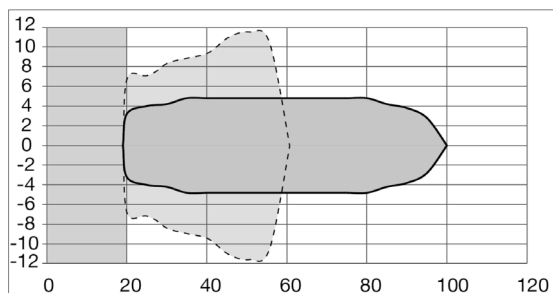
Distance measurements in the blind range are not possible!

The maximum scanning distance is 100mm.

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 beam**



— Plate 20 x 20mm  
 - - - - - Round bar Ø 10mm

Minimum distance

## Cleaning

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

## Commissioning and setting

The measuring range is taught-in and the analog output is switched over by connecting the black wire (PIN2) to 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 (20 ... 100mm). In normal operation, connect the teach line to 0V to avoid interference.

### 1. Teach-in of the measuring range

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 is blinking 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.

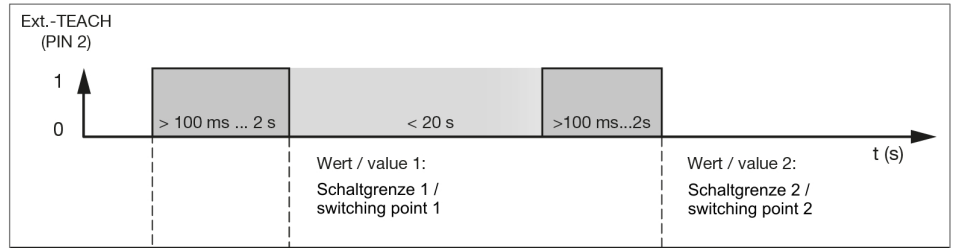
### 5. LED display after each teach process

If the status LED is blinking twice, the teach process was successful and the sensor is working with the new values.

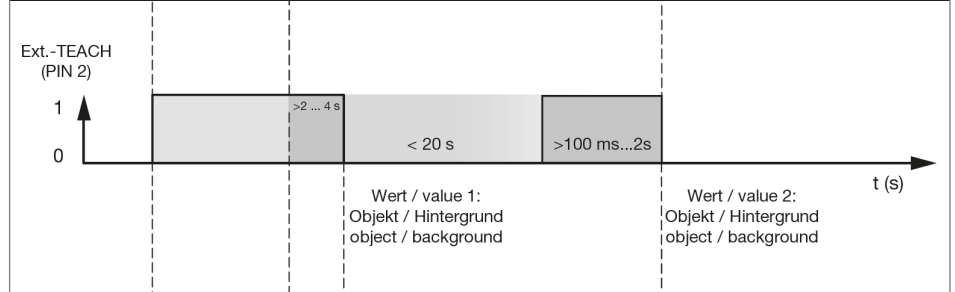
If the status LED is blinking four times, the teach process has been aborted or the time window of 20 seconds has been exceeded. The sensor operates with maximum switching distance as a normally open contact.

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

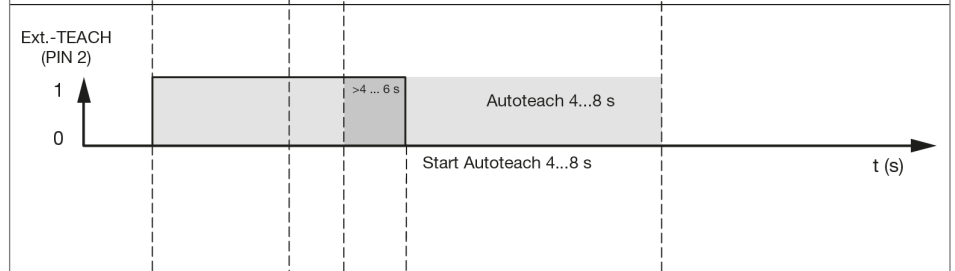
**1. Teach-in of the measuring range**



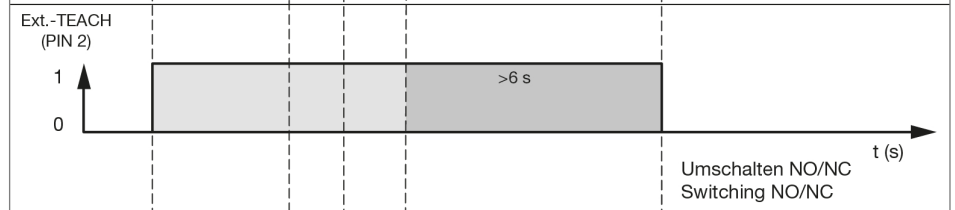
**2. Teaching an object with background suppression (2-point teach)**



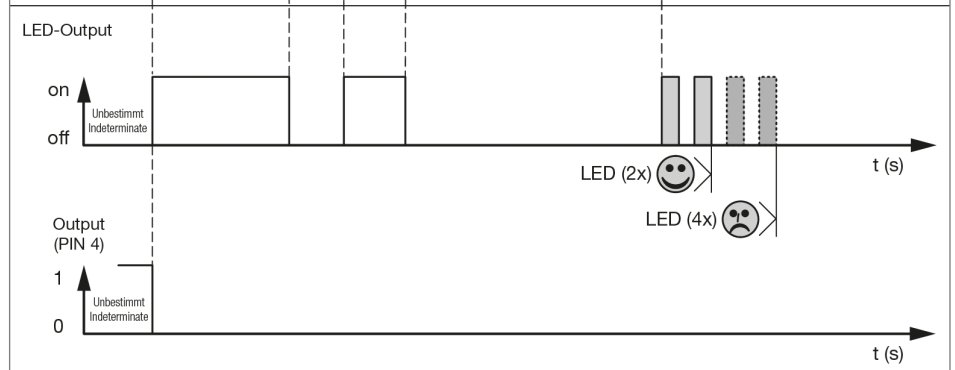
**3. Automatic teach-in (Auto-Teach)**



**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.