

UT129520

Ultrasonic sensors
Diffuse-reflection sensors

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

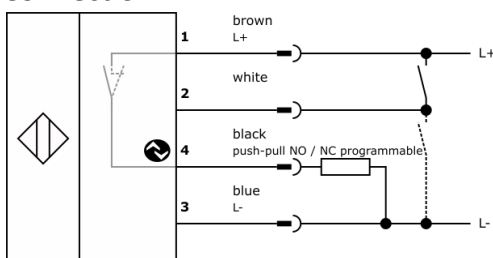


IO-Link-Interface
Normally open contact / normally closed contact switchable

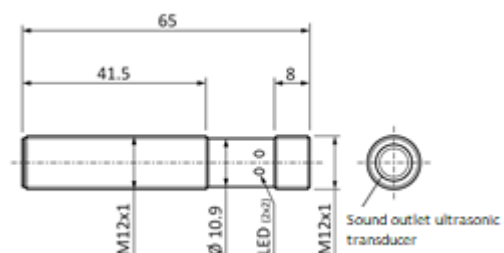
TECHNICAL DATA

Scanning range	20 ... 200mm
Operating voltage U _B	18 ... 30V DC
Switching output	Push-Pull, no/nc switchable
Output current (max. load)	150mA
Short-circuit proof	+
Reverse polarity protection	+
Voltage drop	2.0V DC
Switching frequency	20Hz
No load current	40mA
Norm measuring plate	100 x 100mm
Resolution	1mm
Repeat accuracy	0.5mm
Hysteresis	2 ... 20mm (adjustable via IO-Link)
Mounting distance (Sensor to Sensor)	60mm
Setting	Teach-in
Carrier frequency	400kHz
Protection class	III
Insulation dielectric strength	500V
Degree of protection (EN 60529)	IP 67
Housing material	Brass nickel plated
Ambient temperature	-25 ... +70°C
Temperature drift	0.2%/K (uncompensated)
Connection	M12-connector 4-pole
Mounting accessories	For example VK200325

Connection



Dimensional drawing



Intended use

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

Function

The diffuse-reflection 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 diffuse-reflection sensor can be mounted in any position; however, a vibration-free or vibration-dampening assembly must be observed. The diffuse-reflection sensor has to be protected against mechanical loads for example shocks and impacts.

The transducer surface as well as the field of the sound cone must be kept free mandatorily. You need to pay attention on having no disturbing objects between the sensor and the target object within the sound cone. Otherwise the sensor will detect the disturbing object instead of the target object required. Also, avoid positioning two or more ultrasonic sensors opposite each other.

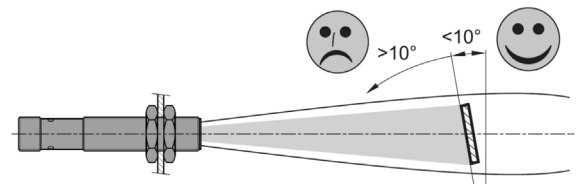
Temperature

The speed of sound in air depends on the temperature. Operation outside the specified temperature range 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. 10°. The max. allowed tilting angle increases on objects with a rough or heavy structured (granular) surface.



Blind range in diffuse mode

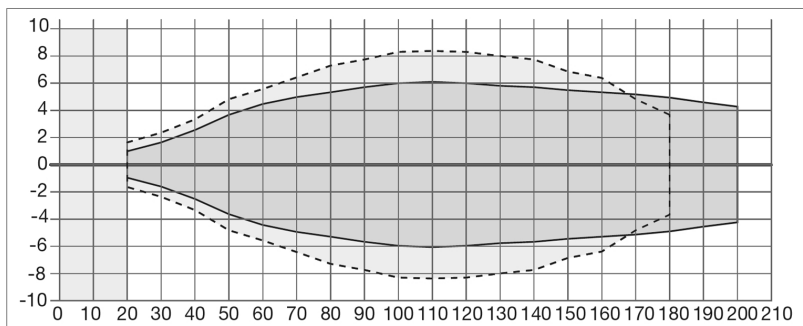
The lower detection field of 0 ... 20mm is in accordance with the ultrasonic-typical blind zone.

Distance measurements within the blind zone are not possible! The max. detection range is 200mm.

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



— Plate 100 x 100mm
 - - - Round bar Ø 10mm

■ = Minimum distance

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 output takes place via the connection of the white wire (PIN2) 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 (20 ... 200mm).

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 point 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 point 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 sound cone 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 the object and the 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.

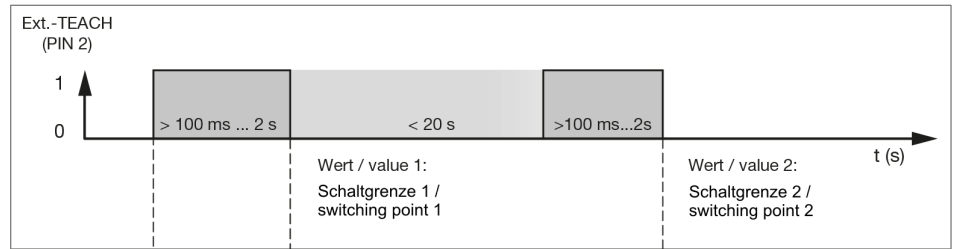
5. LED display after each teach process

If the status LED flashes twice, the teach process was successful and the sensor operates with the new values.

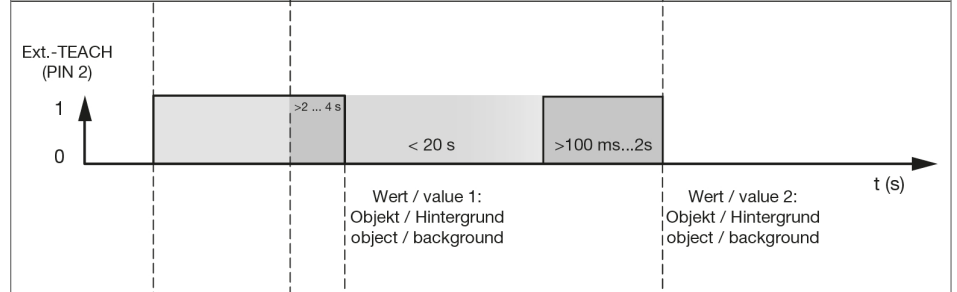
If the status LED flashes four times, the teach process has been aborted or the time window of 20 seconds has been exceeded. The sensor operates with maximum switching distance as a normally open contact.

On the following page the descriptions are shown again graphically.

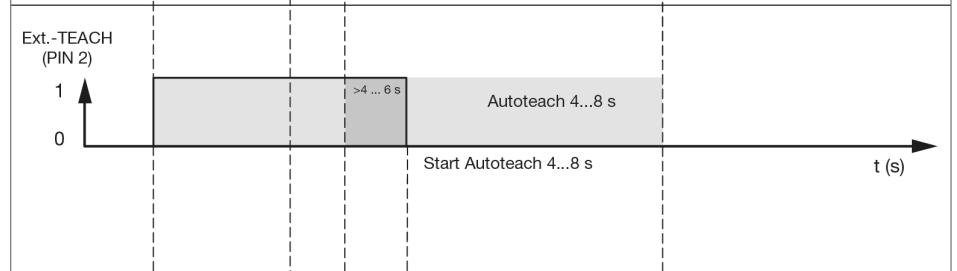
1. Teach-in of a switching window



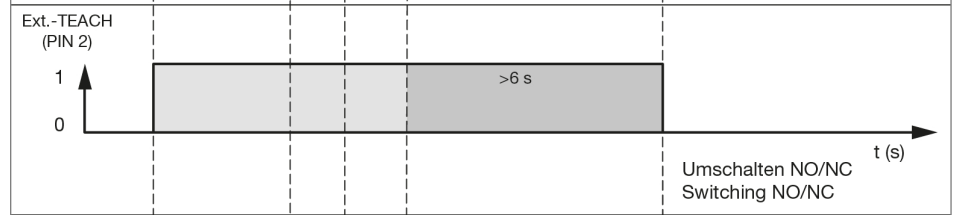
2. Teach-in of an object with background suppression (2-point teach)



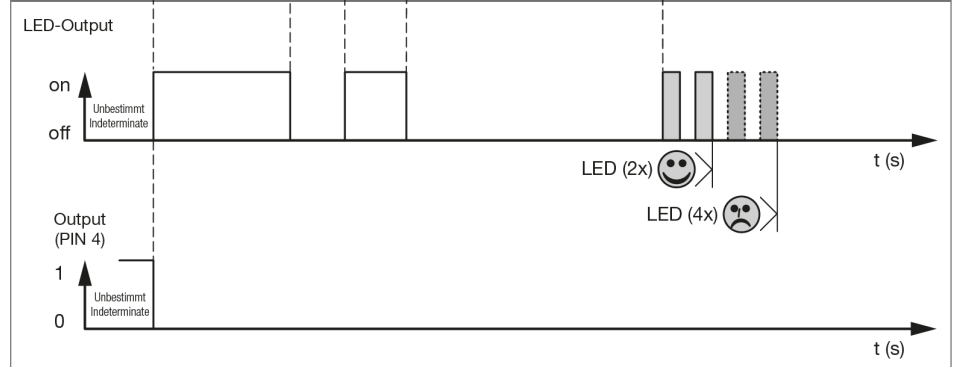
3. Automatic teach-in (Auto-teach)



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.