



Operating Instructions

Fast ultrasonic proximity switch with one switched output

zws-7/CD/QS zws-7/CE/QS
zws-15/CD/5ms.a zws-15/CE/5ms.a

Product Description

The zws sensor offers a non-contact measurement of the distance to an object which must be positioned within the sensor's detection zone.

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The switched output is set in dependence of the adjusted detect distance.

Due to the short response time and the high switching frequency these zws sensors are applicable to the detection of quick processes. For the zws-7, the faster variant, please see the notes for installation and operation.

Via the push-button, the detect distance and operating mode can be adjusted (teach-in). Two LEDs indicate operation and the state of the switched output.

Safety Notes

- Read the operating instructions prior to start-up.
- Connection, installation and adjustment works may only be carried out by expert personnel.
- No safety component in accordance with the EU Machine Directive.

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Installation

- Mount the sensor at the installation site with the aid of the enclosed mounting plate. Maximum torque of attachment screw: 0,5 Nm

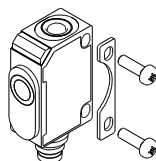


Fig. 1: Attachment with mounting plate

Start-Up

- Connect the power supply.
- Carry out the adjustment in accordance with the diagram.

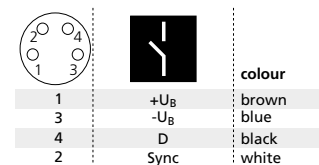


Fig. 2: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cable

Factory Setting

- Operation with one detect point
- Switched output on NOC
- Detect points at operating range

Operating modes

Three operating modes are available for the switched output:

- Operation with one detect point: The switched output is set if the object falls below the set detect point.
- Window mode: The switched output is set if the object is within the set window margins.
- Two-way reflective barrier: The switched output is set if the object is between sensor and reflector.

Synchronization

You can synchronize as many sensors as you like.

- Apply a square-wave signal to the sync-input with pulse width t_i and repetition rate t_p (Fig.3 and technical data).

A high level on the sync-input will deactivate the sensor.

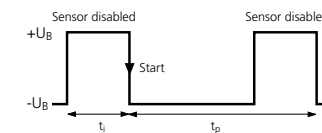


Fig. 3: External synchronization signal

Checking operation mode

- In normal mode shortly press the push-button. The green LED stops shining for one second, then it will show the current operating mode:

- 1 x flashing = operation with one switching point
 - 2 x flashing = window mode
 - 3 x flashing = reflective barrier
- After a break of 3 s the green LED shows the output function:
- 1 x flashing = NOC

Maintenance

microsonic sensors are maintenance-free. In case of excess caked-on dirt we recommend cleaning the white sensor surface.

Notes

- The zws sensor has a blind zone, within which distance measurements are not possible.
- In the normal operating mode, an illuminated yellow LED signals the switched output is switched through.
- The sensor got to know the distance to the object at the teach-in stage. For objects that move into the sound field from the side, an 8-10 % greater distance should be set for reliable object detection by the sensor.

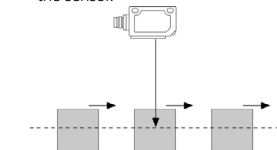
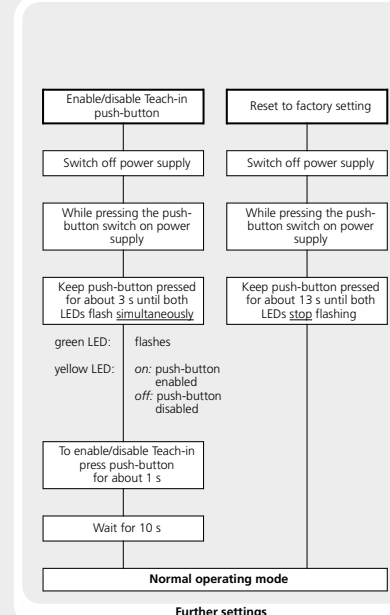
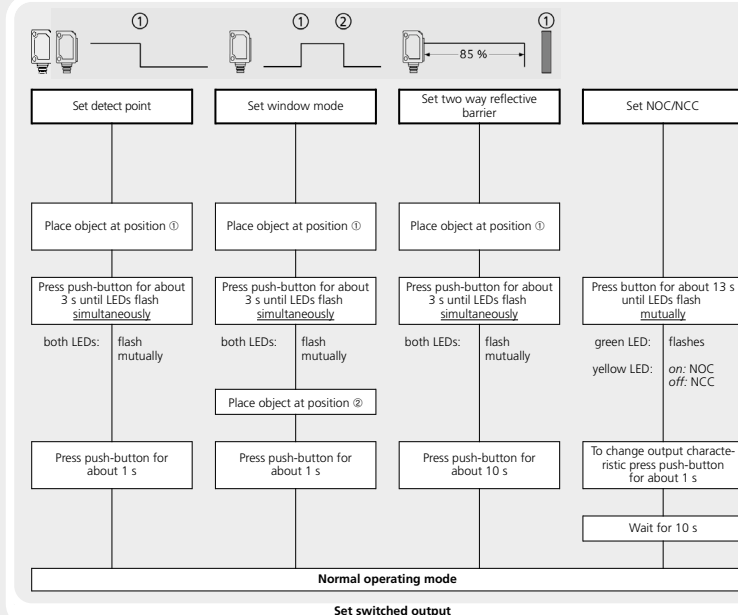


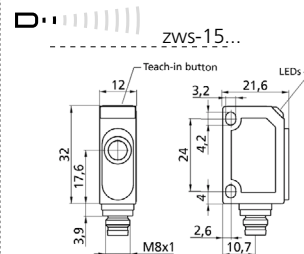
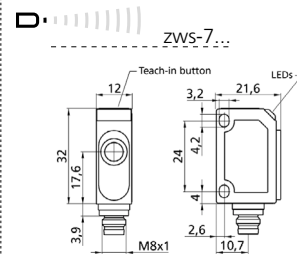
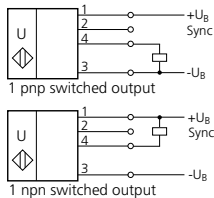
Fig. 4: Setting the switching point

- The zws-7 has a very short measurement cycle time of only 2 ms. Under unfavourable conditions this can lead to the sensor wrongly responding to echoes from exis-

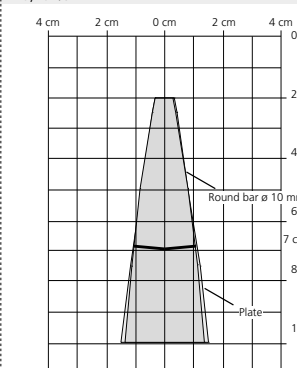
Sensor adjustment with Teach-in procedure



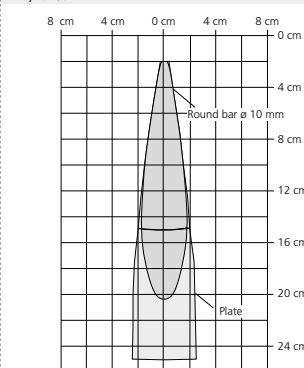
Technical data



blind zone 20 mm
operating range 70 mm
maximum range 100 mm
angle of beam spread See detection zone
transducer frequency 380 kHz
resolution, sampling rate 0,20 mm
reproducibility $\pm 0,15 \%$



blind zone 20 mm
operating range 150 mm
maximum range 250 mm
angle of beam spread See detection zone
transducer frequency 380 kHz
resolution, sampling rate 0,20 mm
reproducibility $\pm 0,15 \%$



accuracy Temperature drift 0,17 % / °C
operating voltage U_B 20 - 30 V DC, reverse polarity protection
voltage ripple $\pm 10 \%$
no-load current consumption < 30 mA
housing ABS
 ultrasonic transducer: polyurethane foam, epoxy resin with glass content
class of protection to EN 60 529 IP 67
type of connection 4-pin M8 initiator plug
controls Yes, Teach-in push-button
indicators LED green (operation)
 LED yellow (state of output)
programmable No
synchronisation Yes, external
pulse width synchronization signal t_p > 150 μ s
repetition rate synchronization signal t_p 2 ms < t_p < 1 s
operating temperature -25°C to +70°C
storage temperature -40°C to +85°C
weight 10 g
switching hysteresis 2 mm
switching frequency 250 Hz
response time < 3 ms
switch-off delay time < 3 ms
time delay before availability < 300 ms
norm conformity EN 60947-5-2

order no. zws-7/CD/Q5
switched output pnp, $U_B=2$ V, $I_{max} = 200$ mA
 switchable NOC/NCC, short-circuit-proof

order no. zws-7/CE/Q5
switched output npn, $-U_B+2$ V, $I_{max} = 200$ mA
 switchable NOC/NCC, short-circuit-proof

accuracy Temperature drift 0,17 % / °C
operating voltage U_B 20 - 30 V DC, reverse polarity protection
voltage ripple $\pm 10 \%$
no-load current consumption < 30 mA
housing ABS
 ultrasonic transducer: polyurethane foam, epoxy resin with glass content
class of protection to EN 60 529 IP 67
type of connection 4-pin M8 initiator plug
controls Yes, Teach-in push-button
indicators LED green (operation)
 LED yellow (state of output)
programmable No
synchronisation Yes, external
pulse width synchronization signal t_p > 150 μ s
repetition rate synchronization signal t_p 5 ms < t_p < 1 s
operating temperature -25°C to +70°C
storage temperature -40°C to +85°C
weight 10 g
switching hysteresis 2 mm
switching frequency 100 Hz
response time < 7 ms
switch-off delay time < 7 ms
time delay before availability < 300 ms
norm conformity EN 60947-5-2

order no. zws-15/CD/5ms.a
switched output pnp, $U_B=2$ V, $I_{max} = 200$ mA
 switchable NOC/NCC, short-circuit-proof

order no. zws-15/CE/5ms.a
switched output npn, $-U_B+2$ V, $I_{max} = 200$ mA
 switchable NOC/NCC, short-circuit-proof

ting measurements. To avoid this, there has to be an unobstructed space extending to a depth of 500 mm in front of the sensor. Only the objects to be detected are to be within the sensor's 20-100 mm operating area.

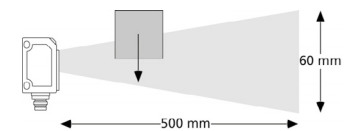


Fig. 5: Unobstructed space in front of the sensor

- With the zws-7, it is vital that the objects to be detected enter the sound fields from the sides.
- If the unobstructed 500 mm space cannot be provided or should the sensor be used in the «Two-way reflective barrier» mode, then a plane reflector at a specific distance to the sensor must be fitted. The size of the reflector and its working clearance from the sensor can be taken from the table in Fig.7.

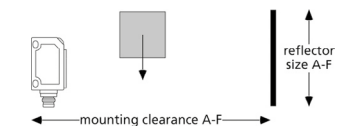


Fig. 6: Sensor/reflector working clearance

| | | |
|---|--------|---------------|
| A | 366 mm | 60 mm x 60 mm |
| B | 194 mm | 60 mm x 60 mm |
| C | 137 mm | 50 mm x 50 mm |
| D | 108 mm | 40 mm x 40 mm |
| E | 91 mm | 40 mm x 40 mm |
| F | 79 mm | 30 mm x 30 mm |

Fig. 7: Working clearance and reflector sizes

- In the »Two-way reflective barrier« operating mode, the object has to be within the range of 0-85 % of the set distance.
- The zws-7 sensor has no temperature compensation.
- If the push-button is not pressed for 2 minutes during the teach-in setting, the settings made hitherto are deleted.
- The sensor can be reset to its factory setting.



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