



**Operating Instructions**

- zws-15/CD/QS    zws-15/CE/QS
- zws-24/CD/QS    zws-24/CE/QS
- zws-25/CD/QS    zws-25/CE/QS
- zws-70/CD/QS    zws-70/CE/QS

**Ultrasonic proximity switch with one switched output**

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

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

**Proper use**

zws ultrasonic sensors are used for non-contact detection of objects.

**Installation**

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

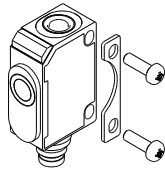


Fig. 1: Attachment with mounting plate

- Connect a connection cable to the M8 device plug.
- Avoid mechanical load on the connector.

1	+U <sub>B</sub>	brown
3	-U <sub>B</sub>	blue
4	D	black
2	Sync	white

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

**Start-Up**

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

**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<sub>i</sub> and repetition rate t<sub>p</sub> (Fig.3 and technical data).

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

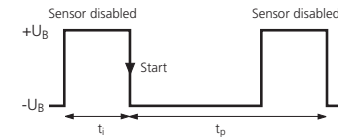


Fig.3: External synchronization signal

**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:

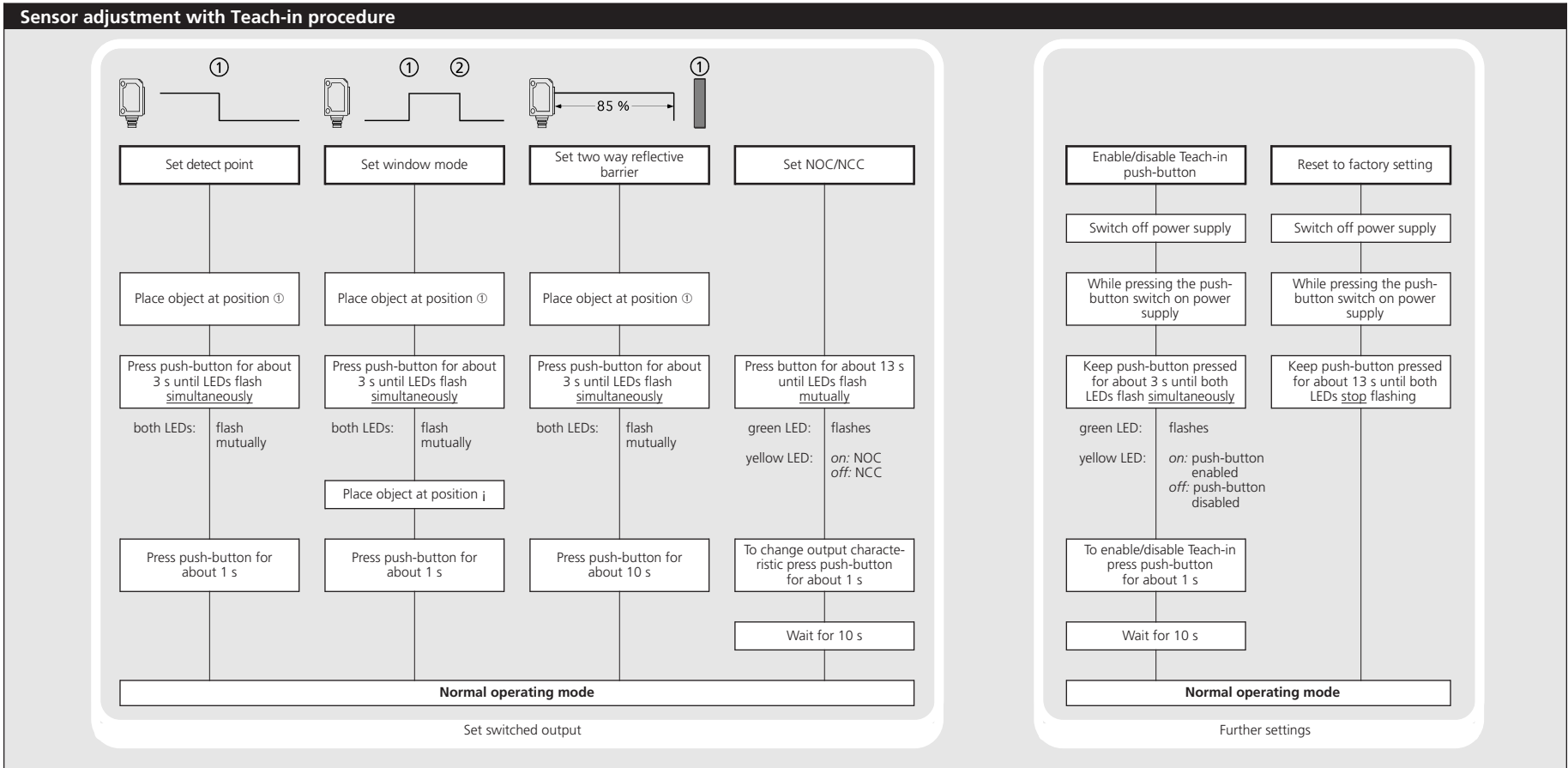
- 1 x flashing = NOC
- 2 x flashing = NCC

**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 standard sensor has no temperature compensation.
- If the object to be sensed moves into the detection area from the side, the switching distance should be set 8-10 % further than the desired switch point to obtain a reliable object detection. If the object moves towards the sensor (e.g. level control) the detect point can be taught to the actual distance at which the sensor has to switch the output.



# Technical data

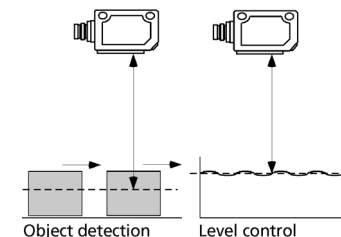
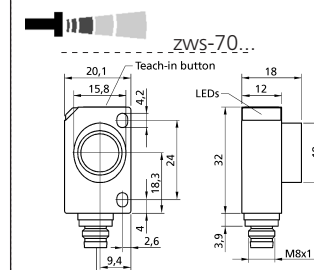
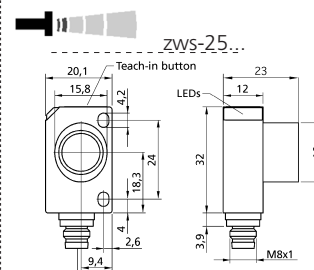
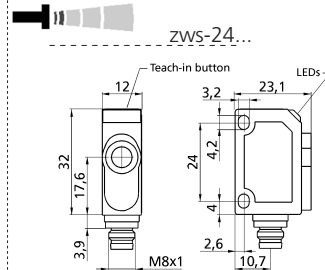
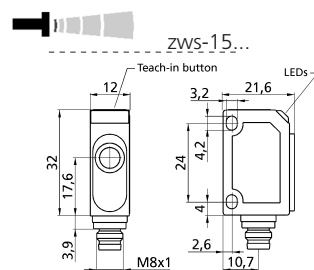
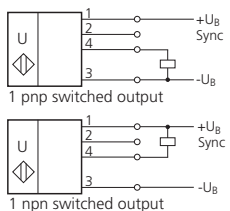


Fig. 4: Set the detect point for different directions of movement of the object

- In the »Two-way reflective barrier« operating mode, the object has to be within the range of 0-85 % of the set distance.
- If the push-button is not pressed for 10 minutes during the teach-in setting, the settings made hitherto are deleted.
- The sensor can be reset to its factory setting.

**Blind zone**  
**Operating range**  
**Maximum range**  
**Angle of beam spread**  
**Transducer frequency**  
**Resolution, sampling rate**  
**Reproducibility**

20 mm  
150 mm  
250 mm  
See detection zone  
380 kHz  
0,20 mm  
± 0,15 %

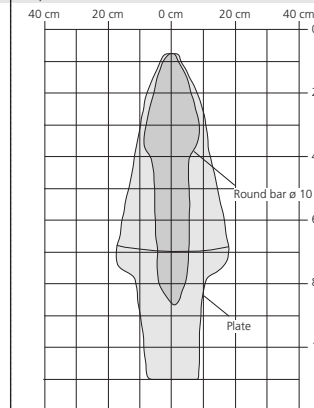
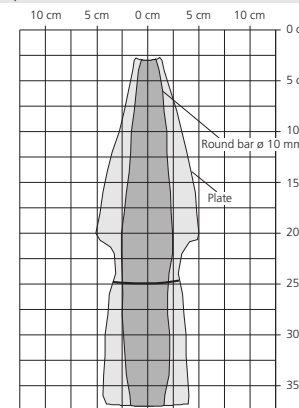
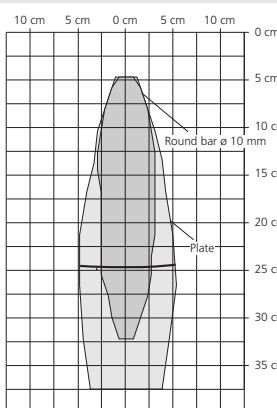
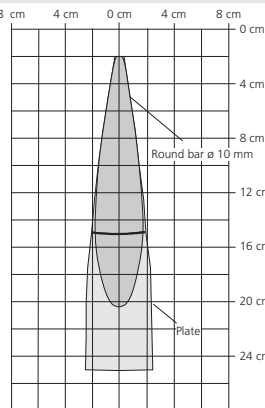
50 mm  
240 mm  
350 mm  
See detection zone  
500 kHz  
0,20 mm  
± 0,15 %

30 mm  
250 mm  
350 mm  
See detection zone  
320 kHz  
0,20 mm  
± 0,15 %

120 mm  
700 mm  
1000 mm  
See detection zone  
300 kHz  
0,20 mm  
± 0,15 %

**Detection zones**

for different objects:  
The dark grey areas are determined with a thin round bar (10 mm dia.) and indicate the typical operating range of a sensor. In order to obtain the light grey areas, a plate (100 x 100 mm) is introduced into the beam spread from the side. In doing so, the optimum angle between plate and sensor is always employed. This therefore indicates the maximum detection zone of the sensor. It is not possible to evaluate ultrasonic reflections outside this area.



**Accuracy**  
**Operating voltage U<sub>B</sub>**  
**Voltage ripple**  
**No-load current consumption**  
**Housing**

Temperature drift 0,17 % / °C  
20 - 30 V DC, reverse polarity protection  
±10 %  
< 25 mA  
ABS

Temperature drift 0,17 % / °C  
20 - 30 V DC, reverse polarity protection  
±10 %  
< 35 mA  
ABS

Temperature drift 0,17 % / °C  
20 - 30 V DC, reverse polarity protection  
±10 %  
< 35 mA  
ABS

Temperature drift 0,17 % / °C  
20 - 30 V DC, reverse polarity protection  
±10 %  
< 35 mA  
ABS

**Class of protection to EN 60 529**

**Type of connection**  
**Controls**  
**Indicators**

IP 67  
4-pin M8 initiator plug  
Yes, Teach-in push-button  
LED green (operation)  
LED yellow (state of output)

IP 67  
4-pin M8 initiator plug  
Yes, Teach-in push-button  
LED green (operation)  
LED yellow (state of output)

IP 67  
4-pin M8 initiator plug  
Yes, Teach-in push-button  
LED green (operation)  
LED yellow (state of output)

IP 67  
4-pin M8 initiator plug  
Yes, Teach-in push-button  
LED green (operation)  
LED yellow (state of output)

**Programmable**

**Synchronisation**

**Pulse width synchronization signal t<sub>p</sub>**

**Repetition rate synchronization signal t<sub>r</sub>**

**Operating temperature**

**Storage temperature**

**Weight**

**Switching hysteresis**

**Switching frequency**

**Response time**

**Time delay before availability**

**Norm conformity**

No  
Yes, external  
> 150 µs  
8 ms < t<sub>p</sub> < 1 s  
-25°C to +70°C  
-40°C to +85°C  
10 g  
2 mm  
25 Hz  
24 ms  
< 300 ms  
EN 60947-5-2

No  
Yes, external  
> 150 µs  
10 ms < t<sub>p</sub> < 1 s  
-25°C to +70°C  
-40°C to +85°C  
10 g  
2 mm  
25 Hz  
24 ms  
< 300 ms  
EN 60947-5-2

No  
Yes, external  
> 150 µs  
10 ms < t<sub>p</sub> < 1 s  
-25°C to +70°C  
-40°C to +85°C  
11 g  
2 mm  
31 Hz  
20 ms  
< 300 ms  
EN 60947-5-2

No  
Yes, external  
> 150 µs  
14 ms < t<sub>p</sub> < 1 s  
-25°C to +70°C  
-40°C to +85°C  
11 g  
2 mm  
11 Hz  
36 ms  
< 300 ms  
EN 60947-5-2

**Order no.**

**Switched output**

**Order no.**

**Switched output**

**zws-15/CD/QS**  
pnp, U<sub>B</sub>-2 V, I<sub>max</sub> = 200 mA  
switchable NOC/NCC, short-circuit-proof

**zws-15/CE/QS**  
npn, -U<sub>B</sub>+2 V, I<sub>max</sub> = 200 mA  
switchable NOC/NCC, short-circuit-proof

**zws-24/CD/QS**  
pnp, U<sub>B</sub>-2 V, I<sub>max</sub> = 200 mA  
switchable NOC/NCC, short-circuit-proof

**zws-24/CE/QS**  
npn, -U<sub>B</sub>+2 V, I<sub>max</sub> = 200 mA  
switchable NOC/NCC, short-circuit-proof

**zws-25/CD/QS**  
pnp, U<sub>B</sub>-2 V, I<sub>max</sub> = 200 mA  
switchable NOC/NCC, short-circuit-proof

**zws-25/CE/QS**  
npn, -U<sub>B</sub>+2 V, I<sub>max</sub> = 200 mA  
switchable NOC/NCC, short-circuit-proof

**zws-70/CD/QS**  
pnp, U<sub>B</sub>-2 V, I<sub>max</sub> = 200 mA  
switchable NOC/NCC, short-circuit-proof

**zws-70/CE/QS**  
npn, -U<sub>B</sub>+2 V, I<sub>max</sub> = 200 mA  
switchable NOC/NCC, short-circuit-proof

