



dependence of the set window limits, a distance-proportional analogue signal is output.

Via the push-button, the window limits of the analogue output and its characteristic can be adjusted (teach-in). Two LEDs indicate operation and the state of the analogue 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

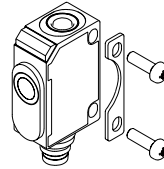


Fig. 1: Attachment with mounting plate

- Connect a connection cable to the M8 device plug.

	1	+U <sub>B</sub>	brown
	3	-U <sub>B</sub>	blue
	4	I   U	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**

- Rising analogue characteristic curve between the blind zone and the operating range

**Synchronisation**

You can synchronise 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.

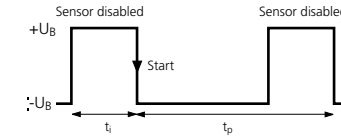


Fig.3: External synchronisation signal

**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 characteristic of the analogue output:

- 1 x flashing = rising
- 2 x flashing = falling

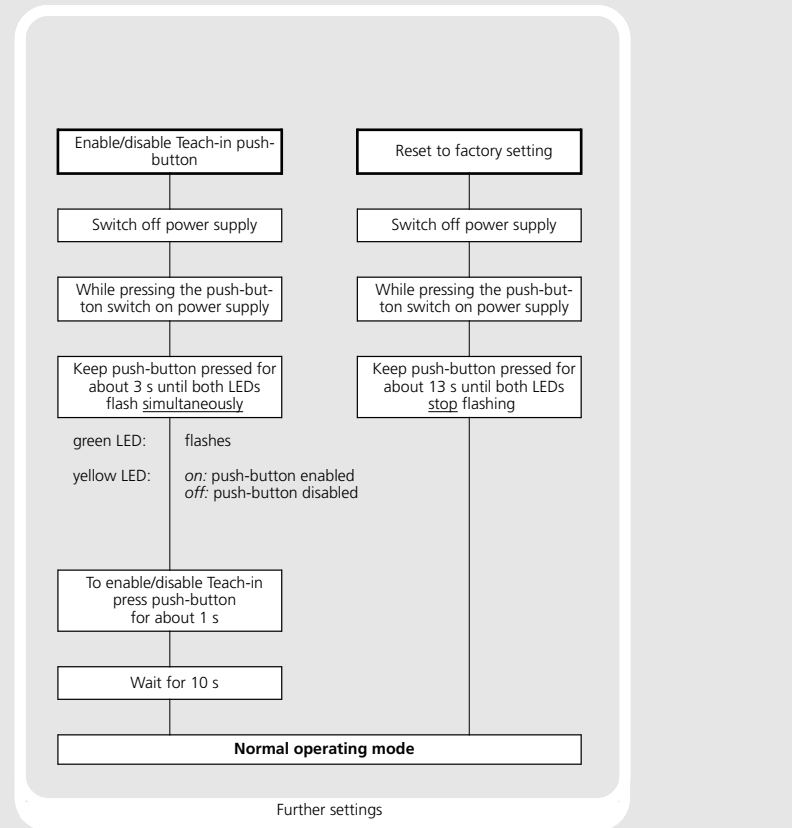
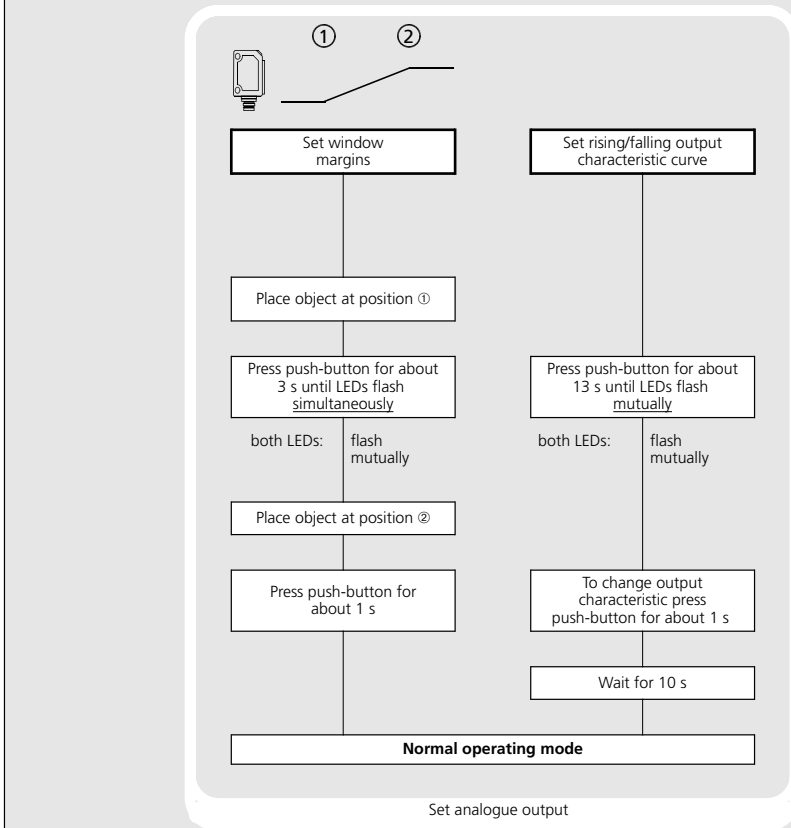
**Maintenance**

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

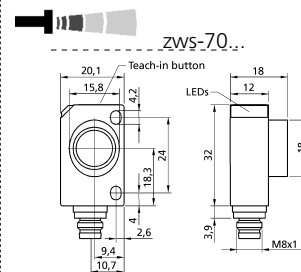
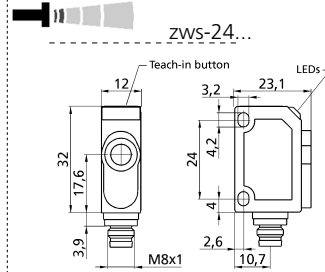
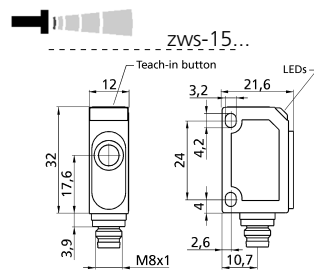
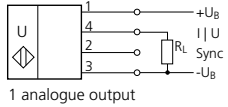
**Notes**

- The zws sensor has a blind zone, within which distance measurements are not possible.
- The zws sensor is equipped with an internal temperature compensation. Due to the sensor's self-heating, the temperature compensation reaches its optimum working point after approx. 30 minutes of operation.
- In the normal operating mode, an illuminated yellow LED signals the object is within the adjusted window limits.
- If the push-button is not pressed for 30 seconds during the teach-in setting, the settings made hitherto are deleted.
- The sensor can be reset to its factory setting.

**Sensor adjustment with Teach-in procedure**

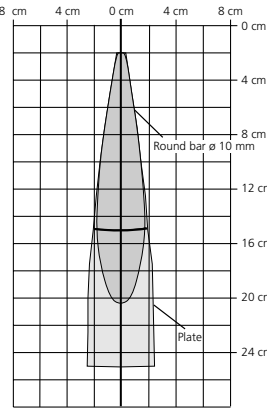


# Technical data

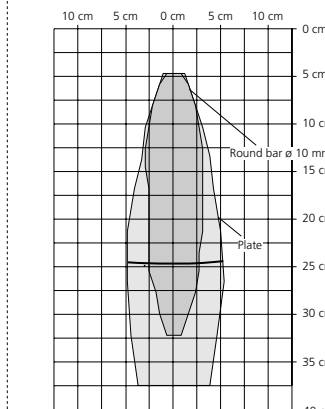


**Blind zone** 20 mm  
**Operating range** 150 mm  
**Maximum range** 250 mm  
**Angle of beam spread** See detection zone  
**Transducer frequency** 380 kHz  
**Resolution, sampling rate** 0,20 mm  
**Reproducibility** ± 0,15 %

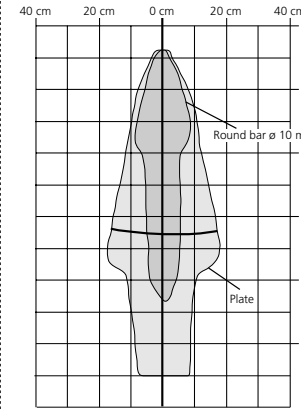
**Detection zones** for different objects:  
 The dark grey areas are determined with a thin round bar (10 mm dia.) and indicate the typical operating range of a sensor. In order to obtain the light grey areas, a plate (100 x 100 mm) is introduced into the beam spread from the side. In doing so, the 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.



**Blind zone** 50 mm  
**Operating range** 240 mm  
**Maximum range** 350 mm  
**Angle of beam spread** See detection zone  
**Transducer frequency** 500 kHz  
**Resolution, sampling rate** 0,20 mm  
**Reproducibility** ± 0,15 %



**Blind zone** 120 mm  
**Operating range** 700 mm  
**Maximum range** 1000 mm  
**Angle of beam spread** See detection zone  
**Transducer frequency** 310 kHz  
**Resolution, sampling rate** 0,20 mm  
**Reproducibility** ± 0,15 %



**Accuracy** Temperature drift internal compensated, ≤ 2 %  
**Operating voltage U<sub>B</sub>** 20 – 30 V DC, reverse polarity protection  
**Voltage ripple** ±10 %  
**No-load current consumption** < 25 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  
**Pulsbreite Synchronisations-Signal t<sub>p</sub>** > 150 µs  
**Wiederholrate Synchronisations-Signal t<sub>p</sub>** 8 ms < t<sub>p</sub> < 1 s  
**Operating temperature** -25°C to +70°C  
**Storage temperature** -40°C to +85°C  
**Weight** 10 g  
**Response time** 24 ms  
**Time delay before availability** < 300 ms  
**Norm conformity** EN 60947-5-2

**Accuracy** Temperature drift internal compensated, ≤ 2 %  
**Operating voltage U<sub>B</sub>** 20 – 30 V DC, reverse polarity protection  
**Voltage ripple** ±10 %  
**No-load current consumption** < 35 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  
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**Indicators** LED green (operation)  
 LED yellow (state of output)  
**Programmable** No  
**Synchronisation** Yes, external  
**Pulsbreite Synchronisations-Signal t<sub>p</sub>** > 150 µs  
**Wiederholrate Synchronisations-Signal t<sub>p</sub>** 10 ms < t<sub>p</sub> < 1 s  
**Operating temperature** -25°C to +70°C  
**Storage temperature** -40°C to +85°C  
**Weight** 10 g  
**Response time** 30 ms  
**Time delay before availability** < 300 ms  
**Norm conformity** EN 60947-5-2

**Accuracy** Temperature drift internal compensated, ≤ 2 %  
**Operating voltage U<sub>B</sub>** 20 – 30 V DC, reverse polarity protection  
**Voltage ripple** ±10 %  
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**Pulsbreite Synchronisations-Signal t<sub>p</sub>** > 150 µs  
**Wiederholrate Synchronisations-Signal t<sub>p</sub>** 14 ms < t<sub>p</sub> < 1 s  
**Operating temperature** -25°C to +70°C  
**Storage temperature** -40°C to +85°C  
**Weight** 11 g  
**Response time** 42 ms  
**Time delay before availability** < 300 ms  
**Norm conformity** EN 60947-5-2

**Accuracy** Temperature drift internal compensated, ≤ 2 %  
**Operating voltage U<sub>B</sub>** 20 – 30 V DC, reverse polarity protection  
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**Time delay before availability** < 300 ms  
**Norm conformity** EN 60947-5-2

**Order no.** zws-15/CI/QS  
**Analogue output 4 - 20 mA** R<sub>L</sub> ≤ 500 Ω  
 rising/falling characteristic  
**Order no.** zws-15/CU/QS  
**Analogue output 0 - 10 V** R<sub>L</sub> ≥ 100 kΩ, short-circuit-proof,  
 rising/falling characteristic

**Order no.** zws-24/CI/QS  
**Analogue output 4 - 20 mA** R<sub>L</sub> ≤ 500 Ω  
 rising/falling characteristic  
**Order no.** zws-24/CU/QS  
**Analogue output 0 - 10 V** R<sub>L</sub> ≥ 100 kΩ, short-circuit-proof,  
 rising/falling characteristic

**Order no.** zws-70/CI/QS  
**Analogue output 4 - 20 mA** R<sub>L</sub> ≤ 500 Ω  
 rising/falling characteristic  
**Order no.** zws-70/CU/QS  
**Analogue output 0 - 10 V** R<sub>L</sub> ≥ 100 kΩ, short-circuit-proof,  
 rising/falling characteristic

**Order no.** zws-70/CI/QS  
**Analogue output 4 - 20 mA** R<sub>L</sub> ≤ 500 Ω  
 rising/falling characteristic  
**Order no.** zws-70/CU/QS  
**Analogue output 0 - 10 V** R<sub>L</sub> ≥ 100 kΩ, short-circuit-proof,  
 rising/falling characteristic

