

within the sensor's detection zone. In 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.



- Operating manual**
- zws-15/CI/QS    zws-15/CU/QS
  - zws-24/CI/QS    zws-24/CU/QS
  - zws-70/CI/QS    zws-70/CU/QS

**Ultrasonic proximity switch with analogue output**

**Product Description**  
The zws sensor offers a non-contact measurement of the distance to an object which must be positioned

- 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

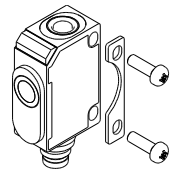


Fig. 1: Attachment with mounting plate

- 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	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

**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.

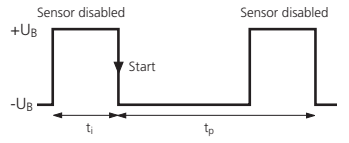


Fig. 3: External synchronization signal

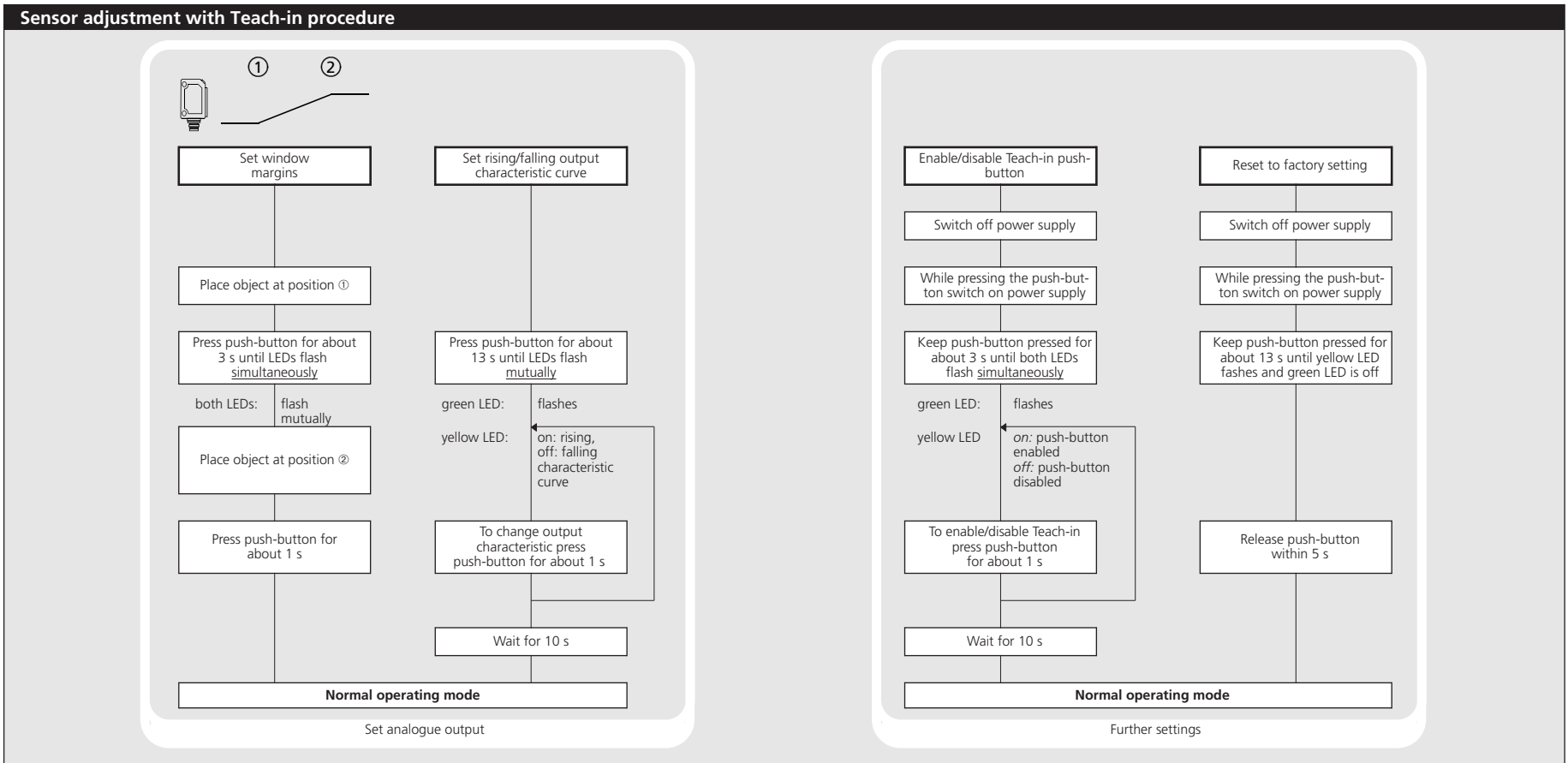
- Checking operation mode**
- In normal mode shortly press the push-button. The green LED stops shining for one

second, then it will show the current characteristic of the analogue output:

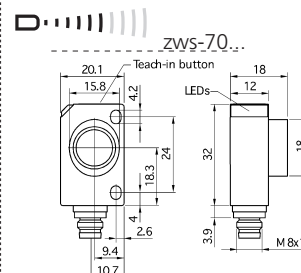
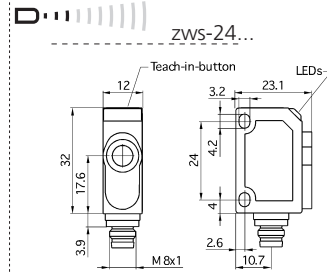
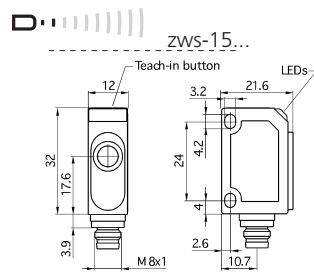
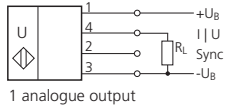
- 1 x flashing = rising
- 2 x flashing = falling

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

- Notes**
- Every time the power supply is switched on, the sensor detects its actual operating temperature and transmits it to the internal temperature compensation. This results in a slight correction of the analogue output value after 45 seconds.
  - If the sensor was switched off for at least 30 minutes and after power on an object is placed in the middle of the adjusted analogue window for 30 minutes (the analogue output value is in the range of 11 to 13 mA or 4.4 to 5.6 V) a new adjustment of the internal temperature compensation to the actual mounting conditions takes place.
  - 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 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.

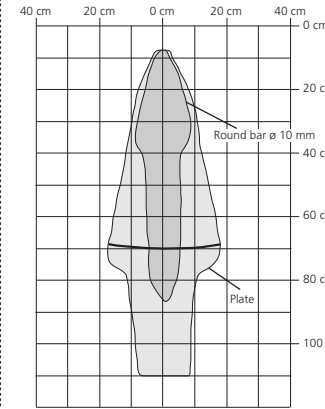
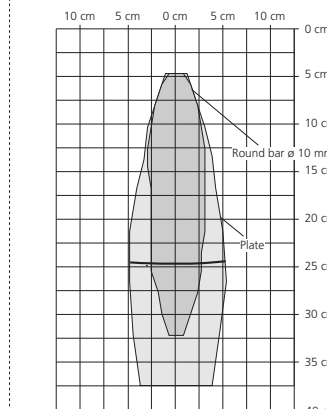
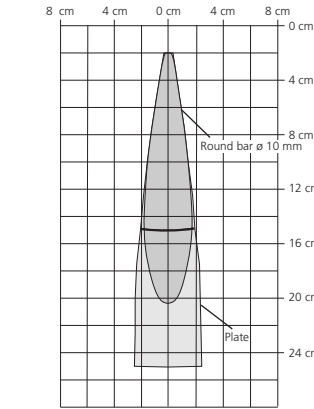


# Technical data



**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**:  $\pm 0.15\%$

**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**:  $\pm 1\%$  (temperature drift internal compensated)  
**operating voltage  $U_B$** : 20 – 30 V DC, reverse polarity protection  
**voltage ripple**:  $\pm 10\%$   
**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**: Teach-in push-button  
**indicators**: LED green (operation)  
LED yellow (object in the window)  
**synchronization**: external  
**pulse width synchronization signal  $t_i$** : > 150  $\mu$ s  
**repetition rate synchronization signal  $t_r$** : 8 ms <  $t_r$  < 1 s  
**operating temperature**: -25°C to +70°C  
**storage temperature**: -40°C to +85°C  
**weight**: 10 g  
**response time**: 50 ms  
**time delay before availability**: < 300 ms  
**norm conformity**: EN 60947-5-2

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**housing**: ABS  
ultrasonic transducer: polyurethane foam, epoxy resin with glass content  
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**type of connection**: 4-pin M8 initiator plug  
**controls**: Teach-in push-button  
**indicators**: LED green (operation)  
LED yellow (object in the window)  
**synchronization**: external  
**pulse width synchronization signal  $t_i$** : > 150  $\mu$ s  
**repetition rate synchronization signal  $t_r$** : 10 ms <  $t_r$  < 1 s  
**operating temperature**: -25°C to +70°C  
**storage temperature**: -40°C to +85°C  
**weight**: 10 g  
**response time**: 50 ms  
**time delay before availability**: < 300 ms  
**norm conformity**: EN 60947-5-2

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**operating voltage  $U_B$** : 20 – 30 V DC, reverse polarity protection  
**voltage ripple**:  $\pm 10\%$   
**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**: Teach-in push-button  
**indicators**: LED green (operation)  
LED yellow (object in the window)  
**synchronization**: external  
**pulse width synchronization signal  $t_i$** : > 150  $\mu$ s  
**repetition rate synchronization signal  $t_r$** : 14 ms <  $t_r$  < 1 s  
**operating temperature**: -25°C to +70°C  
**storage temperature**: -40°C to +85°C  
**weight**: 11 g  
**response time**: 70 ms  
**time delay before availability**: < 300 ms  
**norm conformity**: EN 60947-5-2

**order no.**: **zws-15/CI/QS**  
**analogue output 4 - 20 mA**:  $R_L \leq 500 \Omega$   
rising/falling characteristic

**order no.**: **zws-15/QU/QS**  
**analogue output 0 - 10 V**:  $R_L \geq 100 \text{ k}\Omega$ , short-circuit-proof,  
rising/falling characteristic

**order no.**: **zws-24/CI/QS**  
**analogue output 4 - 20 mA**:  $R_L \leq 500 \Omega$   
rising/falling characteristic

**order no.**: **zws-24/QU/QS**  
**analogue output 0 - 10 V**:  $R_L \geq 100 \text{ k}\Omega$ , short-circuit-proof,  
rising/falling characteristic

**order no.**: **zws-70/CI/QS**  
**analogue output 4 - 20 mA**:  $R_L \leq 500 \Omega$   
rising/falling characteristic

**order no.**: **zws-70/QU/QS**  
**analogue output 0 - 10 V**:  $R_L \geq 100 \text{ k}\Omega$ , short-circuit-proof,  
rising/falling characteristic

