

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. 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

Ultrasonic proximity switch with analogue output

- zws-15/CI/QS zws-15/CU/QS
- zws-24/CI/QS zws-24/CU/QS
- zws-25/CI/QS zws-25/CU/QS
- zws-35/CI/QS zws-35/CU/QS
- zws-70/CI/QS zws-70/CU/QS

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

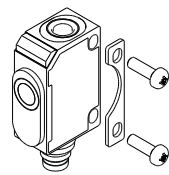


Fig. 1: Attachment with mounting plate

- Avoid mechanical load on the connector.

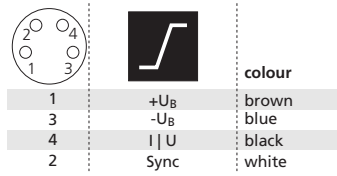


Fig. 2: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cable

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.

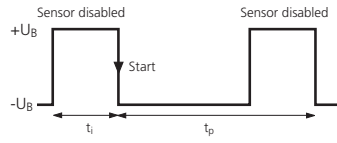


Fig. 3: External synchronization signal

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

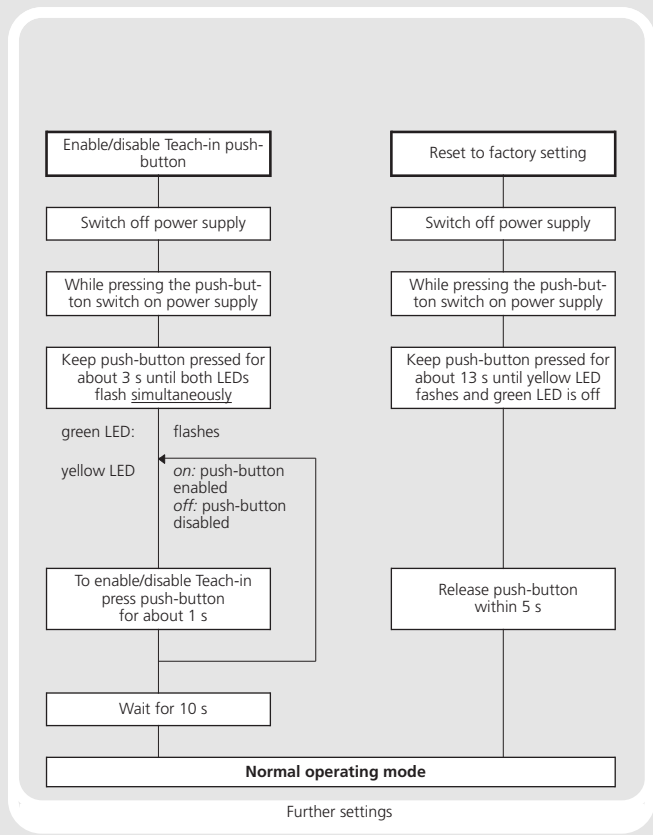
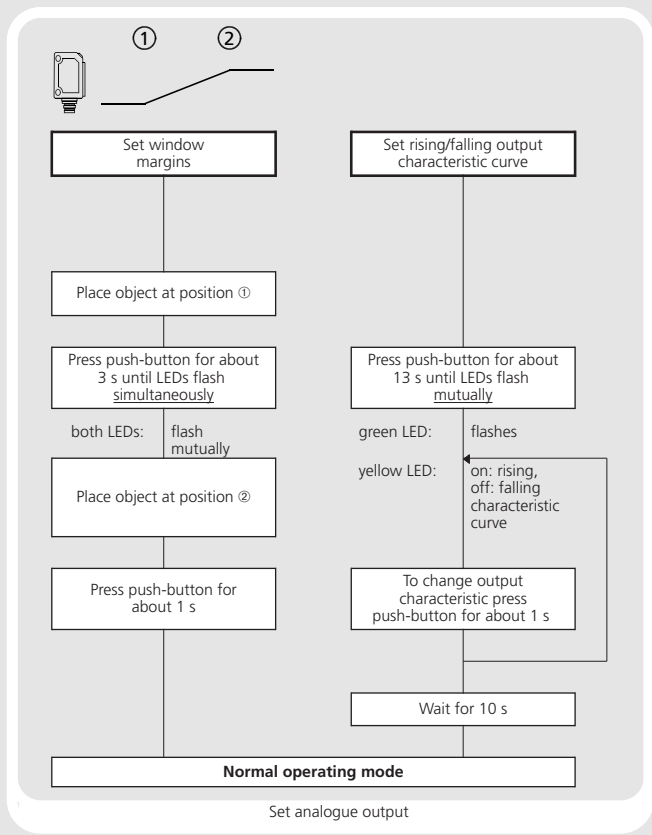
Maintenance

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

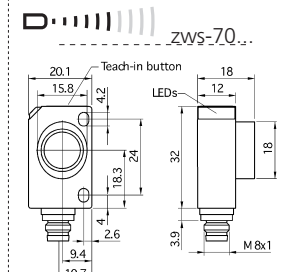
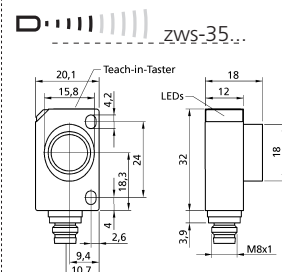
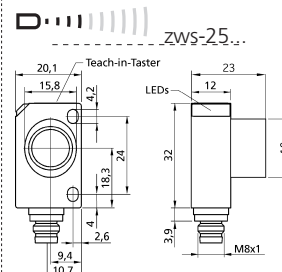
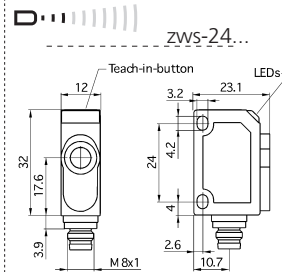
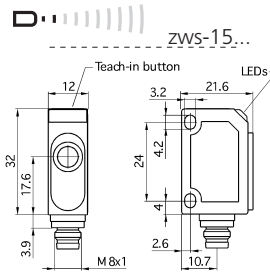
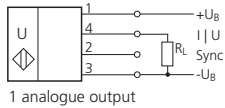
Notes

- 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.

Sensor adjustment with Teach-in procedure



Technical data



blind zone	20 mm	55 mm	30 mm	64 mm	120 mm
operating range	150 mm	240 mm	250 mm	350 mm	700 mm
maximum range	250 mm	350 mm	350 mm	600 mm	1,000 mm
angle of beam spread	see detection zone	see detection zone	see detection zone	see detection zone	see detection zone
transducer frequency	380 kHz	500 kHz	320 kHz	400 kHz	300 kHz
resolution, sampling rate	0.20 mm	0.20 mm	0.20 mm	0.20 mm	0.20 mm
reproducibility	± 0.15 %	± 0.15 %	± 0.15 %	± 0.15 %	± 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.	 4 cm 0 cm 4 cm 8 cm 0 cm 4 cm 8 cm 12 cm 16 cm 20 cm 24 cm	 5 cm 0 cm 5 cm 10 cm 0 cm 5 cm 10 cm 15 cm 20 cm 25 cm 30 cm 35 cm	 5 cm 0 cm 5 cm 10 cm 0 cm 5 cm 10 cm 15 cm 20 cm 25 cm 30 cm 35 cm	 10 cm 0 cm 10 cm 20 cm 0 cm 10 cm 20 cm 30 cm 40 cm 50 cm 60 cm	 20 cm 0 cm 20 cm 40 cm 0 cm 20 cm 40 cm 60 cm 80 cm 100 cm
accuracy	± 1 % (temperature drift internal compensated)	± 1 % (temperature drift internal compensated)	± 1 % (temperature drift internal compensated)	± 1 % (temperature drift internal compensated)	± 1 % (temperature drift internal compensated)
operating voltage U_B	20 – 30 V DC, reverse polarity protection	20 – 30 V DC, reverse polarity protection	20 – 30 V DC, reverse polarity protection	20 – 30 V DC, reverse polarity protection	20 – 30 V DC, reverse polarity protection
voltage ripple	±10 %	±10 %	±10 %	±10 %	±10 %
no-load current consumption	< 25 mA	< 25 mA	< 25 mA	< 25 mA	< 25 mA
housing	ABS	ABS	ABS	ABS	ABS
	ultrasonic transducer: polyurethane foam, epoxy resin with glass content	ultrasonic transducer: polyurethane foam, epoxy resin with glass content	ultrasonic transducer: polyurethane foam, epoxy resin with glass content	ultrasonic transducer: polyurethane foam, epoxy resin with glass content	ultrasonic transducer: polyurethane foam, epoxy resin with glass content
class of protection to EN 60 529	IP 67	IP 67	IP 67	IP 67	IP 67
type of connection	4-pin M8 initiator plug	4-pin M8 initiator plug	4-pin M8 initiator plug	4-pin M8 initiator plug	4-pin M8 initiator plug
controls	Teach-in push-button	Teach-in push-button	Teach-in push-button	Teach-in push-button	Teach-in push-button
indicators	LED green (operation) LED yellow (object in the window)	LED green (operation) LED yellow (object in the window)	LED green (operation) LED yellow (object in the window)	LED green (operation) LED yellow (object in the window)	LED green (operation) LED yellow (object in the window)
synchronisation	external	external	external	external	external
pulse width synchronization signal t_s	> 150 µs	> 150 µs	> 150 µs	> 150 µs	> 150 µs
repetition rate synchronization signal t_p	8 ms < t _p < 1 s	10 ms < t _p < 1 s	10 ms < t _p < 1 s	16 ms < t _p < 1 s	14 ms < t _p < 1 s
operating temperature	-25°C to +70°C	-25°C to +70°C	-25°C to +70°C	-25°C to +70°C	-25°C to +70°C
storage temperature	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C
weight	10 g	10 g	11 g	11 g	11 g
response time	50 ms	50 ms	50 ms	80 ms	70 ms
time delay before availability	< 300 ms	< 300 ms	< 300 ms	< 300 ms	< 300 ms
norm conformity	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
order no.	zws-15/CI/QS	zws-24/CI/QS	zws-25/CI/QS	zws-35/CI/QS	zws-70/CI/QS
analogue output 4 - 20 mA	R _L ≤ 500 Ω rising/falling characteristic	R _L ≤ 500 Ω rising/falling characteristic	R _L ≤ 500 Ω rising/falling characteristic	R _L ≤ 500 Ω rising/falling characteristic	R _L ≤ 500 Ω rising/falling characteristic
order no.	zws-15/CU/QS	zws-24/CU/QS	zws-25/CU/QS	zws-35/CU/QS	zws-70/CU/QS
analogue output 0 - 10 V	R _L ≥ 100 kΩ, short-circuit-proof, rising/falling characteristic	R _L ≥ 100 kΩ, short-circuit-proof, rising/falling characteristic	R _L ≥ 100 kΩ, short-circuit-proof, rising/falling characteristic	R _L ≥ 100 kΩ, short-circuit-proof, rising/falling characteristic	R _L ≥ 100 kΩ, short-circuit-proof, rising/falling characteristic

