microsonic

Operating Instructions

Ultrasonic proximity switch with one switched output

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**

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 skilled personnel.
- No safety component in accordance with the EU Machine Directive

Proper use

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

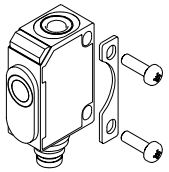


Fig. 1: Attachment with mounting plate

Installation

- Mount the sensor at the installation site with the aid of the enclosed mounting plate, s. Fig. 1.
  Maximum torque: 0,5 Nm
- Connect a connection cable to the M8 device plug, s. Fig. 2.
- Avoid mechanical load on the connector.

		colour
1	$+U_B$	brown
3	$-U_B$	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_i and repetition rate t_p (s. Fig. 3 and technical data).

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

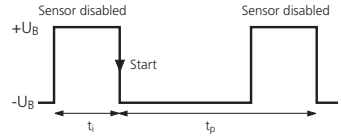


Fig. 3: External synchronization signal

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

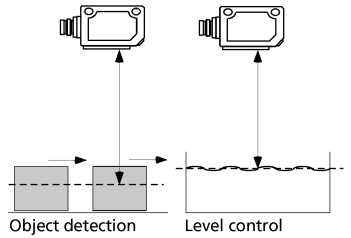
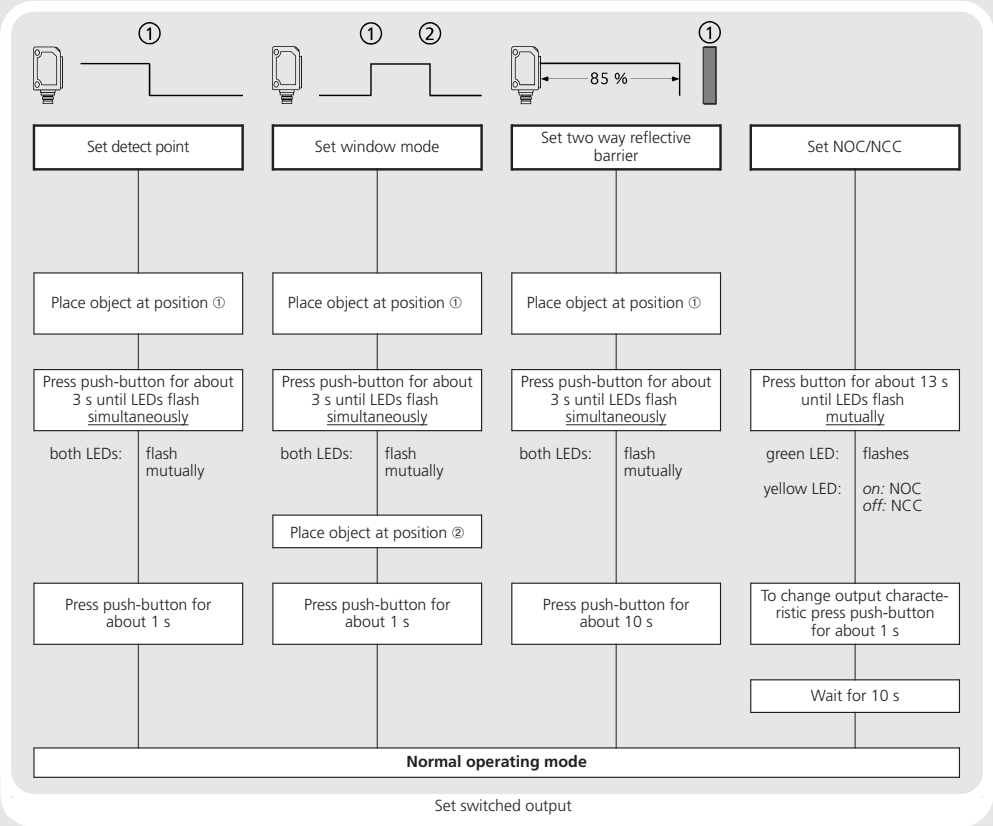


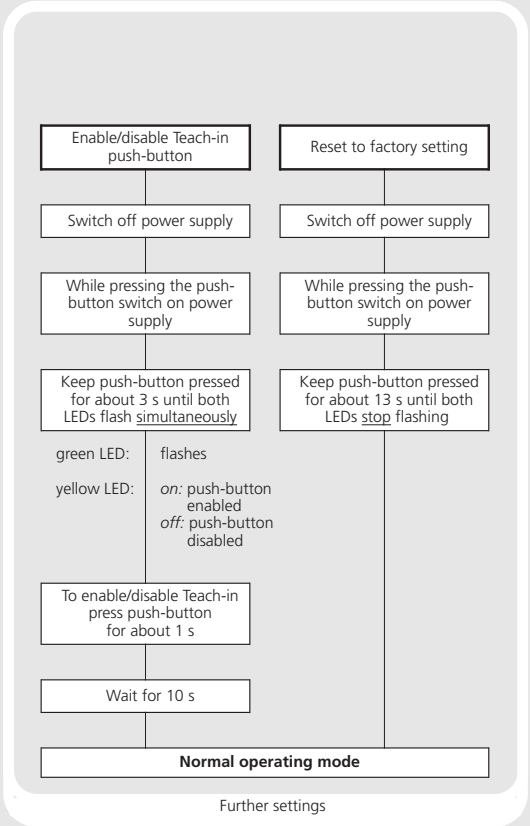
Fig. 4: Set the detect point for different directions of movement of the object

Notes

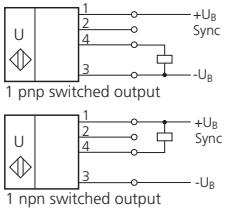
- The zws sensor has a blind zone, within which distance measurements are not possible.
- In the normal operating mode, an illuminated yellow LED signals the switched output is switched through.
- The standard sensor has no temperature compensation.

Sensor adjustment with Teach-in procedure



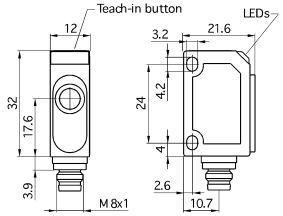
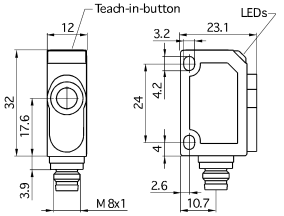
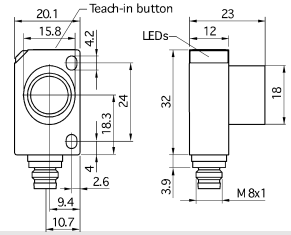
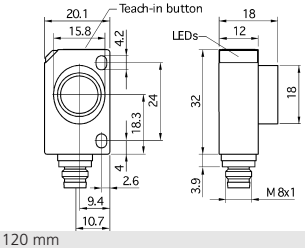
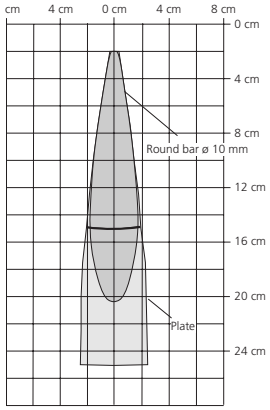
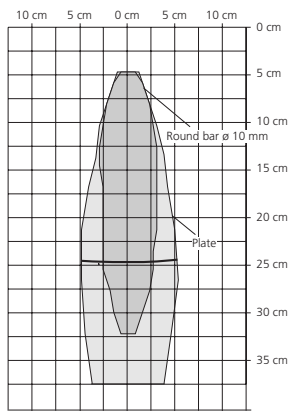
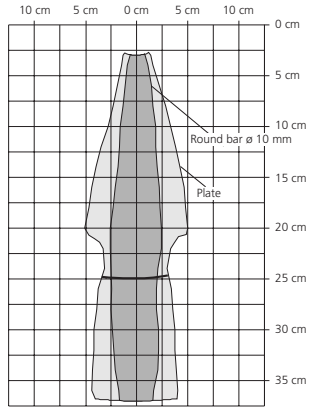
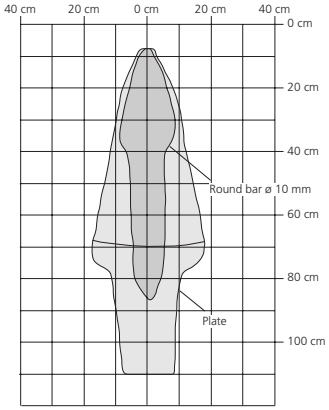


Technical data



1 pnp switched output

1 npn switched output

	zws-15...	zws-24...	zws-25...	zws-70...
				
blind zone	20 mm	50 mm	30 mm	120 mm
operating range	150 mm	240 mm	250 mm	700 mm
maximum range	250 mm	350 mm	350 mm	1,000 mm
angle of beam spread	see detection zone	see detection zone	see detection zone	see detection zone
transducer frequency	380 kHz	500 kHz	320 kHz	300 kHz
resolution, sampling rate	0.20 mm	0.20 mm	0.20 mm	0.20 mm
reproducibility	± 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.				
accuracy	temperature drift 0.17 %/K	temperature drift 0.17 %/K	temperature drift 0.17 %/K	temperature drift 0.17 %/K
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
voltage ripple	±10 %	±10 %	±10 %	±10 %
no-load current consumption	< 25 mA	< 25 mA	< 25 mA	< 25 mA
housing	ABS	ABS	ABS	ABS
	ultrasonic transducer: polyurethane foam,	ultrasonic transducer: polyurethane foam,	ultrasonic transducer: polyurethane foam,	ultrasonic transducer: polyurethane foam,
	epoxy resin with glass content	epoxy resin with glass content	epoxy resin with glass content	epoxy resin with glass content
class of protection to EN 60 529	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
controls	Teach-in push-button	Teach-in push-button	Teach-in push-button	Teach-in push-button
indicators	LED green (operation)	LED green (operation)	LED green (operation)	LED green (operation)
	LED yellow (state of output)	LED yellow (state of output)	LED yellow (state of output)	LED yellow (state of output)
synchronisation	external	external	external	external
pulse width synchronization signal t_i	> 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	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
storage temperature	-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
switching hysteresis	2 mm	2 mm	2 mm	2 mm
switching frequency	25 Hz	25 Hz	31 Hz	11 Hz
response time	24 ms	24 ms	20 ms	36 ms
time delay before availability	< 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
order no.	**zws-15/CD/QS**	**zws-24/CD/QS**	**zws-25/CD/QS**	**zws-70/CD/QS**
switched output	pnp, U_B-2 V, I_{max} = 200 mA	pnp, U_B-2 V, I_{max} = 200 mA	pnp, U_B-2 V, I_{max} = 200 mA	pnp, U_B-2 V, I_{max} = 200 mA
	switchable NOC/NCC, short-circuit-proof	switchable NOC/NCC, short-circuit-proof	switchable NOC/NCC, short-circuit-proof	switchable NOC/NCC, short-circuit-proof
order no.	**zws-15/CE/QS**	**zws-24/CE/QS**	**zws-25/CE/QS**	**zws-70/CE/QS**
switched output	npn, -U_B+2 V, I_{max} = 200 mA	npn, -U_B+2 V, I_{max} = 200 mA	npn, -U_B+2 V, I_{max} = 200 mA	npn, -U_B+2 V, I_{max} = 200 mA
	switchable NOC/NCC, short-circuit-proof	switchable NOC/NCC, short-circuit-proof	switchable NOC/NCC, short-circuit-proof	switchable NOC/NCC, short-circuit-proof

- 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, s. Fig. 4.
- 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.

CE 2014/30/EU