microsonic zws-15 Ultrasonic Proximity Switch with One Switching Output Instruction Manual

Contents

1 microsonic zws-15 Ultrasonic Proximity Switch with One Switching Output
2 Product Information
3 Product Usage Instructions
4 Product Description
5 Installation
6 Factory Setting
7 Maintenance
8 Technical Data
9 Documents / Resources
10 Related Posts

microsonic zws-15 Ultrasonic Proximity Switch with One Switching Output

Product Information

The Zws sensor is an ultrasonic proximity switch with one switching output. It is available in different models – zws-15/CD/QS, zws-24/CD/QS, zws-25/CD/QS, zws-35/CD/QS, andzws-70/CD/QS; and zws-15/CE/QS, zws-24/CE/QS, zws-25/CE/QS, zws-35/CE/QS, and zws-70/CE/QS. The sensor offers a non-contact measurement of the distance to an object which must be positioned within the sensor's detection zone. The switching 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 the operation and the state of the switching output.

Product Usage Instructions

1. Read the operation manual prior to start-up.
2. Connection, installation, and adjustment works may only be carried out by expert personnel.
3. Use the sensor only for its intended purpose – non-contact detection of objects.
4. Set sensor parameters via the Teach-in procedure as per Diagram 1.
5. Factory settings:
    - Operation with one switching point
    - Switching output on NOC
    - Switching point at an operating range
6. Three operating modes are available for the switching output:
    - Operation with one switching point – The switching output is set if the object falls below the set switching point.
    - Window mode – The switching output is set if the object is within the set window limits.
    - Two-way reflective barrier – The switching output is set if there is no object between the sensor and the reflector.
7. Further settings:
    - Set switching outputs

- Set window mode
- Set a two-way reflective barrier
- Set NOC/NCC and twin mode 1)
- Enable/disable the Teach-in push-button
- Reset to factory setting
- Switch off

8. To update firmware, press the push-button for about 3 s until LEDs flash simultaneously.
9. To change the output characteristic, press the push-button for about 1 s.
10. To switch on, press and hold the push-button, then switch on the operating voltage. Keep the push-button pressed for about 3 s until both LEDs flash simultaneously.

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 switching 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 switching output.

Safety Notes

- Read the operation manual 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, use in the area of personal and machine protection not permitted.

Use for intended purpose only
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 (see Fig. 1).
  Maximum torque of attachment screw: 0,5 N

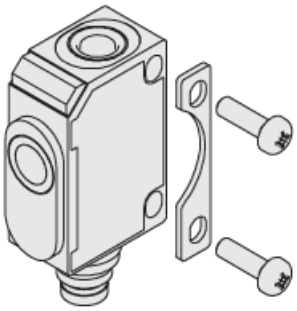


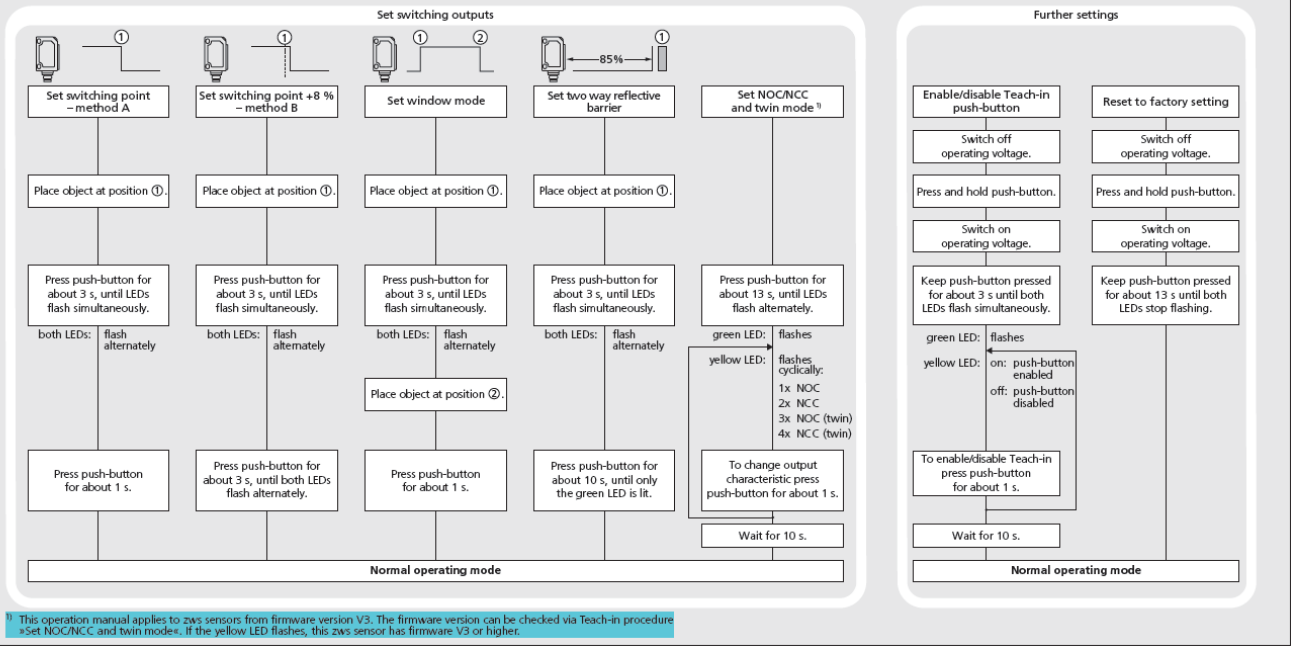
Fig. 1: Attachment with mounting plate

		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

- Connect a connection cable to the M8 device plug.
- Avoid mechanical load on the connector. Start-Up
- Connect the power supply.
- Carry out the adjustment in accordance with Diagram 1.

Diagram 1: Set sensor parameters via Teach-in procedure



Factory Setting

zws sensors are delivered with the following settings:

- Operation with one switching point

- Switching output on NOC
- Switching point at an operating range

Operating modes
Three operating modes are available for the switching output:

- Operation with one switching point
- The switching output is set if the object falls below the set switching point.

Window mode

- The switching output is set if the object is within the set window limits.

Two-way reflective barrier
The switching output is set if there is no object between the sensor and the reflector.

Checking operating mode

In normal operating mode shortly press the push button.

The green LED stops shining for one second, then it will show the current operating mode:

- **1x flashing =** operation with one switching point
- **2x flashing =** window mode
- **3x flashing =** reflective barrier

After a break of 3 s the green LED shows the output function:

- **1x flashing =** NOC
- **2x flashing =** NCC
- **3x flashing =** NOC (twin)
- **4x flashing =** NCC (twin)

Mutual Influencing and Synchronization

If two or more sensors are mounted too close to one another and the minimum assembly distances (see Fig. 3) between the sensors are not reached they can influence one another. There are two methods available to avoid this.

- If only two sensors are operating, the twin mode can be selected at one of the two sensors via the sensor setting »Set NOC/NCC and twin mode«. The other sensor stays at
  the standard NOC/NCC setting. For the sensor in twin mode, the response delay is slightly increased und therefore the switching frequency is reduced.
- If more than two sensors are operating close to one another, the sensors can be synchronized by the accessory SyncBox2.

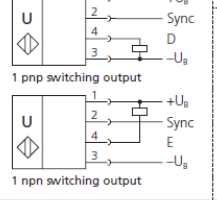
	D D	D↔D
zws-15...	≥0.25 m	≥1.30 m
zws-24...	≥0.25 m	≥1.40 m
zws-25...	≥0.35 m	≥2.50 m
zws-35...	≥0.40 m	≥2.50 m
zws-70...	≥0.70 m	≥4.00 m

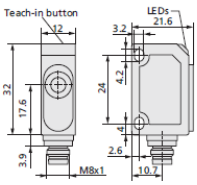
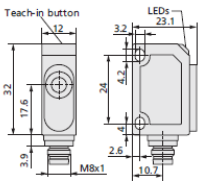
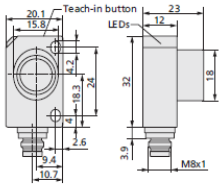
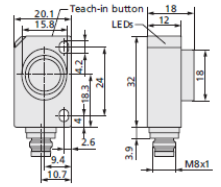
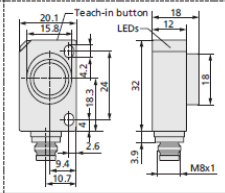
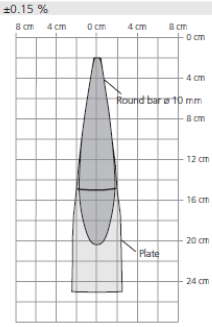
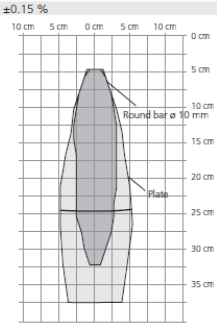
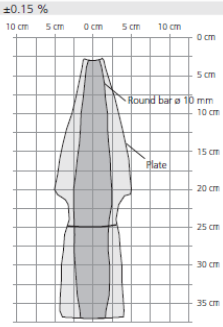
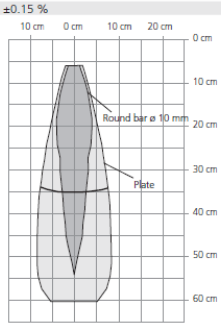
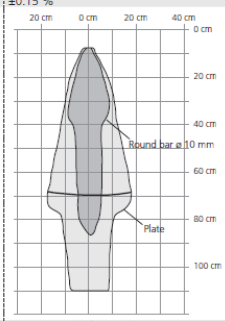
Fig. 3: Minimum assembly distances for Sync

Maintenance

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

Technical Data



	zws-15... D	zws-24... D	zws-25... D	zws-35... D	zws-70... D
					
blind zone	20 mm	50 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	1000 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	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 represent the zone where it is easy to recognise the normal reflector (round bar). This indicates the typical operating range of the sensors. The light grey areas represent the zone where a very large reflector – for instance a plate – can still be recognised. The requirement here is for an optimum alignment to 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	Temperature drift 0.17 %/K
operating voltage U_B	20 to 30 V DC, reverse polarity protection	20 to 30 V DC, reverse polarity protection	20 to 30 V DC, reverse polarity protection	20 to 30 V DC, reverse polarity protection	20 to 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 ultrasonic transducer: polyurethane foam, epoxy resin with glass content	ABS ultrasonic transducer: polyurethane foam, epoxy resin with glass content	ABS ultrasonic transducer: polyurethane foam, epoxy resin with glass content	ABS ultrasonic transducer: polyurethane foam, epoxy resin with glass content	ABS ultrasonic transducer: polyurethane foam, epoxy resin with glass content
class of protection to EN 60529	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 (state of output)	LED green (operation) LED yellow (state of output)	LED green (operation) LED yellow (state of output)	LED green (operation) LED yellow (state of output)	LED green (operation) LED yellow (state of output)
synchronisation	twin mode [1] or external	twin mode [1] or external	twin mode [1] or external	twin mode [1] or external	twin mode [1] or external
pulse width synchronisation signal t_S	>150 µs	>150 µs	>150 µs	>150 µs	>150 µs
cycle time synchronisation signal t_p	10 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 to +70 °C	–25 to +70 °C	–25 to +70 °C	–25 to +70 °C	–25 to +70 °C
storage temperature	–40 to +85 °C	–40 to +85 °C	–40 to +85 °C	–40 to +85 °C	–40 to +85 °C
weight	10 g	10 g	11 g	11 g	11 g
switching hysteresis	2 mm	2 mm	2 mm	5 mm	10 mm
switching frequency	25 Hz (19 Hz in twin mode [2])	25 Hz (19 Hz in twin mode [2])	31 Hz (22 Hz in twin mode [2])	15 Hz (10 Hz in twin mode [2])	17 Hz (12 Hz in twin mode [2])
response time	30 ms (39 ms in twin mode [2])	30 ms (39 ms in twin mode [2])	24 ms (33 ms in twin mode [2])	48 ms (69 ms in twin mode [2])	42 ms (60 ms in twin mode [2])
switch-off delay time	<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/CD/QS**	**zws-24/CD/QS**	**zws-25/CD/QS**	**zws-35/CD/QS**	**zws-70/CD/QS**
switching output	pnp, U_B–2 V, I_{max} = 200 mA switchable NOC/NCC, short-circuit-proof	pnp, U_B–2 V, I_{max} = 200 mA switchable NOC/NCC, short-circuit-proof	pnp, U_B–2 V, I_{max} = 200 mA switchable NOC/NCC, short-circuit-proof	pnp, U_B–2 V, I_{max} = 200 mA switchable NOC/NCC, short-circuit-proof	pnp, U_B–2 V, I_{max} = 200 mA switchable NOC/NCC, short-circuit-proof
order no.	**zws-15/CE/QS**	**zws-24/CE/QS**	**zws-25/CE/QS**	**zws-35/CE/QS**	**zws-70/CE/QS**
switching output	npn, –U_B+2 V, I_{max} = 200 mA switchable NOC/NCC, short-circuit-proof	npn, –U_B+2 V, I_{max} = 200 mA switchable NOC/NCC, short-circuit-proof	npn, –U_B+2 V, I_{max} = 200 mA switchable NOC/NCC, short-circuit-proof	npn, –U_B+2 V, I_{max} = 200 mA switchable NOC/NCC, short-circuit-proof	npn, –U_B+2 V, I_{max} = 200 mA switchable NOC/NCC, short-circuit-proof

[2] For information on twin mode, see section »Mutual Influencing and Synchronization«

Notes

- The zws sensor has a blind zone, within which distance measurements are not possible.
- The sensor has no temperature compensation.
- In the normal operating mode, an illuminated yellow LED signals the switching output is switched through.
- In the »Set switching point – method A« Teach-in procedure the actual distance to the object is taught to the sensor as the switching point. If the object moves towards the sensor (e.g. with level control) then the taught distance is the level at which the sensor has to switch the output.
- If the object to be scanned moves into the detection area from the side, the »Set switching point +8 % –method B« Teach-in procedureshould be used. In this way the switching distance is set 8 % furtherthan the actual measured distanceto the object. This ensures a reliable switching distance even if theheight of the objects varies slightly,see **Fig. 4.**

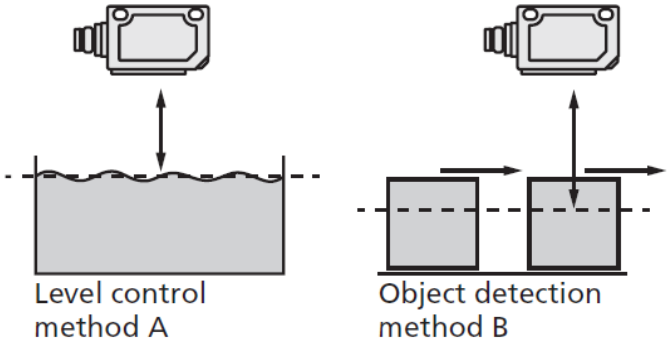
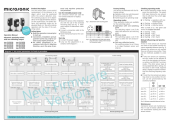


Fig. 4: Set the switching point for different directions of movement of the object

- In the »Two-way reflective barrier« operating mode, the object has to be within the range of 0 to 85 % of the set distance.
- If the push-button is not pressed for 8 minutes during the Teach-in setting, the settings made until now are deleted.
- This operation manual applies to zws sensors from firmware version V3. The firmware version can be checked via Teach-in procedure »Set NOC/NCC and twin mode«. If the yellow LED flashes, this zws sensor has firmware V3 or higher.

Documents / Resources

	microsonic zws-15 Ultrasonic Proximity Switch with One Switching Output [pdf] Instruction Manual zws-15-CD-QS, zws-24-CD-QS, zws-25-CD-QS, zws-35-CD-QS, zws-70-CD-QS, zws-15-CE-QS, zws-24-CE-QS, zws-25-CE-QS, zws-35-CE-QS, zws-70-CE-QS, zws-15, zws-15 Ultrasonic Proximity Switch with One Switching Output, Ultrasonic Proximity Switch with One Switching Output, Proximity Switch with One Switching Output, Switch with One Switching Output