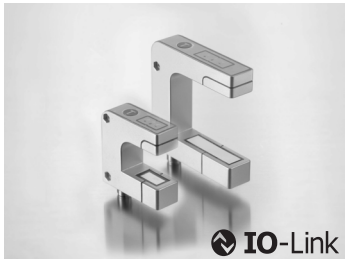
microsonic



Operating manual

bks+3/FIU/A
bks+6/FIU/A

Ultrasonic web edge sensor with analogue output and IO-Link interface

Product Description

The bks+ ultrasonic web edge sensors are fork sensors for scanning the edges of sound-impermeable and slightly sound-permeable materials such as foil or paper.
The fork's lower leg is equipped with an ultrasonic sensor which cyclically emits short sound impulses, which are detected by the ultrasonic receiver accommodated in the upper fork leg. Material immersing into the fork covers this sound path and thus attenuates the receive signal, which is evaluated by the internal electronics.
An analogue signal and a binary value via IO-Link is output in dependence of the coverage degree.

- Via the Teach-in button on the edge sensor's top or via pin 5 on the device plug, the sensor can be adjusted to the material to be controlled.
- Choosing between rising and falling output characteristic is possible.
- Three LEDs indicate the position of the web material inside the fork.

Safety Notes

- Read the operating manual prior to start-up.
- Connection, installation and adjustments may only be carried out by qualified staff.
- No safety component in accordance with the EU Machine Directive, use in the area of personal and machine protection not permitted.

IO-Link

The bks+3/FIU/A and bks+6/FIU/A sensors are IO-Link-capable in accordance with IO-Link specification V1.1.3.

Installation

➔ Mount the sensor at the installation site.
➔ Connect a connection cable to the M12 device plug, see Fig. 1.

		colour
1	$+U_B$	brown
3	$-U_B$	blue
4	F IO-Link	black
2	I/U	white
5	Com	grey

Fig. 1: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cable

Synchronisation

If the mounting distances between the sensors are less than those specified in Fig. 2 when operating several web edge sensors, the internal synchronisation should be used to avoid mutual interference between the sensors.
Connect Sync-channels (pin 5 at the units receptacle) of a maximum of 10 sensors.

	distance
bks+3/FIU/A	<40 mm
bks+6/FIU/A	<50 mm

Fig. 2: Mounting distances below which synchronisation should be used

Start-Up

➔ Connect the power supply.
➔ Adjustment to web material according to Diagram 1.

Factory setting

- Analogue output on voltage output
- Rising analogue characteristic (0 V at maximum coverage)
- Switching output on High active
- Switching output window is around zero position

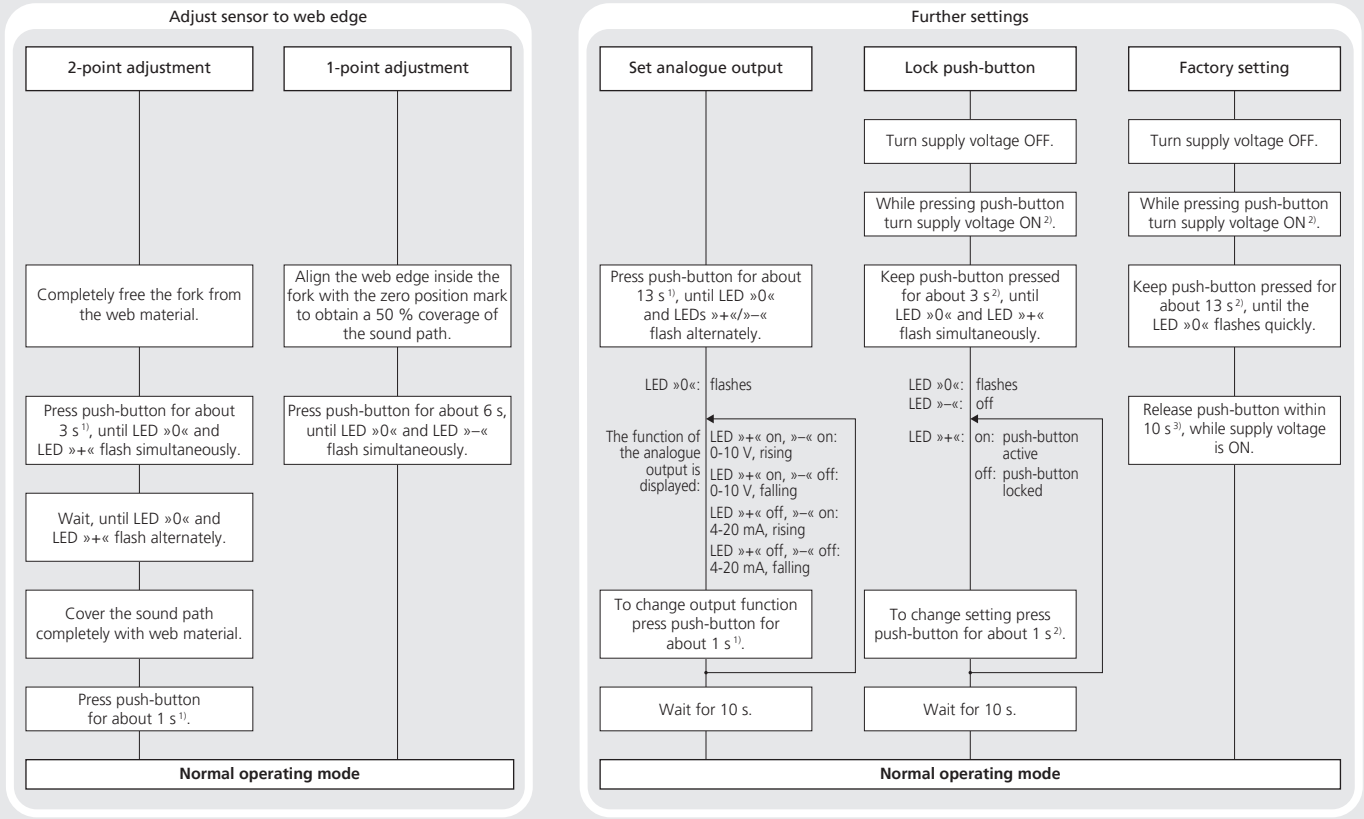
Maintenance

microsonic sensors are maintenance-free. With heavy dirt deposits, we recommend a cleaning of the white sensor surface.

Notes

- The working range depends on the ultrasonic transducers and cannot be adjusted (working range see »Technical data«).
- The sensor is adjusted to the web material and the environmental conditions using the 2-point adjustment (see Diagram 1).
- If the fork of the sensor cannot be completely cleared of web material, the sensor can be adjusted using the 1-point adjustment (see Diagram 1).
- For optimum measurement results the material to be detected should be kept in a range of ±5 mm around the centre between the upper and lower fork leg.
- The sensor can be reset to its factory settings (see »Further settings«, Diagram 1).
- Using the LinkControl adapter (optional accessory) and the LinkControl software for Windows®, all Teach-in and additional sensor parameter settings can be optionally adjusted.
- The ultrasonic transducers in the upper and lower fork leg are mounted with a slope of 2° for functional reasons.
- The latest IODD file and informations about start-up and configuration of bks+ sensors via IO-Link, you will find online at: www.microsonic.de/en/IODD.

Diagram 1: Sensor adjustment via Teach-in procedure

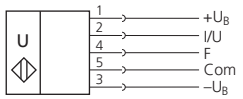


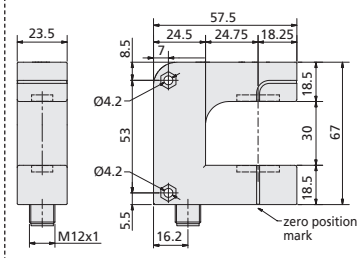
1) or connect pin 5 (Com) to $+U_B$

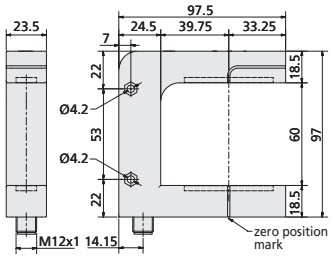
2) or connect pin 5 (Com) to $-U_B$

3) or disconnect pin 5 (Com) from $-U_B$

Technical data







	bks+3/FIU/A	bks+6/FIU/A
fork width	30 mm	60 mm
fork depth	43 mm	73 mm
working range	≥12 mm (±6 mm)	≥40 mm (±20 mm)
transducer frequency	170 kHz	310 kHz
resolution	<0.003 mm	0.01 mm
reproducibility	±0.1 mm	±0.1 mm
operating voltage U_B	20 to 30 V DC, reverse polarity protection (Class 2)	20 to 30 V DC, reverse polarity protection (Class 2)
voltage ripple	±10 %	±10 %
no-load current consumption	≤60 mA	≤60 mA
housing	zinc die cast chromed, plastic parts: PBT ultrasonic transducer: polyurethane foam, epoxy resin with glass contents	zinc die cast chromed, plastic parts: PBT ultrasonic transducer: polyurethane foam, epoxy resin with glass contents
class of protection to EN 60 529	IP 65	IP 65
type of connection	5-pin M12 initiator plug, brass, nickel-plated	5-pin M12 initiator plug, brass, nickel-plated
controls	Teach-in-button and Teach-in via pin 5	Teach-in-button and Teach-in via pin 5
indicators	LED green: centre LEDs yellow: outside the centre	LED green: centre LEDs yellow: outside the centre
programmable	LCA-2 with LinkControl and IO-Link	LCA-2 with LinkControl and IO-Link
synchronisation	internal synchronisation up to 10 sensors	internal synchronisation up to 10 sensors
operating temperature	+5 to +60 °C	+5 to +60 °C
storage temperature	–40 to +85 °C	–40 to +85 °C
weight	190 g	280 g
response time	5.1 ms	6 ms
measurement cycle time	4 ms	4 ms
time delay before availability	<300 ms	<300 ms
order no.	**bks+3/FIU/A**	**bks+6/FIU/A**
analogue output	current output 4 to 20 mA voltage output 0 to 10 V short-circuit-proof, switchable rising/falling	current output 4 to 20 mA voltage output 0 to 10 V short-circuit-proof, switchable rising/falling
switching output	Push-Pull, U_B –3 V, –U_B +3 V, I_{max} = 100 mA switchable High/Low active; short-circuit-proof	Push-Pull, U_B –3 V, –U_B +3 V, I_{max} = 100 mA switchable High/Low active; short-circuit-proof

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Enclosure Type 1
For use only in industrial machinery NFPA 79 applications.

The proximity switches shall be used with a Listed (CYJV/7) cable/connector assembly rated minimum 32 Vdc, minimum 290 mA, in the final installation.

UK CA CE 2014/30/EU

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