Product Description
The bks+ ultrasonic web edge sensor is a fork sensor 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. The bks+6/FIU optional can be programmed using the LinkControl-Adapter LCA-2 and LinkControl software.

Sensor adjustment with Teach-in procedure
- 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.

IO-Link
The bks+6/FIU sensors are IO-Link-capable in accordance with IO-Link specification V1.1.

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.

Installation
- Mount the sensor at the installation site.
- Connect a connection cable to the M12 device plug.

Notes
- Normal mode operation and gradient of the analogue output curve depend on the ultrasonic transducers and cannot be adjusted. The working range always is ± 40 mm.
- For sound-impermeable materials the sensor can be adjusted to the environmental conditions by the 1-point adjustment procedure.
- For slightly sound-permeable materials the sensor has to be set up to the material and the environmental conditions by using the 2-point adjustment. Carry out a practical test to find out whether a material is slightly sound-permeable.
- 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.

Technical data
- Fork width
  - 60 mm
- Operating temperature
  - +5°C to +60°C
- Transducer frequency
  - 30 to 300 kHz
- Resin in glass contents
  - Epoxy resin with glass contents

- Operating voltage Uo
  - 20 to 30 V DC, reverse polarity protection
- Weight (fork + housing)
  - 280 g

- Repeatability
  - ± 0.1 mm
- Reproducibility
  - ± 10 %
- Voltage ripple
  - ± 4.5 mm around zero position
- Ramping time
  - 4 ms

- Response time
  - 6 ms
- Repetition rate
  - 10 kHz
- Storage temperature
  - -40°C to +85°C
- Switched output
  - voltage output 0-10 V

Factory setting
- Analogue output on voltage output
- Rising analogue characteristic (0 V at maximum coverage)
- Switched output on NO
- Switcheb output window is ± 4.5 mm around zero position

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

Further settings
- or disconnect Pin 5 (Sync/Com) from -Uo
- or connect Pin 5 (Sync/Com) to +Uo
IO-Link Mode

The bks+6/FIU sensors are IO-Link-capable in accordance with IO-Link specification V1.1 and compatible to specification V1.0.

Service data
The following sensor parameters may be set via IO-Link.

Teach-in via push-button
The push-button can be activated/deactivated for sensor settings with Teach-in.

Temperature compensation
The temperature compensation is used for measurement value correction for varying ambient temperatures and can be disabled.

Analogue output mode
For the analogue output either the function output voltage or current output can be selected.

Rising / falling analogue characteristic
The analogue characteristic can be set on rising (0 V / 4 mA at full coverage) or falling characteristic.

Set NOC/NCC
The NCC or NOC output function can be preset for the switched output.

Switching off the LEDs
When activated, the LEDs are switched off 30 seconds after a key press. After a new key press they will run for 30 seconds.

System commands
With 5 system commands the following settings may be carried out:
- restore IO-Link parameters to their factory settings
- sensor adjustment: fork cleared
- sensor adjustment: fork 50 % covered
- sensor adjustment: fork 100 % covered
- reset all sensor parameters including the IO-Link parameters to their factory settings.

Events
The bks+ sensor sends the following events:
- parameter was changed
- sensor adjustment successful
- sensor adjustment failed

IODD file
The latest IODD file you will find on the internet under www.microsonic.de/en/IODD.

For further informations on IO-Link see www.io-link.com.

Switching window
If the web edge is within the switching window the switching output is set. The switching window is defined by the adjusted center and the width.

Note
The switching window has to be within the operating range.

Filter strength
For both measurement value filters, a filter strength between P00 (weak filter effect) and P09 (strong filter effect) can be selected.

The bks+ ultrasonic sensors provide for a choice of 3 filter settings:
- F00 (no filter)
- Each ultrasonic measurement acts on the output in an unfiltered manner.
- F01 (average value filter) Forms approximately the arithmetic mean of several measurements. According to the mean value the output is set. The number of measurements, from which the mean is formed is dependent on the chosen filter strength.
- F02 (median filter) Finds the median of several measurements. According to the median the output is set. The number of measurements, for which the median is determined is dependent on the selected filter strength.

Temperature compensation
The temperature compensation is set. The switching window is defined is dependent on the selected filter strength.

Filter strength
For both measurement value filters, a filter strength between P00 (weak filter effect) and P09 (strong filter effect) can be selected.

Temperature compensation
The temperature compensation is set. The switching window is defined is dependent on the selected filter strength.

Switching window
If the web edge is within the switching window the switching output is set. The switching window is defined by the adjusted center and the width.

Note
The switching window has to be within the operating range.