Operating manual

Ultrasonic label and splice sensor with one or two switching outputs with IO-Link interface

esf-1/CF/A
esf-1/CDF/A
esf-1/7/CF/A
esf-1/15/CF/D/A

The signal level for the backing or web material. With its three Teach-in methods, the esf-1 sensor can optimally be adjusted to any task configuration. With QuickTeach, there is also a simplified Teach-in procedure available.

Product description
- Assured detection of labels made of paper, metal or (transparent) plastic.
- Detection of splices of paper, plastic or metal webs.
- Detection of materials with weights from < 20 g/m² to >> 400 g/m²; sheet metals and plastic films up to 0.2 mm thickness.
- Three standard Teach-in methods and optional QuickTeach.
- Parameterisable with LinkControl.
- Response time of 300 µs until label resp. splice is detected.
- Three fork depths of 70 mm, 86 mm and 165 mm.
- The esf-1 sensors are IO-Link capable according to specification V1.1.

Safety tips
- Read instruction manual before commissioning.
- Connection, installation and adjustment may only be carried out by expert personnel.
- Not a safety component as defined by the EU Machinery Directive.

Installation
- Install the esf-1 in such a way that the leg with the button is on top. This mounting position permits you to keep the measuring track optimally clean.
- Connect the connection line with the 4-pin M8 connector as shown in fig. 1, and with 5-pin M12 connector as shown in fig. 2.

Commissioning
- Turn the power supply.

Teach-in with push-button and control input
- The Teach-in process can optionally be carried out with the button on the top leg of the fork or with the Teach-in input on pin 5 on the M12 connector or pin 2 on the M8 connector.

Standard Teach-in
- There are three Teach-in methods available:
  - Dynamic Teach-in of label
  - Separate Teach-in for backing material and labels
  - Splice sensor

QuickTeach
- With QuickTeach, you have optional a simplified Teach-in process that you have to activate once before initial commissioning.

Notes using QuickTeach
- To use QuickTeach, you have to decide whether the sensor will act as a label or a splice detector.
- Once QuickTeach is activated, you can’t switch between NCC/NOC any more.

Operation
- The esf-1 continually performs measurements and sets the switched outputs based on its results. Operation modes see fig. 3.
- Notes using QuickTeach
  - To use QuickTeach, you have to decide whether the sensor will act as a label or a splice detector.
  - Once QuickTeach is activated, you can’t switch between NCC/NOC any more.

Factory setting
- The esf-1 sensors have the following settings configured at the factory:
  - esf-1/CF/A
    - Label/splice output F on high active.
    - QuickTeach is deactivated.
  - esf-1/7/CF/A
    - Label/splice output F on high active.
    - Output D on web break display.

Maintenance
- The esf-1 is maintenance-free. For significant deposits of dirt, we recommend carefully blowing out the measuring track with clean, oil-free compressed air.

Parameterisation with LinkControl
- The esf-1 can be extensively parameterised with LinkControl. To do this, you need the optionally available LCA-2 LinkControl adapter and the LinkControl software for Windows©.

Operation with LinkControl
- Install LinkControl-software at your PC. Connect the adapter to your PC using the usb cable.
- Connect the power supply cable at the T-connector of the LCA-2.
- Start the LinkControl-Software and follow the instructions on the screen.
- To connect the esf-1/CF/A with the LinkControl-Adapter you need an adapter cable M8 to M12.

You can make the following settings:
- NC/NOC function of the switching outputs
- Function of the switching output D
- Teach-in procedure
- QuickTeach change

In addition, the measured values are shown in a graph.

IO-Link
- The latest IODD file and information about start-up and configuration of esf sensors with IO-Link, you will find online at: www.microsone.de/esf.
Standard Teach-in methods

Dynamic Teach-in of label

- Insert the backing material with label into the fork
- Press push-button (LED red: off, LED green: flash, LED yellow: on) for 3 s, until red LED is off and yellow and green LED flash
- Pull the backing material with label through the fork

Static Teach-in of label

- Insert web material into the fork
- Press push-button (LED red: off, LED green: flash, LED yellow: on) for 3 s, until red and green LED are off and yellow LED flashes
- Pull the web material (without splice) through the fork

Teach-in only for sheeting (splice sensor)

- a) Only insert backing material into the fork
- Press push-button (LED red: off, LED green: flash, LED yellow: on) for 6 s, until red and yellow LED are off and green LED flashes
- Pull some backing material through the fork
- Press push-button (LED red: off, LED green: flash, LED yellow: on) for 1 s
- LED yellow: flashes briefly: QuickTeach splice sensor
- LED red: flashes briefly: QuickTeach label sensor
- LED green: flashes briefly: Standard Teach-in method
- Move the backing material with the label slightly in the fork, only the label should be detected.
- Press push-button (LED red: off, LED green: flash, LED yellow: on) for 1 s

QuickTeach

Activate QuickTeach

- Turn off operating voltage
- Press push-button (LED red: off, LED green: flash, LED yellow: on) for 3 s, until red and yellow LED are off and green LED flashes
- Pull the backing material with label into the fork
- Press push-button (LED red: off, LED green: flash, LED yellow: on) and continue to hold it down

QuickTeach label sensor

- Insert backing material with label into the fork
- Press push-button (LED red: off, LED green: flash, LED yellow: on) for 3 s, until red and yellow LED are off and green LED flashes
- Pull the backing material with label through the fork at a constant speed
- Wait until the flashing stops

QuickTeach splice sensor

- Insert web material into the fork
- Press push-button (LED red: off, LED green: flash, LED yellow: on) for 3 s, until red and yellow LED are off and green LED flashes
- Pull the backing material with labels through the fork
- Press push-button (LED red: off, LED green: flash, LED yellow: on) and continue to hold it down

Normal operation

Further settings (only available in standard Teach-in methods)

Adjusting label/splice output F to NCC/NOC

- Turn off operating voltage
- Press push-button (LED red: off, LED green: flash, LED yellow: on) for 3 s, until red LED comes on and green and yellow LED flash simultaneously
- LED red: on flashes briefly: output F not set for label/splice
- LED red: on flashes briefly: output F set for label/splice

Enable/disable Teach-in

- Turn on operating voltage
- Press push-button (LED red: off, LED green: flash, LED yellow: on) for 5 s, until red LED comes on and green and yellow LED flash simultaneously
- LED red: on flashes briefly: push-button enabled
- LED red: on flashes briefly: push-button disabled

Reset to factory setting

- Turn on operating voltage
- Press push-button (LED red: off, LED green: flash, LED yellow: on) for 10 s, until red and yellow LED light up and green LED flashes
- Release push-button, before the operating voltage is turned off

Normal operation

1) All settings via push-button can alternatively be made by connecting the Teach-in/control input Com to +U.<small>9</small>
2) All settings via push-button can alternatively be made by connecting the Teach-in/control input Com to -U.<small>9</small>
### Technical data

<table>
<thead>
<tr>
<th>Model</th>
<th>Push-Pull switched output</th>
<th>1 Push-Pull and 1 pnp switched output</th>
</tr>
</thead>
<tbody>
<tr>
<td>esf-1/CF/A</td>
<td>Push-Pull</td>
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### Technical Details

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<th>Specification</th>
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<tr>
<td><strong>Push-Pull switched output</strong></td>
<td>Push-Pull, +UB-3 V, -UB+3 V, I_max = 100 mA, E: 20 V to 30 V DC</td>
</tr>
<tr>
<td><strong>1 Push-Pull and 1 pnp switched output</strong></td>
<td>Push-Pull, +UB-3 V, -UB+3 V, I_max = 100 mA, short-circuit-proof, switchable active/low active</td>
</tr>
<tr>
<td><strong>web break output D</strong></td>
<td>Push-Pull, +UB-3 V, -UB+3 V, I_max = 100 mA, short-circuit-proof, switchable active/low active</td>
</tr>
</tbody>
</table>

### Class of Protection

- **EN 60529**

### Temperature

- **Operating Temperature**
  - +5 °C to +60 °C
  - -40 °C to +85 °C

### Storage Temperature
- +5 °C to +60 °C
- -40 °C to +85 °C

### Weight
- 80 g
- 165 g

### Time Delay Before Availability
- < 300 ms
- < 300 ms

### Order No.
- esf-1/CF/A
- esf-1/CDF/A
- esf-1/7CF/A
- esf-1/15CF/A

1) Can be programmed with Teach-in, IO-Link and LinkControl.