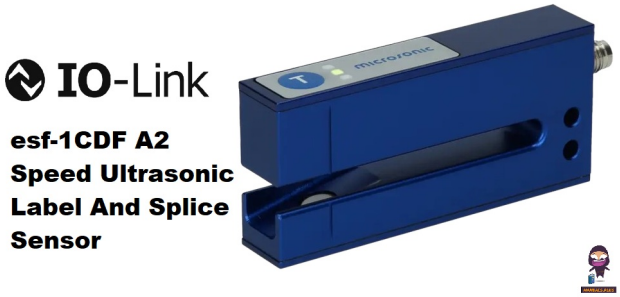


IO-Link esf-1CDF A2 Speed Ultrasonic Label And Splice Sensor Instruction Manual

Contents

IO-Link esf-1CDF A2 Speed Ultrasonic Label And Splice Sensor

Product Information

Specifications:

- Product: Ultrasonic label and splice sensor
- Switching Outputs: One or two
- Interface: IO-Link
- Models: esf-1/CF/A, esf-1/CDF/A, esf-1/7/CDF/A, esf-1/15/CDF/A
- Features:
  - Reliable detection of labels made of various materials
  - Detection of splices of paper, plastic, or metal webs
  - Detection of materials with grammages from >400 g/m2
  - Teach-in methods and QuickTeach functionality
  - Configurable via LinkControl and IO-Link
  - Three fork depths: 70 mm, 86 mm, 165 mm

Product Usage Instructions

Safety Notes:

Read the operating manual before start-up. Connection, installation, and adjustments should only be done by qualified personnel. The product is not a safety component according to the EU Machine Directive.

Proper Use:

The esf-1 ultrasonic sensors are used for non-contact detection of labels and splices.

Teach-in Methods:

The product offers three standard Teach-in methods and optional QuickTeach for easy configuration.

Operation Modes:

The product operates continuously, performing measurements and setting the switching outputs based on its results. LED displays indicate the current operating mode.

FAQ

- **Q: How do I enable QuickTeach?**
  - A: QuickTeach must be enabled once before use by deciding whether the sensor will act as a label or a splice detector. Once enabled, you cannot switch between NCC/NOC.
- **Q: What are the factory settings for esf-1 sensors?**
  - A: The esf-1 sensor is delivered with Label/splice output F on NOC, QuickTeach disabled for esf-1/CF/A, and Label/splice output F on NOC, Output D on web break display, Output web break on NOC, QuickTeach disabled for esf-1/../CDF/A.

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

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

Functional principle

An ultrasonic transmitter in the lower leg of the fork transmits a fast se-quence of pulses through the backing material. The sound pulses cause the backing material to vibration, so that a weakened sound wave is transmit-ted from the opposite side. The recei-ver in the upper leg of the fork recei-ves and evaluates this sound wave. The esf-1 sensor can be used as a label sensor and/or a splice sensor. The backing material transmits a diffe-rent signal level than the backing ma-terial with label or web material with splice. The difference between the backing material and backing with label or the web material and splice can be very subtle. To ensure reliable detection, the esf-1 sensor must there-fore initially learn the signal level for the backing or web material. With its three Teach-in methods, the esf-1 sensor can be optimally adjusted to any task configuration.\ With QuickTeach, there is also a simp-lified Teach-in procedure available.

Product Description

- Reliable detection of labels made of paper, metal or (transparent) plastic
- Detection of splices of paper-, plastic- or metal webs
- Detection of materials with grammages 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.
- Configurable v ia LinkControl and IO-Link
- Response time of 300 µs for label/ splice detection
- Three fork depths of 70 mm, 86 mm and 165 mm

IO-Link

The esf-1 sensor is IO-Link-capable in accordance with IO-Link specification V1.1 and supports Smart Sensor Pro-file like Digital Measuring Sensor. The sensor can be monitored and parame-terized via IO-Link.
The latest IODD file and information about start-up and configuration of esf-1 sensors via IO-Link, you will find online at:

- **www.microsonic.de/en/esf**.

Safety Notes

- Read the operating manual prior to start-up.
- Connection, installation and ad- 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.

Proper Use

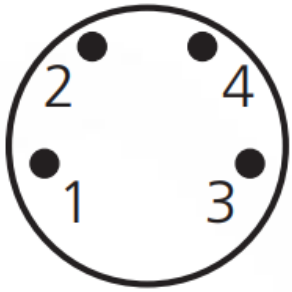
esf-1 ultrasonic sensors are used for non-contact detection of labels and splices.

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 opti-mally clean.
- Connect the sensor with the 4-pin M8 initiator plug as shown in Fig. 1, and with 5-pin M12 initiator plug as shown in Fig. 2.

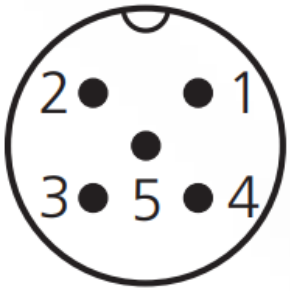
Start-up

- Connect the power supply.
- Insert web material into the fork without the material touching the fork.
- Carry out one of the three standard Teach-in methods or QuickTeach.



		colour
1	$+U_B$	brown
3	$-U_B$	blue
4	label/splice output F	black
2	Teach-in/Com	white

Fig. 1: Pin assignment of esf-1/CF and colour coding for microsonic connection lines



		colour
1	$+U_B$	brown
3	$-U_B$	blue
4	label/splice output F	black
2	web break output D	white
5	Teach-in/Com	grey

Fig. 2: Pin assignment of esf-1/../CDF/A and colour coding of the microsonic connection lines

Teach-in via push-button and control input

The Teach-in procedure can be carried out via the button on the top leg of the fork or with the Teach-in/Com in-put

on pin 5 on the M12 connector or pin 2 on the M8 connector.

Notes using Teach-in

- The Teach-in/Com control input is parallel with the push-button.
- +UB/–UB connected to the control input corresponds to a key press.
- A Teach-in using the control input can also be carried out with active synchronization.
- A failed teach-in is indicated by the flashing of the 3 LEDs.

Standard Teach-in

There are three Teach-in methods available (see Diagram 1):

- Dynamic Teach-in of labels
- Separate Teach-in for backing material and labels
- Splice sensor

QuickTeach

With QuickTeach (see Diagram 2), you have an optional simplified Teach-in procedure. QuickTeach must be enabled once before use.

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 enabled, you can‘t switch between NCC/NOC any more.

Operation

The esf-1 continually performs measurements and sets the switching out-puts based on its results. An overview of the operating modes with the asso-ciated LED displays is shown in Fig. 3.

operation mode	LED green	LED yellow	LED red
ready for use	on	–	–
backing material	on	off	off
label/splice	on	on	off
web break	on	off	on
error in Teach-In	flash	flash	flash

Fig. 3: LED display

Factory setting

The esf-1 sensor is delivered factory-made with the following settings:

esf-1/CF/A

- Label/splice output F on NOC
- QuickTeach is disabled

esf-1/../CDF/A

- Label/splice output F on NOC
- Output D on web break display
- Output web break on NOC
- QuickTeach is disabled

The sensor can be reset to its factory setting (see »Further settings«, Dia-gram 3).

- To do this, connect all Teach-in/Com control inputs together.
- See Fig. 1 and Fig. 2 for the pin assignment.

Configuration via LinkControl Using the LinkControl adapter (optional accessory) and the LinkControl software for Windows®, all Teach-in and additional sensor parameter set-tings can be optionally adjusted.

Synchronization

If multiple esf-1 sensors are operated in tight space, they can influence one another. To avoid this, the esf-1 sensors can be synchronized.

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 (see Fig. 4).

	pin (esf-1)	colour adapter cable	pin (LCA-2)
$+U_B$	1	brown	1
$-U_B$	3	blue	3
Com	2/5	grey	5

Fig. 4: Connection of the esf-1 to the LCA-2

You can make the following settings: NC/NO function of the switching outputs

- Function of the switching output D Teach-in procedure
- Enable/disable QuickTeach

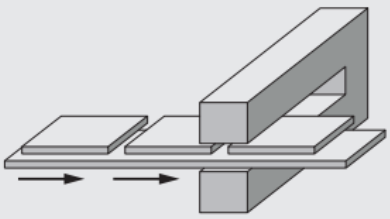
In addition, the measurement data are shown in a graph.

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.

Standard Teach-in methods

Diagram 1: Standard Teach-in methods



Dynamic Teach-in of labels

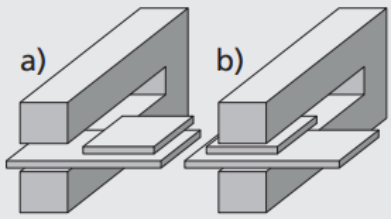
Insert the backing material with label into the fork.

Press push-button[1] for 3 s, until red LED is off and yellow and green LED flash alternately.

LED red:	off
LED green:	flashes
LED yellow:	on

Move the backing material with label through the fork at a constant speed.

Wait until the LEDs stop flashing.



Static Teach-in of labels

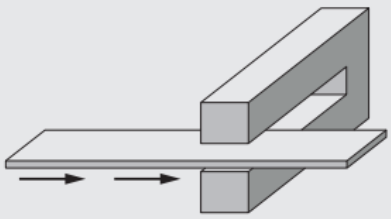
a) Only insert backing material into the fork.

Press push-button[1] for 6 s, until red and yellow LED are off and green LED flashes.

LED red:	off
LED green:	flashes
LED yellow:	on

Move some backing material through the fork.

Press push-button[1] for 1 s.



Teach-in only for web material (splice sensor)

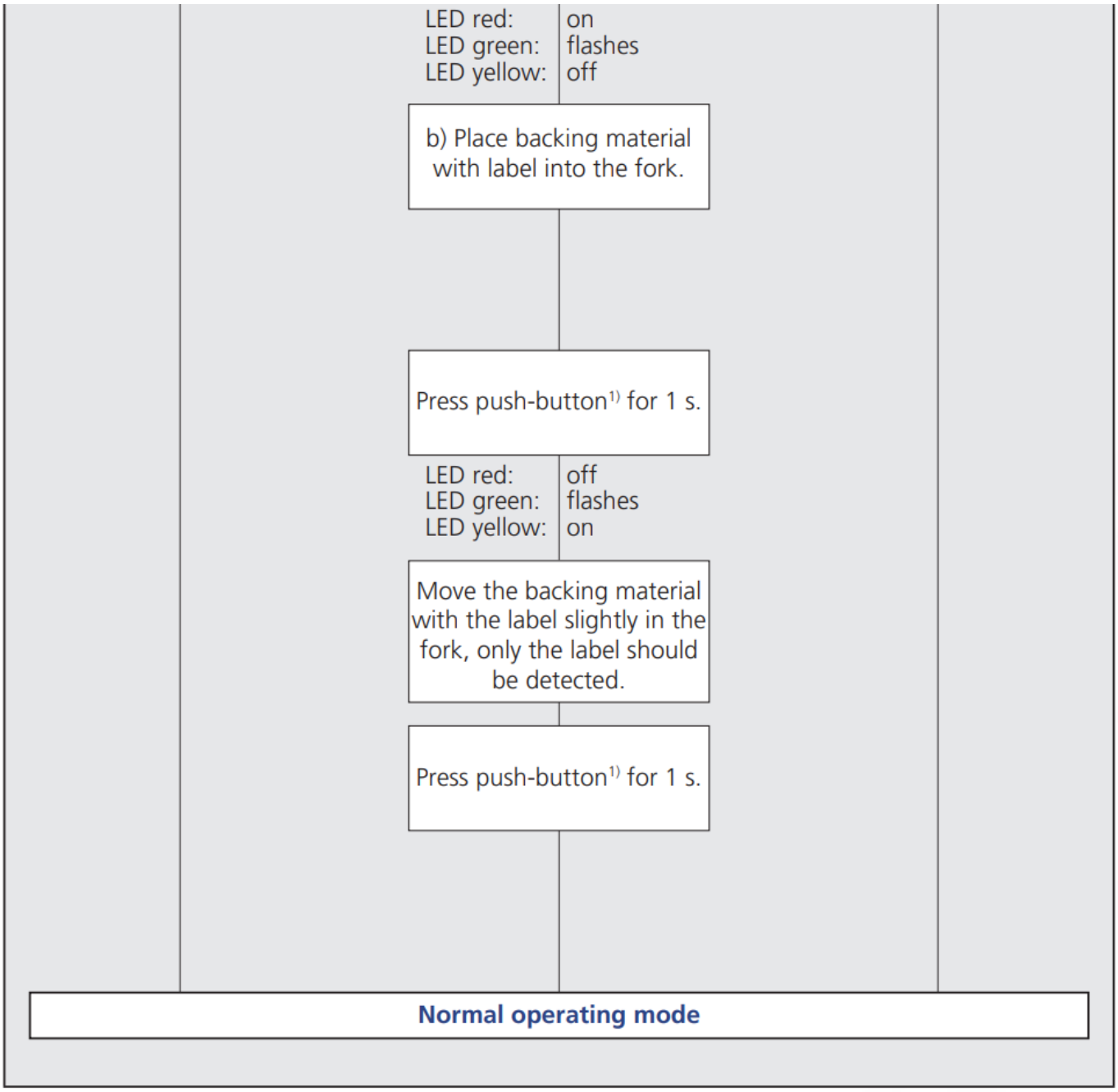
Insert web material into the fork.

Press push-button[1] for 9 s, until red and green LED are off and yellow LED flashes.

LED red:	off
LED green:	flashes
LED yellow:	on

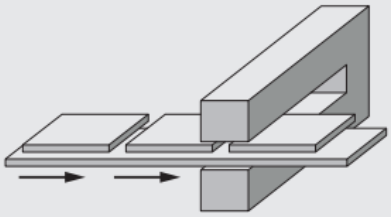
Move web material (without splice) through the fork.

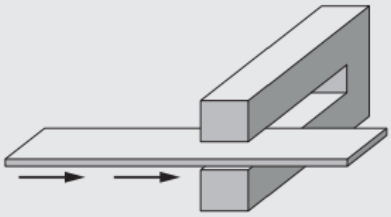
Press push-button[1] for 1 s.



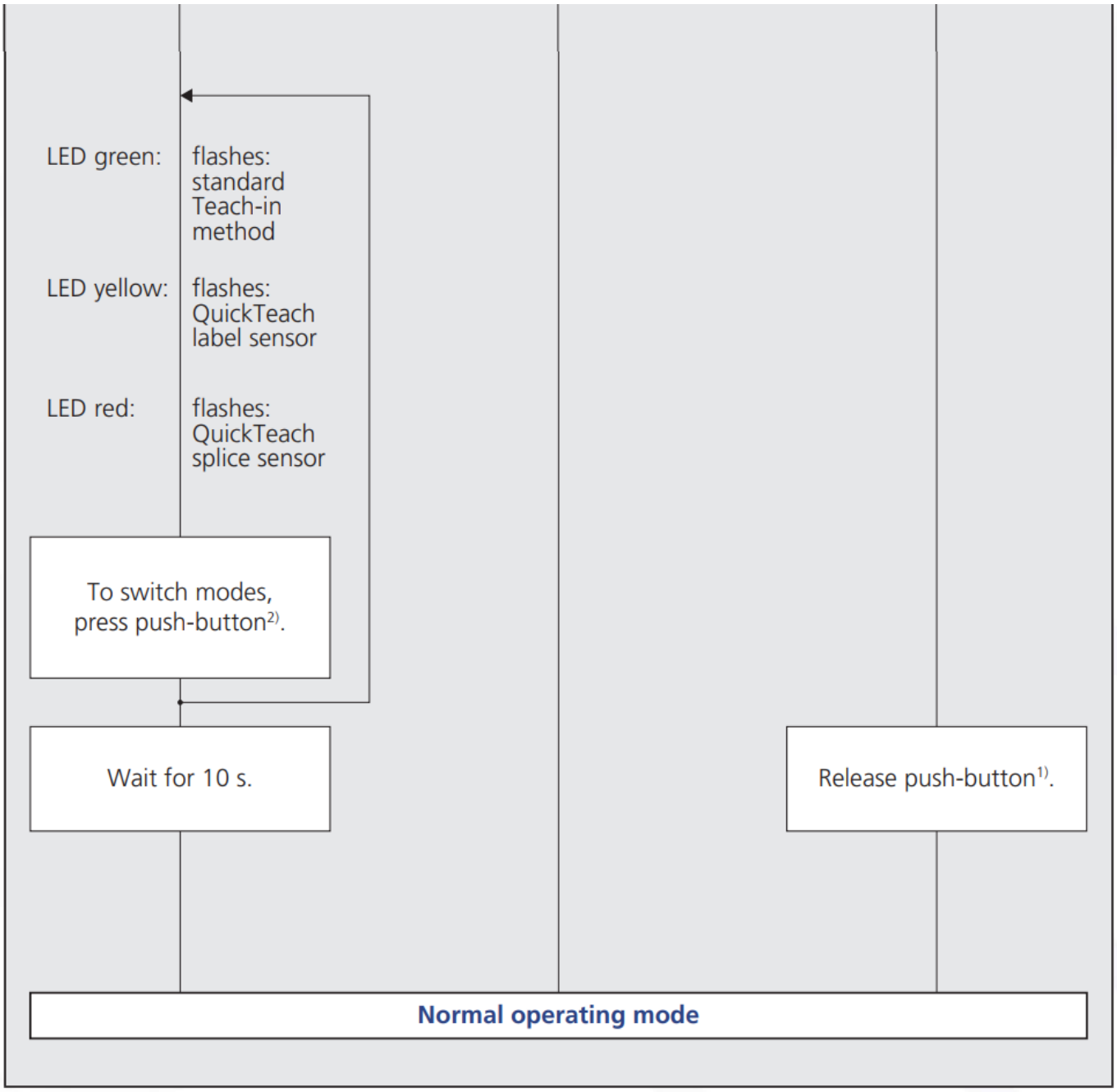
QuickTeach

Diagram 2: QuickTeach



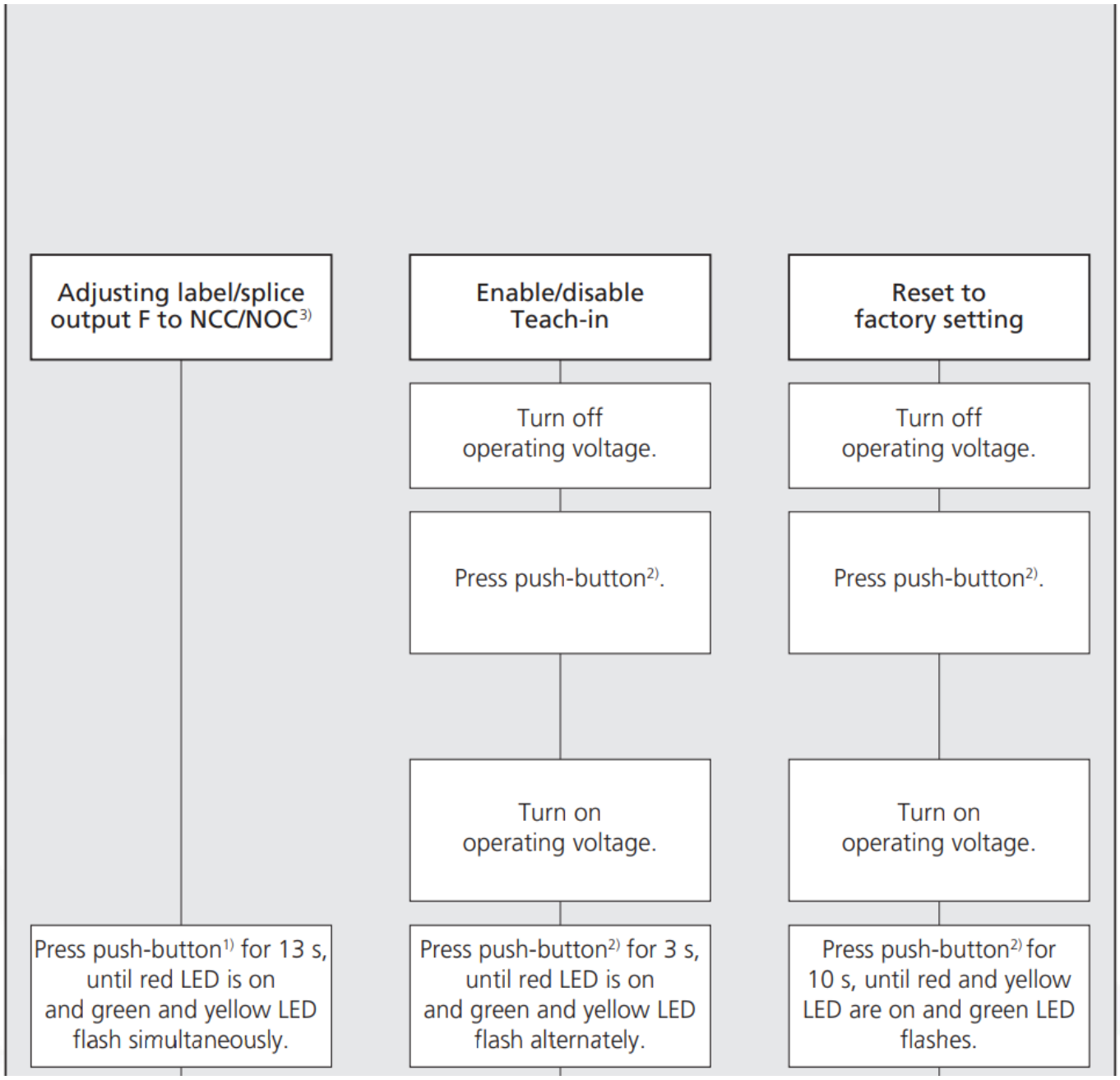


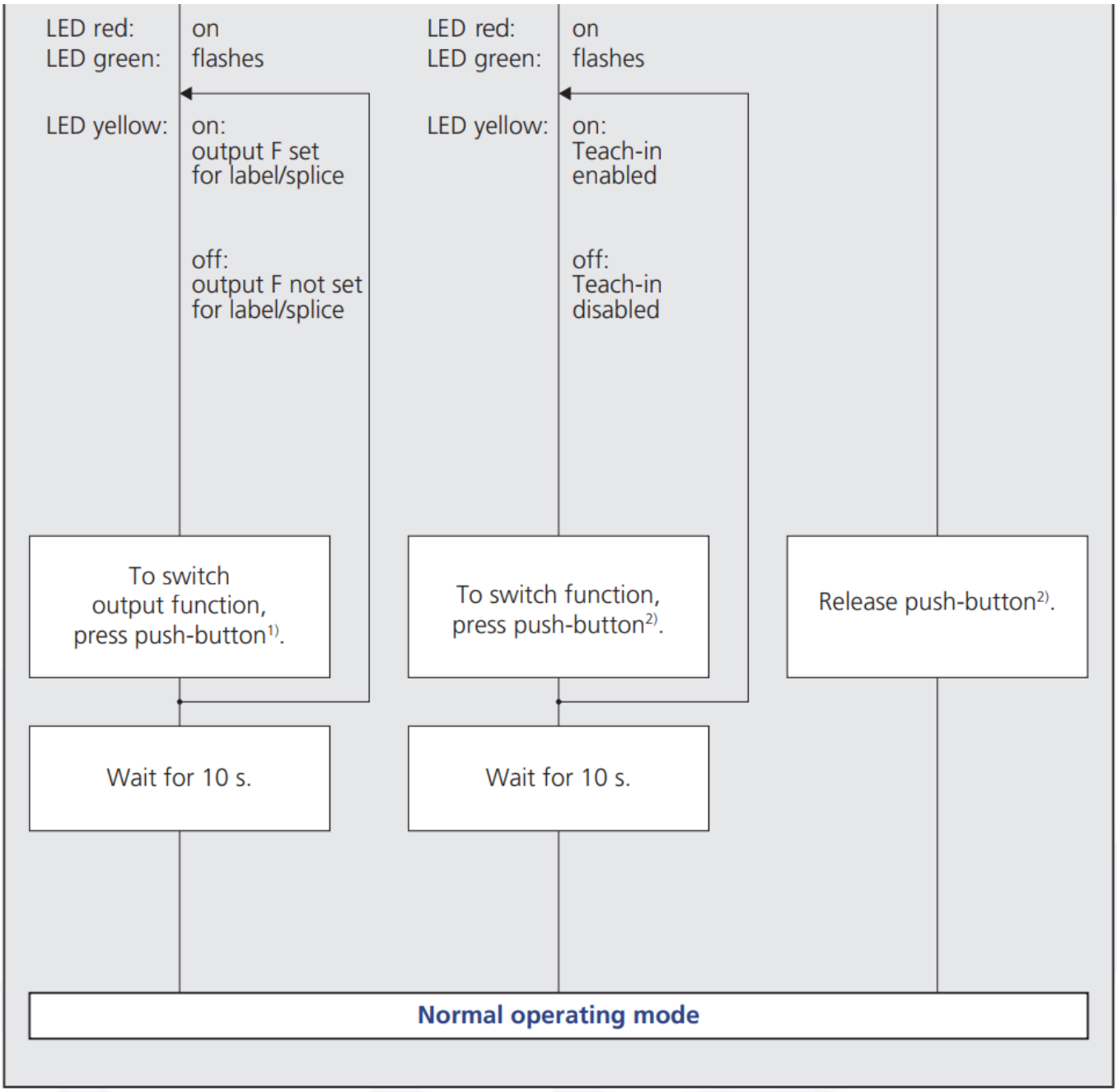
Enable QuickTeach	QuickTeach label sensor	QuickTeach splice sensor
Turn off operating voltage.	Insert backing material with label into the fork.	Insert web material into the fork.
Press push-button[2].	Press push-button[1] for 1 s, until LED red: off, LED green: flashes, LED yellow: on.	Press push-button[1] (LED red: on, LED green: flashes, LED yellow: off) and continue to hold it down.
Turn on operating voltage.	Move the backing material with labels through the fork at a constant speed.	Move web material (without splice) through the fork.
Hold down push-button[2] for 6 s, until red and green LED are on and yellow LED flashes.	Wait until the LEDs stop flashing.	



Further settings

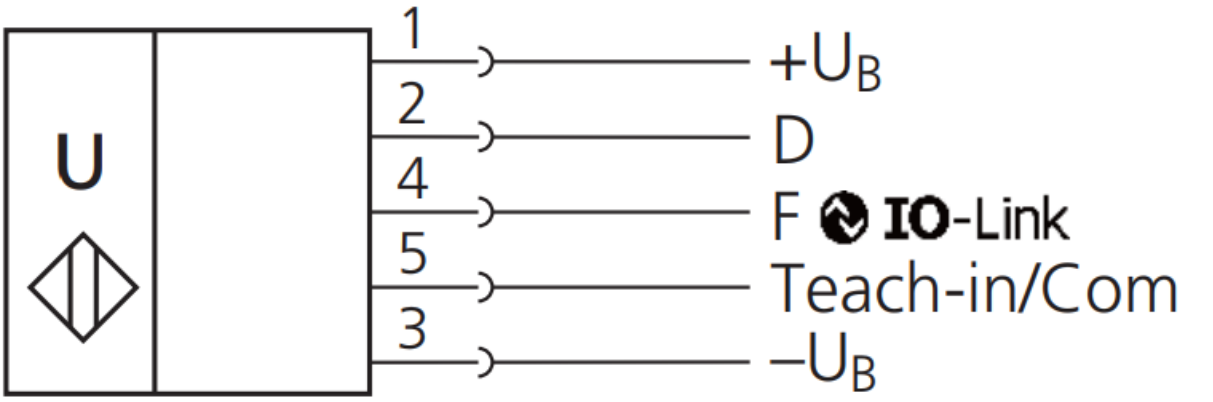
Diagram 3: Further settings


Adjusting label/splice output F to NCC/NOC3)
Enable/disable Teach-in
Reset to factory setting
Turn off operating voltage.
Turn off operating voltage.
Press push-button2).
Press push-button2).
Turn on operating voltage.
Turn on operating voltage.
Press push-button1) for 13 s, until red LED is on and green and yellow LED flash simultaneously.
Press push-button2) for 3 s, until red LED is on and green and yellow LED flash alternately.
Press push-button2) for 10 s, until red and yellow LED are on and green LED flashes.



Technical Data

esf-1/CDF/A; esf-1/7/CDF/A; esf-1/15/CDF/A



1 push-pull and 1 pnp switching output

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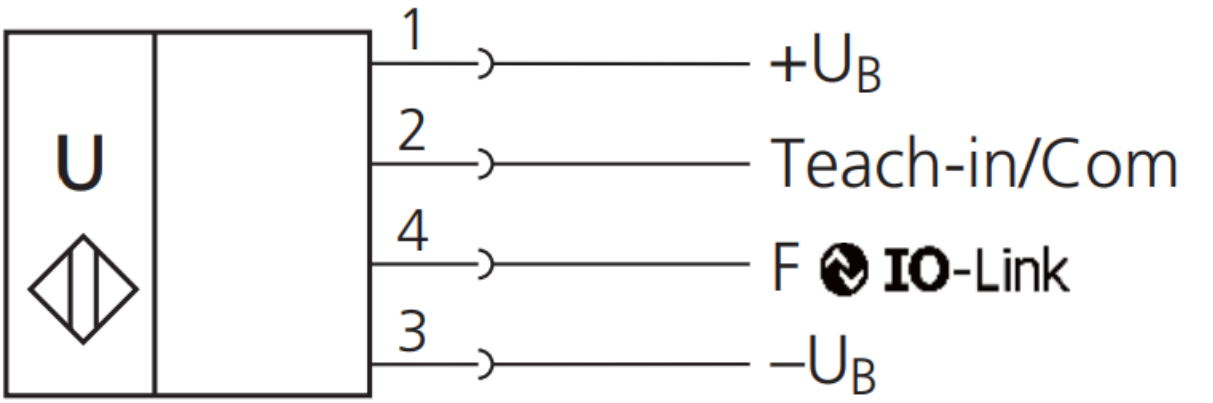
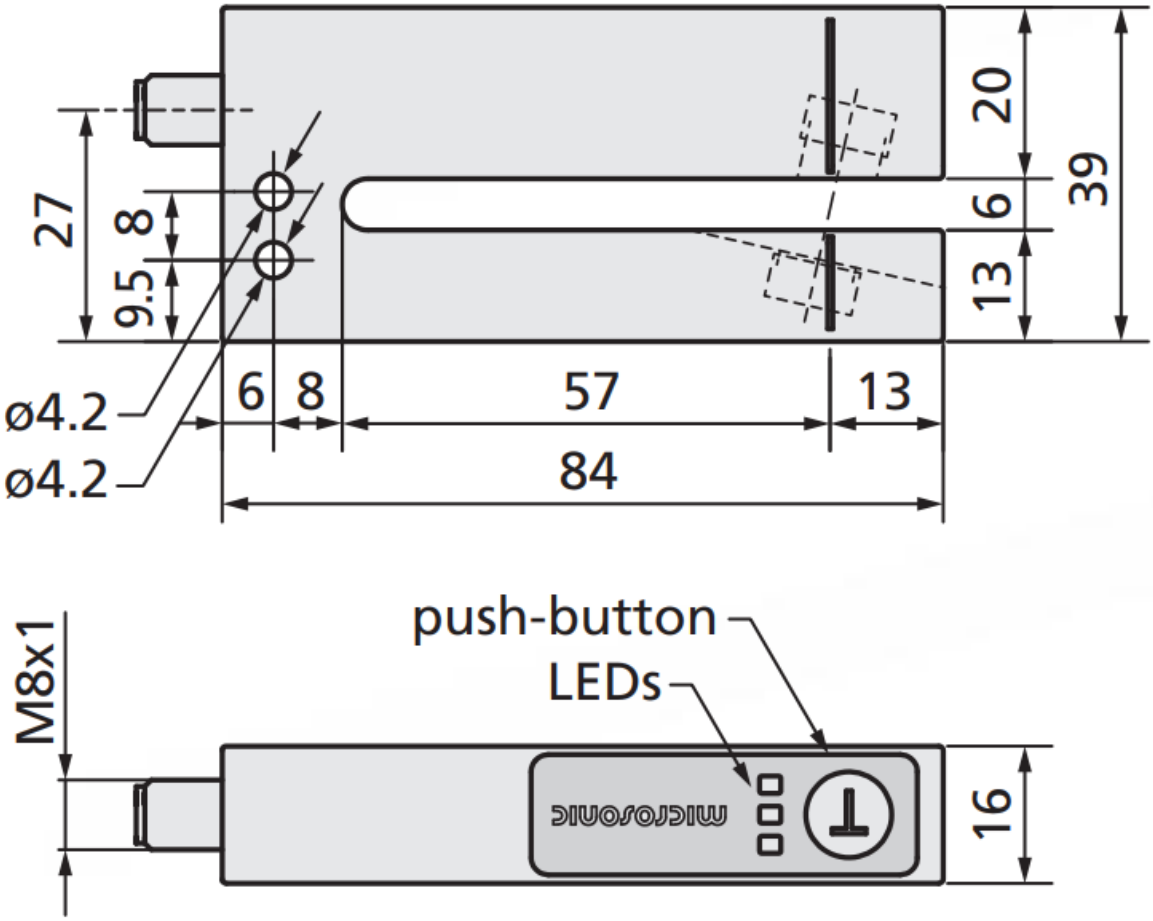
esf-1/CF/A



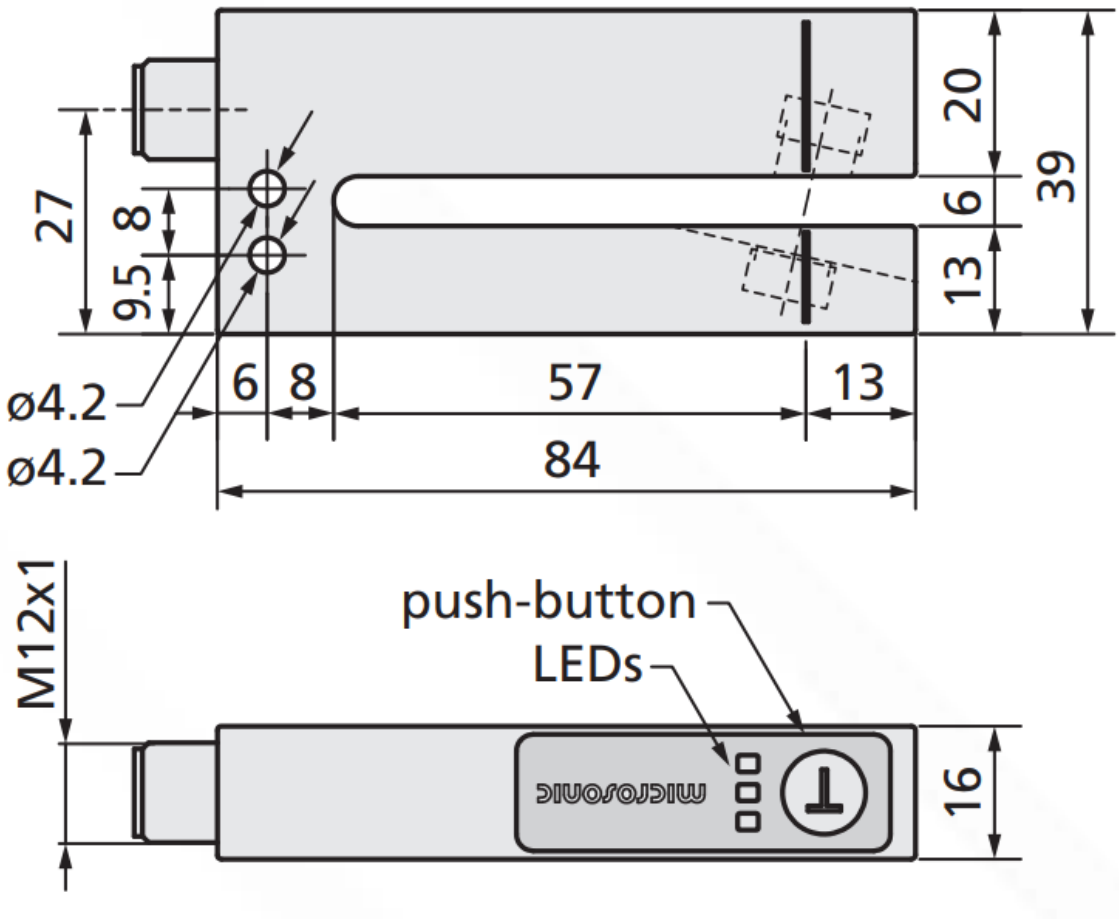
1 push-pull switching output



- fork width 6 mm
- fork depth 70 mm
- transducer frequency 500 kHz
- working range web material with grammages of <20 g/m2 to >>400 g/m2, metal-laminated paper and films up to 0.2 mm thick, self-adhesive films, labels on backing material
- operating voltage UB 20 to 30 V DC, reverse polarity protection (Class 2)
- operating voltage ripple ±10 %
- no-load current consumption ≤50 mA
- type of connection 4-pin M8 initiator plug
- controls Teach-in push-button, control input Pin 2
- scope of settings Teach-in, IO-Link, LinkControl
- response time 300 µs to 2 ms, depending on the material
- indicators LED green: working/backing material
    - LED yellow: label/splice
    - LED red: web break
    - LEDs flash: Teach-in dismissed
- IO-Link V1.1
- housing
    - aluminium anodized; plastic parts: PBT, PA; ultrasonic transducer: polyurethane, epoxy resin with glass content
- class of protection to EN 60529 IP 65
- operating temperature +5 to +60 °C

- storage temperature –40 to +85 °C
- weight 80 g
- norm conformity EN 60947-5-2
- time delay before availability <300 ms
- order no. esf-1/CF/A
- label/splice output F push-pull, +UB–3 V, –UB+3 V, Imax. = 100 mA, short-circuit-proof, switchable NOC/NCC
- web break output D

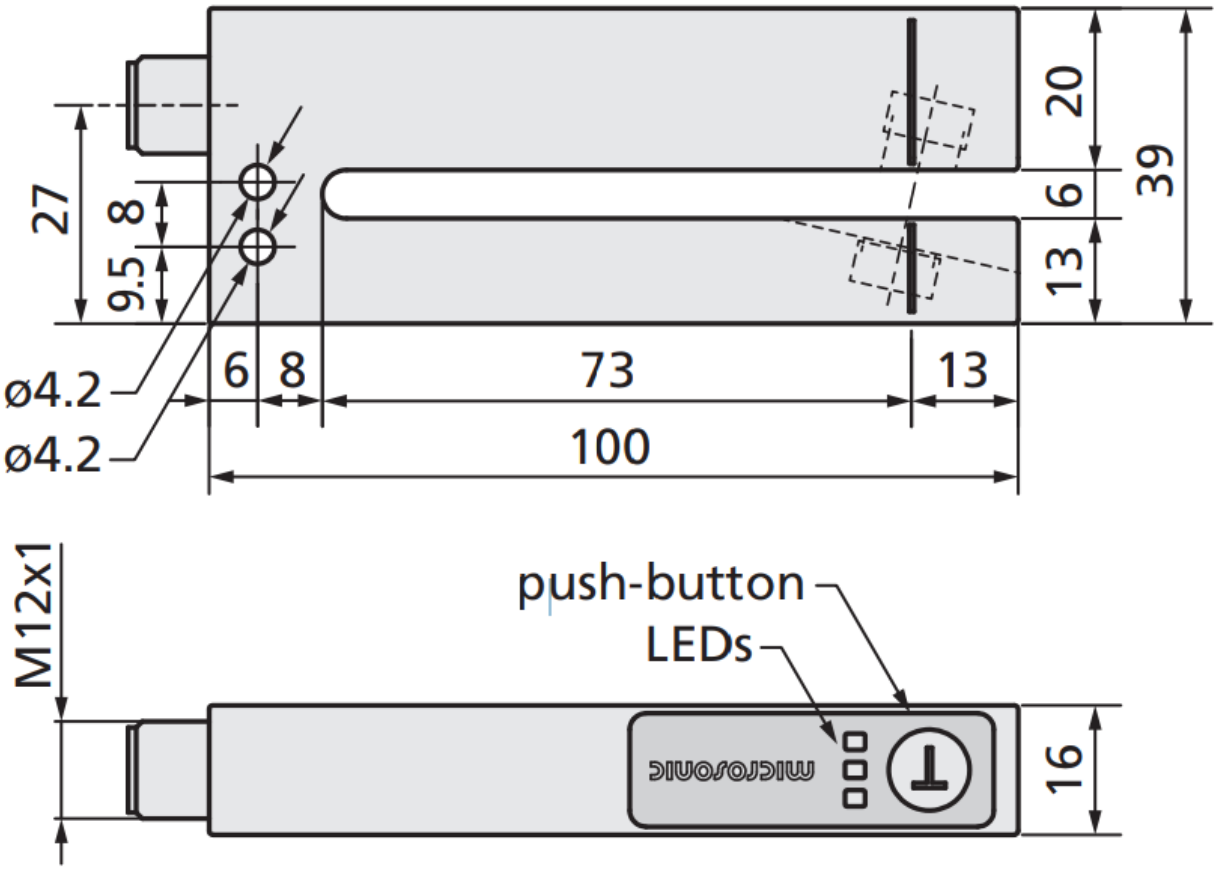
esf-1/CDF/A



- fork width 6 mm
- fork depth 70 mm
- transducer frequency 500 kHz
- working range web material with grammages of <20 g/m2 to >>400 g/m2, metal-laminated paper and films up to 0.2 mm thick, self-adhesive films, labels on backing material
- operating voltage UB 20 to 30 V DC, reverse polarity protection (Class 2)
- operating voltage ripple ±10 %
- no-load current consumption ≤50 mA
- type of connection 4-pin M8 initiator plug
- controls Teach-in push-button, control input Pin 2
- scope of settings Teach-in, IO-Link, LinkControl
- response time 300 µs to 2 ms, depending on the material

- indicators LED green: working/backing material
    - LED yellow: label/splice
    - LED red: web break
    - LEDs flash: Teach-in dismissed
- IO-Link V1.1
- housing
    - aluminium anodized; plastic parts: PBT, PA; ultrasonic transducer: polyurethane, epoxy resin with glass content
- class of protection to EN 60529 IP 65
- operating temperature +5 to +60 °C
- storage temperature –40 to +85 °C
- weight 80 g
- norm conformity EN 60947-5-2
- time delay before availability <300 ms
- order no. esf-1/CDF/A
- label/splice output F push-pull, +UB–3 V, –UB+3 V, Imax. = 100 mA, short-circuit-proof, switchable NOC/NCC
- web break output D pnp, +UB–3 V, Imax. = 100 mA, short-circuit-proof, switchable NOC/NCC

esf-1/7/CDF/A

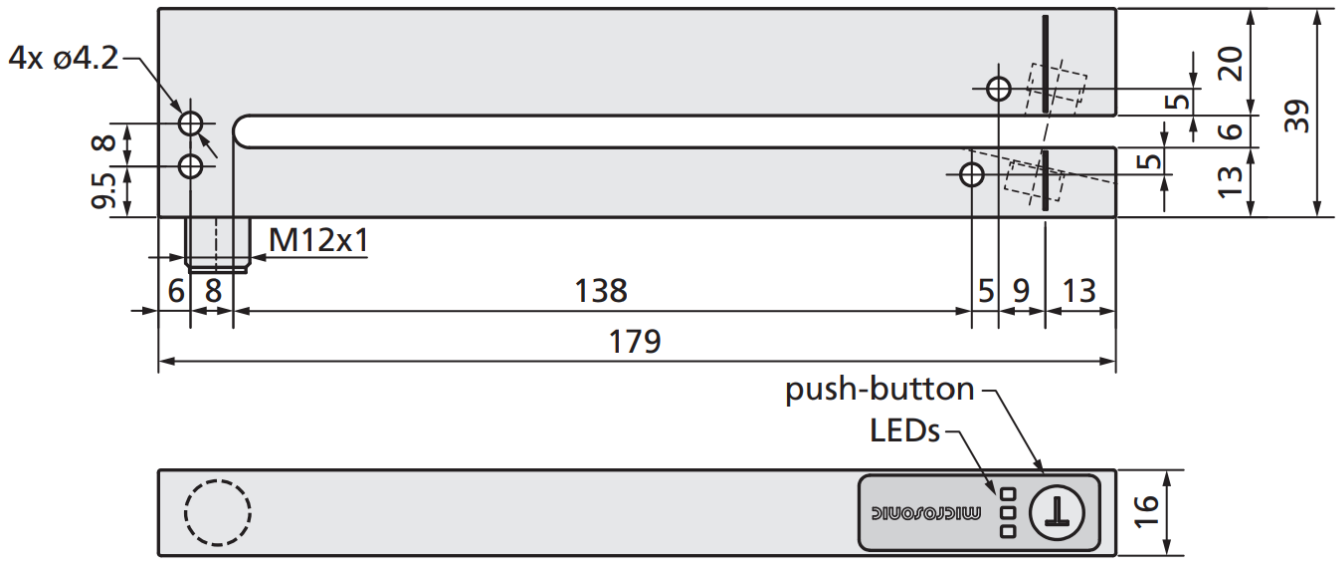


- fork width 6 mm
- fork depth 86 mm
- transducer frequency 500 kHz
- working range web material with grammages of <20 g/m2 to >>400 g/m2, metal-laminated paper and films up

to 0.2 mm thick, self-adhesive films, labels on backing material

- operating voltage UB 20 to 30 V DC, reverse polarity protection (Class 2)
- operating voltage ripple ±10 %
- no-load current consumption ≤50 mA
- type of connection 4-pin M8 initiator plug
- controls Teach-in push-button, control input Pin 2
- scope of settings Teach-in, IO-Link, LinkControl
- response time 300 µs to 2 ms, depending on the material
- indicators LED green: working/backing material
    - LED yellow: label/splice
    - LED red: web break
    - LEDs flash: Teach-in dismissed
- IO-Link V1.1
- housing
    - aluminium anodized; plastic parts: PBT, PA; ultrasonic transducer: polyurethane, epoxy resin with glass content
- class of protection to EN 60529 IP 65
- operating temperature +5 to +60 °C
- storage temperature –40 to +85 °C
- weight 90 g
- norm conformity EN 60947-5-2
- time delay before availability <300 ms
- order no. esf-1/7/CDF/A
- label/splice output F push-pull, +UB–3 V, –UB+3 V, Imax. = 100 mA, short-circuit-proof, switchable NOC/NCC
- web break output D pnp, +UB–3 V, Imax. = 100 mA, short-circuit-proof, switchable NOC/NCC

esf-1/15/CDF/A



- fork width 6 mm
- fork depth 165 mm

- transducer frequency 500 kHz
- working range web material with grammages of <20 g/m2 to >>400 g/m2, metal-laminated paper and films up to 0.2 mm thick, self-adhesive films, labels on backing material
- operating voltage UB 20 to 30 V DC, reverse polarity protection (Class 2)
- operating voltage ripple ±10 %
- no-load current consumption ≤50 mA
- type of connection 4-pin M8 initiator plug
- controls Teach-in push-button, control input Pin 2
- scope of settings Teach-in, IO-Link, LinkControl
- response time 300 µs to 2 ms, depending on the material
- indicators LED green: working/backing material
    - LED yellow: label/splice
    - LED red: web break
    - LEDs flash: Teach-in dismissed
- IO-Link V1.1
- housing
    - aluminium anodized; plastic parts: PBT, PA; ultrasonic transducer: polyurethane, epoxy resin with glass content
- class of protection to EN 60529 IP 65
- operating temperature +5 to +60 °C
- storage temperature –40 to +85 °C
- weight 160 g
- norm conformity EN 60947-5-2
- time delay before availability <300 ms
- order no. esf-1/15/CDF/A
- label/splice output F push-pull, +UB–3 V, –UB+3 V, Imax. = 100 mA, short-circuit-proof, switchable NOC/NCC
- web break output D pnp, +UB–3 V, Imax. = 100 mA, short-circuit-proof, switchable NOC/NCC

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 mini-mum 32 Vdc, minimum 290 mA, in the final in-stallation.

Contact

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- BTW NL807226841B01
- BANK NL93HAND0784527083
- KVK 18128491

Documents / Resources

	IO-Link esf-1CDF A2 Speed Ultrasonic Label And Splice Sensor [pdf] Instruction Manual esf-1CDF Speed Ultrasonic Label And Splice Sensor, esf-1CDF, Speed Ultrasonic Label And Splice Sensor, Ultrasonic Label And Splice Sensor, Label And Splice Sensor, Splice Sensor

References

- User Manual