en 2020/07/02    50128317-01
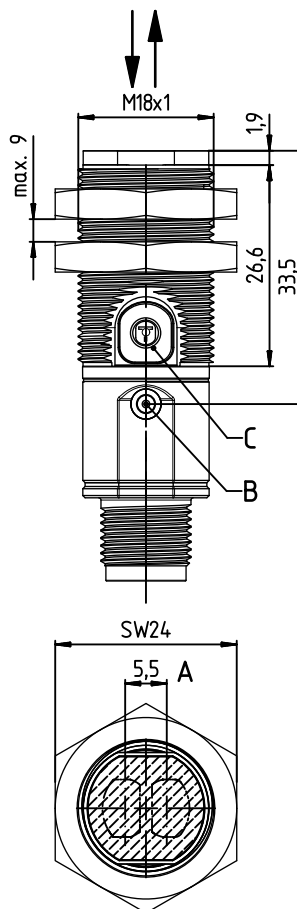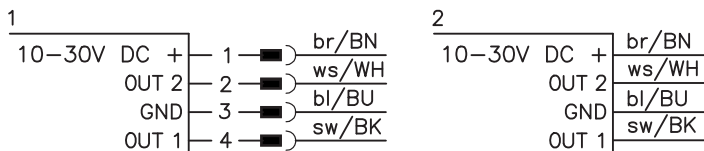
**80 … 150mm**

- Diffuse reflection sensor for the detection of labels on bottles
- Easy setting via teach-in
- Infrared light
- Active ambient light suppression A$^2$LS
- Embedded mounting option
- Full control through green and yellow indicator LEDs
- Sturdy plastic housing with stainless steel threaded sleeve with cylindrical M18x1 design

We reserve the right to make changes ? DS_FT328I_P1_en_50128317_02.fm

## Accessories: (available separately)

- Mounting systems (BTU D18M-D12, BT D18M.5)
- M12 connectors (KD …)
- Ready-made cables (K-D …)

## Dimensioned drawing



M18x1

max. 9

1,9

26,6

33,5

SW24

5,5    A

C

B

**A**  Optical axes
**B**  Indicator diode
**C**  Teach button

## Electrical connection



| 1 | | |
|---|---|---|
| 10−30V DC + | 1 | br/BN |
| OUT 2 | 2 | ws/WH |
| GND | 3 | bl/BU |
| OUT 1 | 4 | sw/BK |

| 2 | |
|---|---|
| 10−30V DC + | br/BN |
| OUT 2 | ws/WH |
| GND | bl/BU |
| OUT 1 | sw/BK |

# Technical data

### Optical data

| | |
|---|---|
| Operating range limit [1] | 80 … 150 mm |
| Operating range [2] | 80 … 120 mm |
| Light source | LED (modulated light) |
| Wavelength | 850 nm (infrared light) |

### Time behavior

| | |
|---|---|
| Switching frequency | 500 Hz |
| Response time | 1 ms |
| Readiness delay | ≤ 300 ms |

### Electrical data

| | | |
|---|---|---|
| Operating voltage $U_B$ [3] | | 10 … 30 VDC (incl. residual ripple) |
| Residual ripple | | ≤ 15 % of $U_B$ |
| Open-circuit current | | ≤ 20 mA |
| Switching output | …/4P… | 2 PNP transistor outputs |
| | | Pin 2: PNP dark switching, pin 4: PNP light switching |
| | …/2N… | 2 NPN transistor outputs |
| | | Pin 2: NPN dark switching, pin 4: NPN light switching |
| Signal voltage high/low | | ≥ ($U_B$-2.5 V)/≤ 2.5 V |
| Output current | | Max. 100 mA [4] |

### Indicators

| | |
|---|---|
| Green LED | Ready |
| Yellow LED | Reflection (object detected) |

### Mechanical data

| | |
|---|---|
| Housing | Plastic with stainless steel threaded sleeve |
| Optics cover | Plastic |
| Weight | 30 g with M12 connector |
| | 80 g with 2 m cable |
| Connection type | M12 connector, 4-pin |
| | Cable 2 m, 4 x 0.20 mm² |

### Environmental data

| | |
|---|---|
| Ambient temp. (operation/storage) | -40 °C … +60 °C/-40 °C … +70 °C |
| Protective circuit [5] | 2, 3 |
| VDE protection class | III |
| Degree of protection | IP 67 |
| Light source | Exempt group (in acc. with EN 62471) |
| Standards applied | IEC 60947-5-2 |
| Certifications | UL 508, C22.2 No.14-13 [3] [6] |

1) Operating range limit: typical scanning range
2) Operating range: ensured scanning range
3) For UL applications: use is permitted exclusively in Class 2 circuits according to NEC
4) Sum of the output currents for both outputs, 50 mA at ambient temperatures > 40 °C
5) 2=polarity reversal protection, 3=short circuit protection for all outputs
6) These proximity switches shall be used with UL Listed Cable assemblies rated 30V, 0.5A min, in the field installation, or equivalent (categories: CYJV/CYJV7 or PVVA/PVVA7)

# Mounting instructions

The sensor must be oriented at an angle of approx. 30 degrees to horizontal. We recommend using our BTU D18M-D12 mounting system (part no. 50117490).

### Adjustment and alignment

Push the BTU without sensor onto the rod, slightly tighten both screws and set the inclination to approx. 30 degrees. To do this, measure the distance from the upper edge of the clamp to the lower edge of the mounting bracket. The desired inclination is reached at 42 mm. Align the sensor so that the emitted light strikes the center of the bottle. Tighten both screws on the BTU and screw the sensor to the mounting plate as shown in the drawing. Recheck the distance of 80 … 120 mm and the setting.



BTU D18M-D12
ca. 30° → H = 42 mm
H
Rod Ø 12 mm
80 … 120 mm
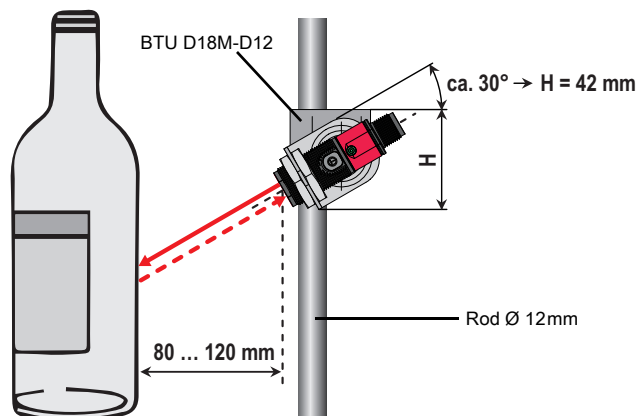
## Tables

## Diagrams

## Notes

**Observe intended use!**

⭢ This product is not a safety sensor and is not intended as personnel protection.
⭢ The product may only be put into operation by competent persons.
⭢ Only use the product in accordance with its intended use.

The sensor is used for the detection of labels (paper or film, adhesive or sleeve) on transparent containers (bottles and glasses; all types of glass, empty or full) at typical distance of 80 … 120 mm.

## FT328I                                                    Label sensor

## Order guide

The sensors listed here are preferred types; current information at www.leuze.com.

|  | | Designation | Part no. |
|---|---|---|---|
| **Sensors with axial optics** | | | |
| With M12 connector | Pin 4: PNP light switching, pin 2: PNP dark switching | FT328I.3/4P-M12P1 | 50127773 |
| | Pin 4: NPN light switching, pin 2: NPN dark switching | FT328I.3/2N-M12P1 | 50144041 |
| With cable, 2m | Pin 4: PNP light switching, pin 2: PNP dark switching | FT328I.3/4PP1 | On request |
| | Pin 4: NPN light switching, pin 2: NPN dark switching | FT328I.3/2NP1 | On request |

| **Accessories for optimum fastening** | | |
|---|---|---|
| Mounting system for rods Ø 12mm | BTU D18M-D12 | 50117490 |
| Mounting system *omni-mount* | BT318B-OM | 50121904 |
| Mounting bracket for standard mounting | BT D18M.5 | 50113548 |
| Mounting bracket for *omni-mount* | BT D21M | 50117257 |

## Part number code

```
F T 3 2 8 I . 3 / 4 P - M 1 2 P 1
```
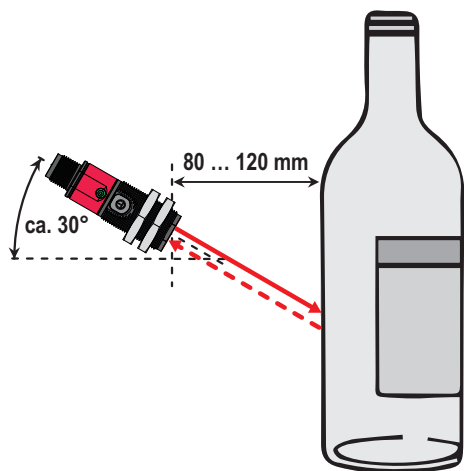
**Operating principle**
FT          Diffuse reflection sensor with fading

**Series**
328I        Series 328 with infrared light

**Equipment**
.3          Axial optics, teach-in via teach button

**Switching output/function /OUT1OUT2 (OUT1 = Pin 4, OUT2 = Pin 2)**
4           PNP, light switching
P           PNP, dark switching
2           NPN, light switching
N           NPN, dark switching

**Electrical connection**
-M12        M12 connector, 4-pin
n/a         Cable, standard length 2m

**Configuration**
P1          Configured for label detection

## Setting the label sensor

The sensor evaluates the signal difference between a free glass surface (here: specular reflection) and a surface with a label (here: diffuse reflection). For optimum adaptation to the conditions, the sensor has two operating levels.

|  | Operating level 1: standard | Operating level 2: sensitive |
|---|---|---|
| Application (typical) | Clear signal difference between the free glass surface and the label surface, e.g., *paper label*. | Small signal difference between the free glass surface and the label surface, e.g., *foil label*. |
| Teach | **Press button for 2 … 7s** until yellow LED flashes at 3 Hz, then release button. | **Press button for 7 … 12s** until LED flashes yellow and green alternately at 3 Hz, then release button. |
| Observation | After teaching, the sensor is in a stable OFF state and shows no faulty switching on the bare glass surface (without label). If the label is turned into the detection range of the sensor, the sensor detects the label over the entire length of the label.<br><br>In the event of faulty switching on the glass surface, repeat the teach event. Check whether a stable switching behavior can be achieved with a slightly changed inclination.<br><br>It may be necessary to change the teach mode from *Standard* to *Sensitive*. ||

1. **Align the sensor on an area without label as shown:**
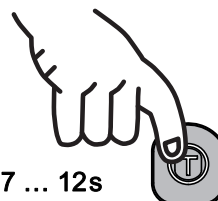   Note **the position of the teach button, the angle** and **the distance**!

80 … 120 mm

ca. 30°

2. **Teach the sensor:**
   **Standard** (operating level 1)

2 … 7s

LED flashes **yellow** at 3 Hz
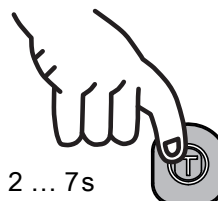
or

**Sensitive** (operating level 2)

7 … 12s

Flashes **yellow** and **green alternately** with 3 Hz

## Fine adjustment of the switching threshold (sensitivity) using *easy tune*

The switching threshold (A) can be adjusted upward and downward by pressing the teach button for a short or long period time. The effect is comparable to turning a potentiometer.

Press the teach button for a **short period of time** (2 ms … 200 ms) to **increase the switching threshold**; the sensor becomes **less sensitive**.
Result: greater protection against faulty switching on the bare glass surface.
The required signal difference between glass and label surface is increased.
Used preferably with paper labels.

Press the teach button **for a long period of time** (200 ms … 2 s) to **reduce the switching threshold**; the sensor becomes **more sensitive**.
Result: the required signal difference between glass and label surface is reduced.
Used preferably with foil labels.
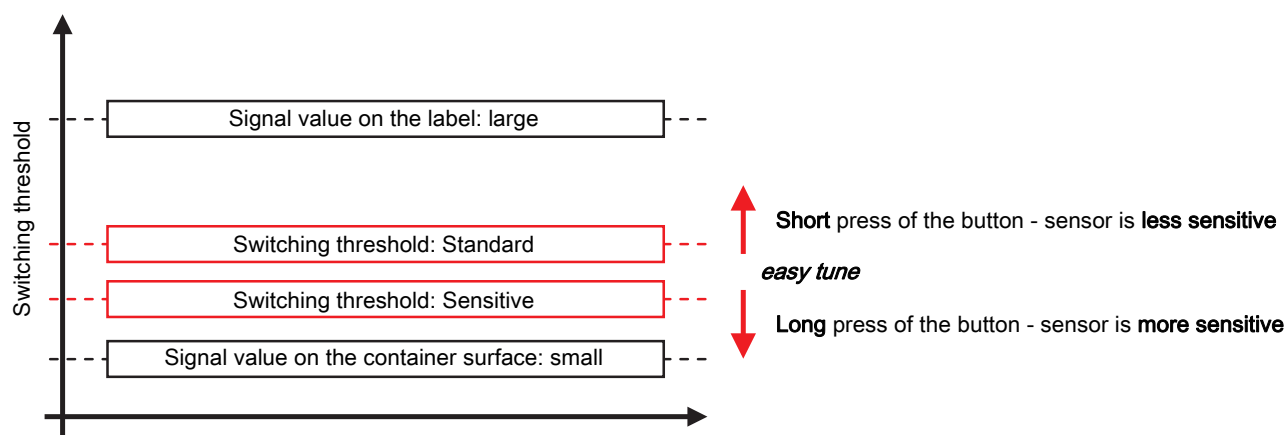


| NOTE | |
|---|---|
| ℹ | The details on installation and on sensor settings take into account a typical application for detecting the label on a transparent container, e.g., mineral water in a glass or PET bottle with paper label. Having a particularly strong influence on the function are color and surface structure of the container, container contents, the geometrical arrangement of the sensor (angle to the horizontal as well as distance between sensor and container) and especially the label. |
| | As long as there are clear signal differences between the bare container surface and the label surface, the sensor evaluates these and functions very robustly. A predominantly white paper label on a white PET milk bottle can, under some circumstances, not be detected due to the low signal difference. In the event of operating problems, we recommend always changing just one parameter and then observing the effect of the measure. Necessary changes could be:<br>1.**Standard** or **Sensitive** teach mode<br>2.Use *easy tune* to slightly increase or decrease the sensitivity.<br>3.Increase or decrease the angle to the horizontal<br>4.Increase or reduce the distance between sensor and container |

# Adjusting the switching behavior of the switching output – light/dark switching

This function permits inversion of the sensors' switching logic.

- Press teach button until the **green** LED flashes.
- Release teach button.
- The LED then displays the changed switching logic **for 2s**:

  **YELLOW Continuous light** = switching outputs **light switching** (in the case of complementary sensors, Q1 (pin 4) light switching, Q2 (pin 2) dark switching), this means output active when object is detected.

  **GREEN Flashing light** = switching outputs **dark switching** (in the case of complementary sensors, Q1 (pin 4) dark switching, Q2 (pin 2) light switching), this means output inactive when object is detected.

- Ready.

> 12s

LED flashes **green** at 3Hz

or

2s YELLOW = light switching

Flashes GREEN for 2s = dark switching