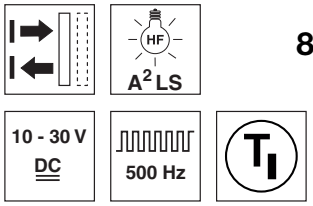
FT5I — Label sensor

en 01-2015/09 50130822



80 … 150 mm

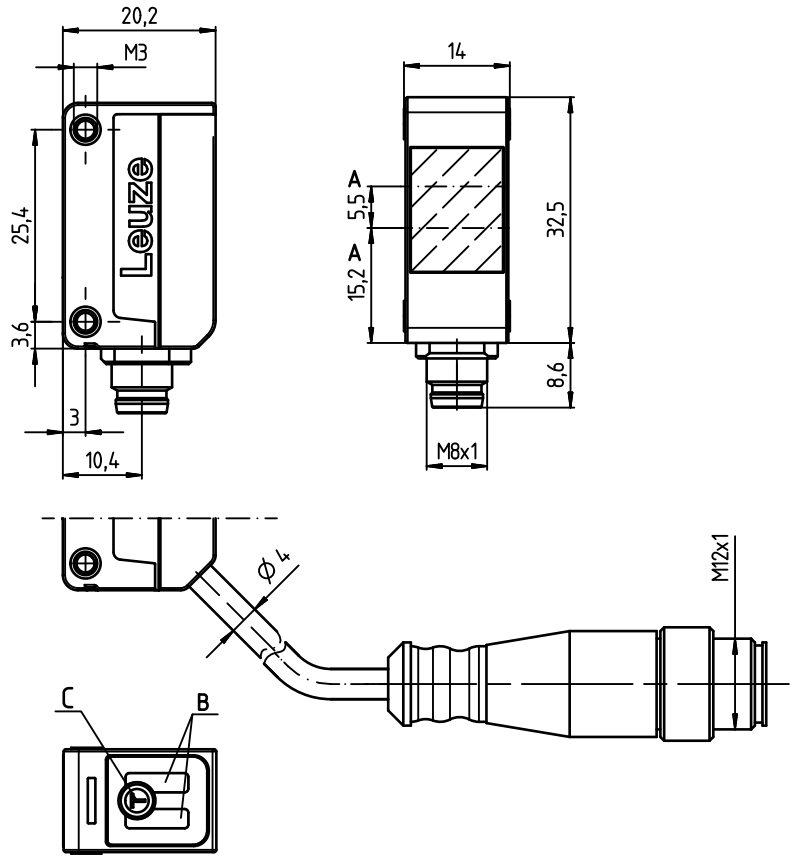
- Reflection light scanner for the detection of labels on bottles
- Easy setting via teach-in
- Infrared light
- Active suppression of extraneous light A^2LS
- Simple mounting with integrated M3 metal threaded sleeves
- Compact installation possible due to cable outlet at the rear or bottom
- Full control through green and yellow indicator LEDs
- Robust plastic housing acc. to IP 67 for industrial application

Accessories:

(available separately)

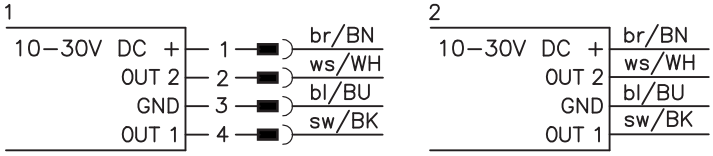
- Mounting systems (BTU 200 …)
- M12 connectors (KD …)
- Ready-made cables (K-D …)

Dimensioned drawing



A Optical axes
B Indicator diode
C Teach button

Electrical connection



Specifications

Optical data

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

Timing

Switching frequency		500 Hz
Response time		1 ms
Delay before start-up		≤ 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	40 g with 200 mm cable and M12 connector
Connection type	cable 200 mm with M12 connector, 4-pin

Environmental data

Ambient temp. (operation/storage)	-40 °C … +60 °C/-40 °C … +70 °C
Protective circuit [5]	2, 3
VDE safety 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]

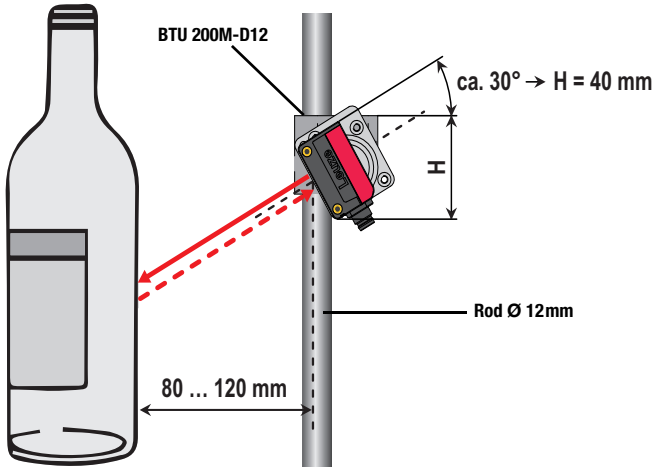
1) Scanning range limit: typical scanning range
2) Scanning range: ensured scanning range
3) For UL applications: for use in class 2 circuits according to NEC only
4) Sum of the output currents for both outputs, 50 mA when ambient temperatures > 40 °C
5) 2=polarity reversal protection, 3=short circuit 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 200M-D12** mounting system (part no. 50117255).

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 plate. The desired inclination is reached at 40 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.



Remarks

Operate in accordance with 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 the intended use.

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

Order guide

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

		Designation	Part no.
With 200mm cable and M12 connector	Pin 4: PNP light switching, pin 2: PNP dark switching	FT5I.3/4P-200-M12P1	50130280
		Additional types on request	

Accessories for optimum fastening

Mounting system for rods Ø 10mm	BTU 200M-D10	50117256
Mounting system for rods Ø 12mm	BTU 200M-D12	50117255
Mounting system for rods Ø 14mm	BTU 200M-D14	50117254

You can find other rod fastening accessories at *www.leuze.com*

Part number code

F	T	5	I	.	3	/	4	P	-	2	0	0	-	M	1	2	P	1

Operating principle

FT	Reflection light scanner with fading

Series

5I	Series 5 with infrared light

Equipment

.3	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

-200-M12	Cable 200mm with M12 connector, 4-pin

Parameterization

P1	Configured for label detection

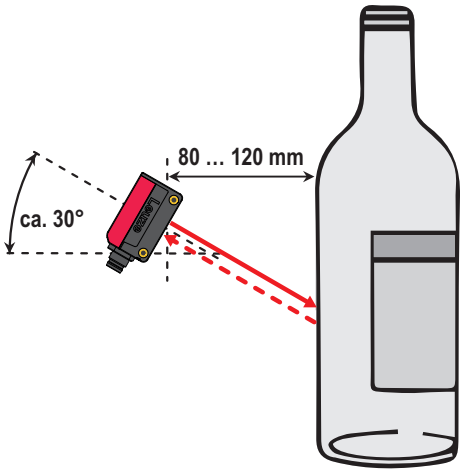
Setting the label sensor

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 3Hz, then release button.	**Press button for 7 … 12s** until LED flashes yellow and green alternately at 3Hz, 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. 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. It may be necessary to change the teach mode from ***Standard*** to ***Sensitive***.	

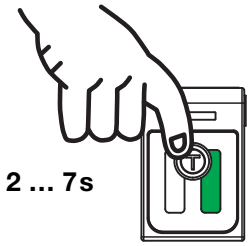
1. Align the sensor on an area without label as shown:

Note the **angle** and **distance!**



2. Teach the sensor:

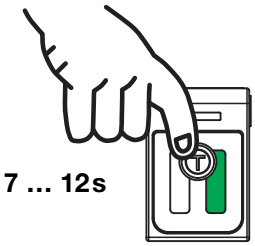
Standard (operating level 1)



simultaneously
flashing at
3Hz

or

Sensitive (operating level 2)



alternatingly
flashing at
3Hz

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

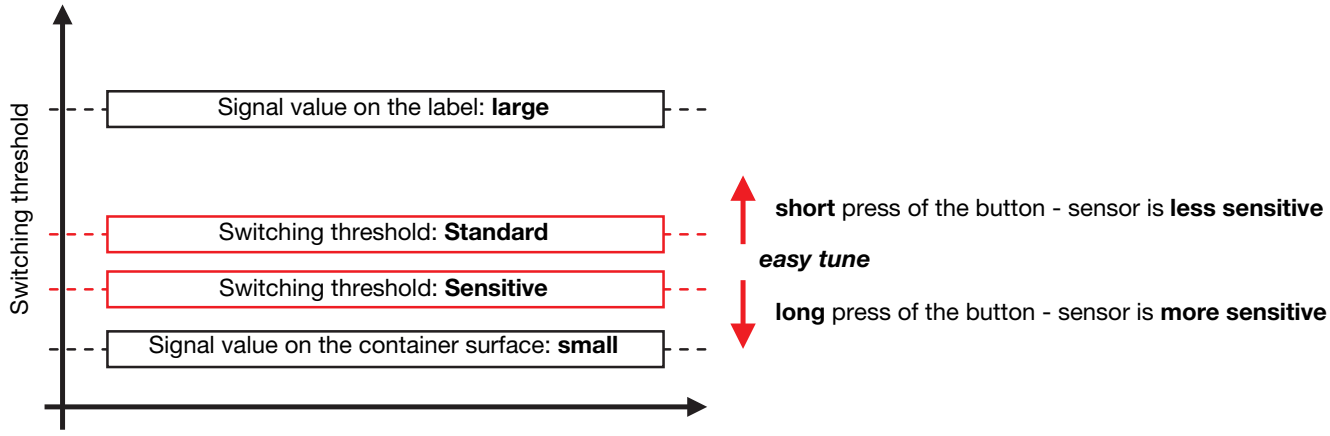
The switching threshold can be adjusted upward and downward by pressing the teach button for a short or long period time. The effect is comparable to turning a potentiometer.

Press the teach button for a **short period of time** (2ms … 200ms) 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** (200ms … 2s) 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.



Remarks

The details on installation and on sensor setting 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 this 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:

1. **Standard** or **Sensitive** teach mode
2. Use ***easy tune*** to slightly increase or decrease the sensitivity.
3. Increase or decrease the angle to the horizontal
4. Increase or reduce the distance between sensor and container

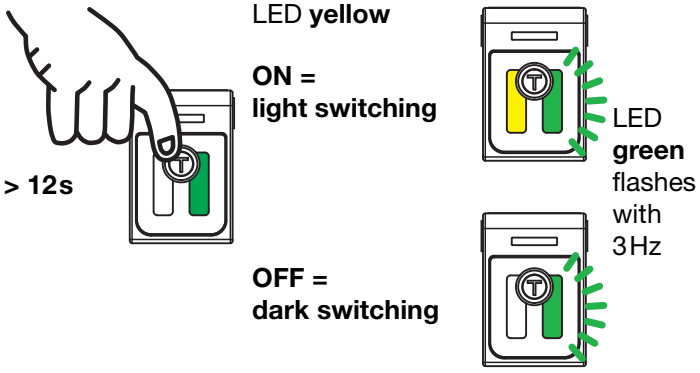
Adjusting the switching behavior of the switching output – light/dark switching

This function permits inversion of the sensors' switching logic.

- Press the teach button until only the green LED flashes. The yellow LED then shows the inverted switching logic:

  ON = 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.

  OFF = 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.



- Release teach button.
- Ready.