

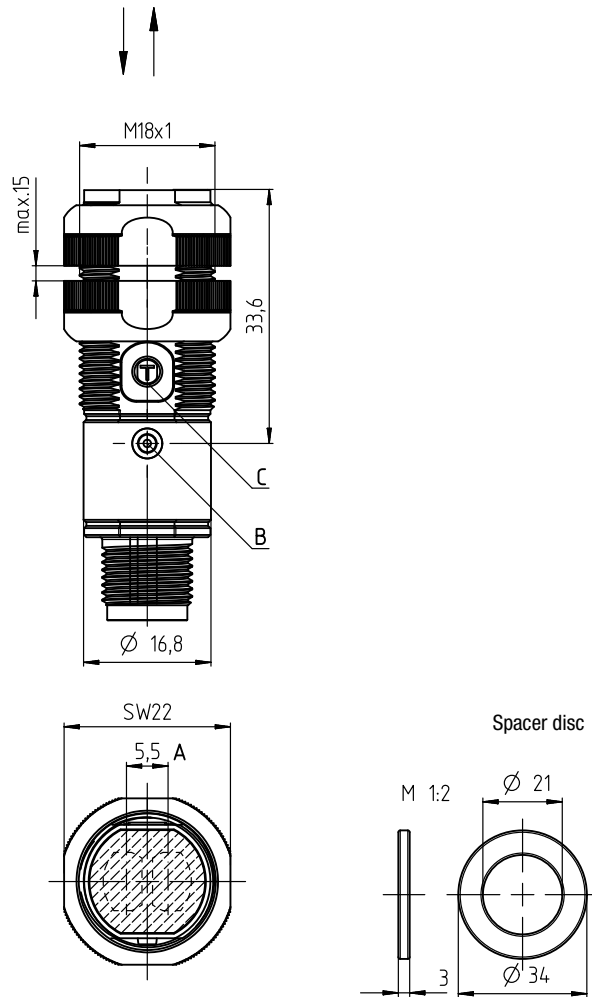
**FT318BI**

**Diffuse reflection light scanners with fading**

en 03-2015/09 50127492

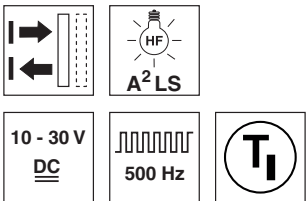


**Dimensioned drawing**



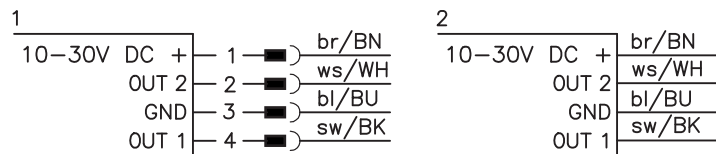
- A** Optical axes
- B** Indicator diode
- C** Teach button

**1 ... 280mm**



- Diffuse reflection light scanners with fading
- V-optics allow for reliable detection of dark objects in the short range
- Scanning range adjustment via teach-in
- Infrared light for universal use
- Active suppression of extraneous light A²LS
- Simple fine adjustment via *omni-mount*
- Embedded mounting option
- Full control through green and yellow indicator LEDs
- Robust plastic housing acc. to IP 67 for industrial application

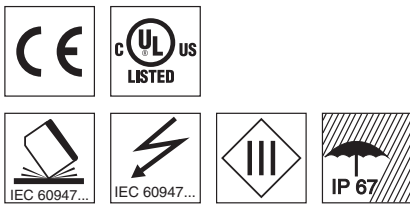
**Electrical connection**



**Zubehör:  
Accessories:**

- (available separately)
- Mounting systems (BT D18M.5, BT D21M, BT 318...)
  - M12 connectors (KD ...)
  - Ready-made cables (K-D ...)

We reserve the right to make changes • DS\_FT318BI\_en\_50127492.fm



## Specifications

### Optical data

Scanning range limit <sup>1)</sup>	1 ... 280mm
Scanning range <sup>2)</sup>	1 ... 215mm
Light source	LED (modulated light)
Wavelength	850nm (infrared light)

### Timing

Switching frequency	500Hz
Response time	1ms
Delay before start-up	≤ 300ms

### Electrical data

Operating voltage $U_B$ <sup>3)</sup>	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of $U_B$
Open-circuit current	≤ 20mA
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	≥ ( $U_B - 2.5V$ ) / ≤ 2.5V
Output current	max. 100mA <sup>4)</sup>

### Indicators

Green LED	ready
Yellow LED	reflection (object detected)

### Mechanical data

Housing	plastic
Optics cover	plastic
Weight	20g with M12 connector 70g with 2m cable
Connection type	M12 connector, 4-pin cable 2m, 4x0.20mm <sup>2</sup>

### Environmental data

Ambient temp. (operation/storage)	-40°C ... +60°C / -40°C ... +70°C
Protective circuit <sup>5)</sup>	2, 3
VDE safety class	III
Protection class	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 <sup>3)</sup> <sup>6)</sup>

- 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, 50mA 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)



### Fading: black/white error < 50%

The black/white error is calculated from the scanning range against white and the reduction of the scanning range against black:

$$\text{black/white-error} = \frac{\text{Reduction of the scanning range against black}}{\text{Scanning range against white}} \times 100\%$$

### Example:

Setting: "teach on object" at 160mm on white 90%

#### - Detection:

Black object, 6%, is detected at approx. 100mm, the black/white error here is:  
60mm / 160mm = approx. 38%

Setting: "teach on object" at 120mm on black 6%

#### - Situation in background:

White object, 90%, is no longer detected at distance > 200mm, the black/white error here is:  
80mm / 200mm = 40%

## Tables

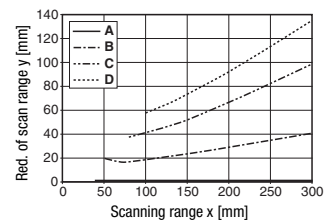
1	1	215	280
2	1	190	245
3	3	150	190
4	5	125	160

1	white 90%
2	gray 50%
3	gray 18%
4	black 6%

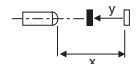
□	Scanning range [mm]
■	Typ. scanning range limit [mm]

## Diagrams

Typ. black/white behavior



- A white 90%
- B gray 50%
- C gray 18%
- D black 6%



## Remarks

### Operate in accordance with intended use!

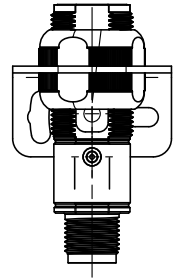
- ⚠ This product is not a safety sensor and is not intended as personnel protection.
- ⚠ The product may only be put into operation by competent persons.
- ⚠ Only use the product in accordance with the intended use.

- With the set scanning range, a tolerance of the scanning range limits is possible depending on the reflection properties of the material surface.

**Mounting options**

**Standard mounting**

Alignment of the supplied mounting nuts with flat side towards the mounting sheet.  
Mounting bracket BT D18M.5 is recommended for standard mounting.

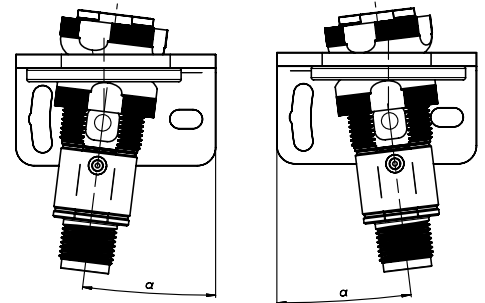


**Omni-mount**

*Omni-mount* makes fine adjustment of the sensors possible in a very simple and economical manner. For this type of mounting, the mounting nuts are used with the round side towards the mounting device. The mounting sheet must have a bore hole of approx. 21 mm in diameter. The special molding of the mounting nuts together with the spacer disc included in the delivery contents allows form-locking fastening of the sensors at different adjustment angles. The maximum possible tilt angle depends on the thickness of the mounting sheet. Mounting bracket BT D21M is recommended for *omni-mount*.

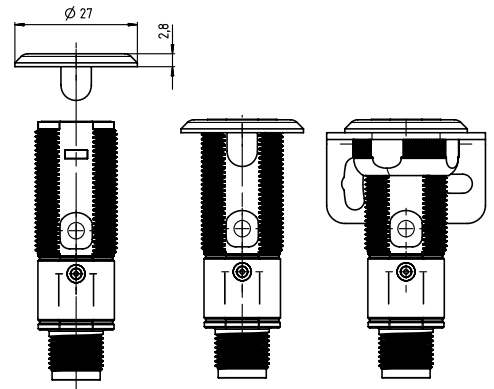
Mounting sheet thickness	Max. adjustment angle
2 mm	+/- 5°
4 mm <sup>*)</sup>	+/- 8°

<sup>\*)</sup> Corresponds to the thickness of the BT D21M mounting bracket



**Embedded mounting**

Embedded mounting, e.g. into a materials handling belt, is possible via the BT 318P-LS mounting support. The supports can be used either for fastening the axial sensors or for sensors with 90° optics.



## Order guide

The sensors listed here are preferred types; current information at [www.leuze.com](http://www.leuze.com).

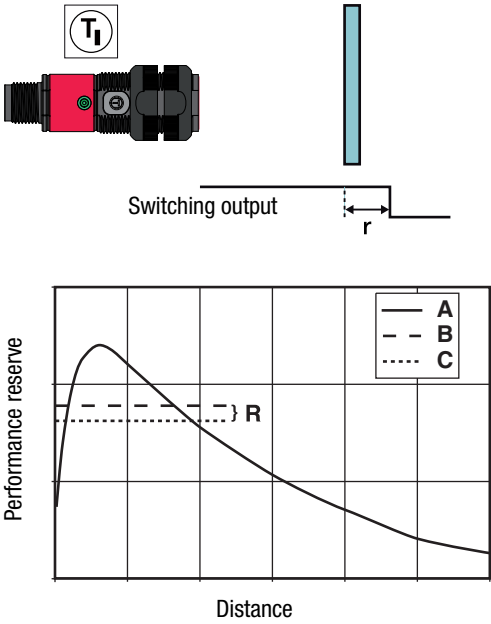
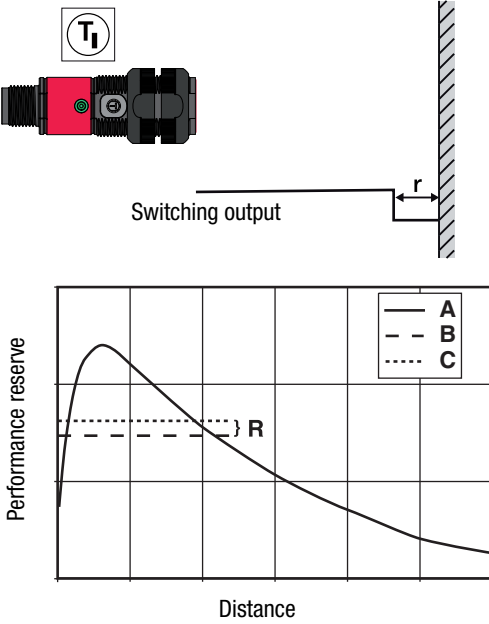
		Designation	Part no.
<b>Sensors with axial optics</b>			
<b>With M12 connector</b>	Pin 4: PNP light switching, pin 2: PNP dark switching	FT318BI.3/4P-M12	50127996
	Pin 4: NPN light switching, pin 2: NPN dark switching	FT318BI.3/2N-M12	50127997
<b>With cable, 2m</b>	Pin 4: PNP light switching, pin 2: PNP dark switching	FT318BI.3/4P	50126609
	Pin 4: NPN light switching, pin 2: NPN dark switching	FT318BI.3/2N	50126608
<b>Accessories for optimum fastening</b>			
Support for embedded mounting	Collective packaging with 10 supports	BT 318P-LS	50117258
Mounting bracket for standard mounting		BT D18M.5	50113548
Mounting bracket for <i>omni-mount</i>		BT D21M	50117257

## Part number code

**F T 3 1 8 B I . 3 / 4 P - M 1 2**

<b>Operating principle</b>							
FT	Diffuse reflection light scanners with fading						
<b>Series</b>							
318BI	Series 318B wit infrared light						
<b>Equipment</b>							
.3	Axial optics, Teach-in via teach button						
<b>Switching output/function /OUT1/OUT2 (OUT1 = Pin 4, OUT2 = Pin 2)</b>							
4	PNP, light switching						
P	PNP, dark switching						
2	NPN, light switching						
N	NPN, dark switching						
<b>Electrical connection</b>							
-M12	M12 connector, 4-pin						
N/A	Cable, standard length 2m						

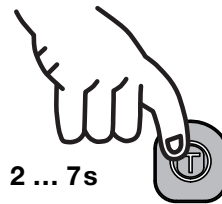
**Teach-in method**

Teach	Operating level 1	Operating level 2
<p>Standard Teach</p>	<p><b>Teach on object:</b></p> <p>During this teach event, the object is located in front of the sensor. The switching threshold is set by the teach so that the object is detected with a tight signal reserve <b>R</b>. Thus, the object is detected even if the distance increases by the value <b>r</b> with respect to the distance during the teach.</p>  <p><b>A</b> Signal - object  <b>B</b> Teach on object  <b>C</b> Switching threshold</p>	<p><b>Teach on background:</b></p> <p>This teach is only suitable for applications with a fixed background. The teach is performed directly on the background without an object. The switching threshold is set to a value that is just above the background signal (signal reserve <b>R</b>). Thus, objects can be detected up to a distance of <b>r</b> in front of the background.</p>  <p><b>A</b> Signal - background  <b>B</b> Teach on background  <b>C</b> Switching threshold</p>

**Operation via teach button**

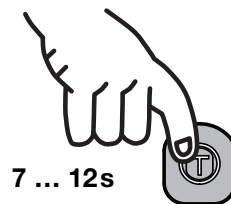
**Teach in operating level 1**

- Press teach button until the **yellow** LED flashes.
- Release teach button.
- Ready.



**Teach in operating level 2**

- Press teach button until green and yellow LEDs flash **alternately**.
- Release teach button.
- Ready.

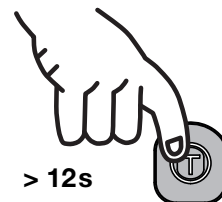


**Adjusting the switching behavior of the switching output – light/dark switching**

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



**2s YELLOW = light switching**

or



**flashes GREEN for 2s = dark switching**

- Ready.