SMART
**SENSOR**
BUSINESS

Leuze electronic

the sensor people

Figure can vary

**Part no.: 50133945**
**FT318BI.X3/4P-M12**
**Energetic diffuse sensor**

# Contents

# Technical data

| | |
|---|---|
| ***Basic data*** | |
| Series | 318B |
| Operating principle | Diffuse reflection principle |
| Application | Detection of dark objects at short range |

| | |
|---|---|
| ***Special design*** | |
| Special design | V-optics |

| | |
|---|---|
| ***Optical data*** | |
| Operating range | Guaranteed operating range |
| Operating range, white 90% | 0.001 ... 0.11 m |
| Operating range, gray 50% | 0.001 ... 0.1 m |
| Operating range, gray 18% | 0.003 ... 0.08 m |
| Operating range, black 6% | 0.005 ... 0.07 m |
| Operating range limit | Typical operating range |
| Operating range limit, white 90% | 0.001 ... 0.13 m |
| Operating range limit, gray 50% | 0.001 ... 0.12 m |
| Operating range limit, gray 18% | 0.003 ... 0.1 m |
| Operating range limit, black 6% | 0.005 ... 0.085 m |
| Light source | LED , Infrared |
| LED light wavelength | 850 nm |
| LED group | Exempt group (in acc. with EN 62471) |
| Transmitted-signal shape | Pulsed |

| | |
|---|---|
| ***Electrical data*** | |
| Protective circuit | Polarity reversal protection<br>Short circuit protected |
| ***Performance data*** | |
| Supply voltage $U_B$ | 10 ... 30 V , DC , Incl. residual ripple |
| Residual ripple | 0 ... 15 % , From $U_B$ |
| Open-circuit current | 0 ... 20 mA |
| ***Outputs*** | |
| Number of digital switching outputs | 2 Piece(s) |
| ***Switching outputs*** | |
| Voltage type | DC |
| Switching current, max. | 100 mA |
| Switching voltage | high: ≥($U_B$-2.5V)<br>low: ≤2.5V |
| ***Switching output 1*** | |
| Assignment | Connection 1, pin 4 |
| Switching element | Transistor , PNP |
| Switching principle | Light switching |
| ***Switching output 2*** | |
| Assignment | Connection 1, pin 2 |
| Switching element | Transistor , PNP |
| Switching principle | Dark switching |

| |
|---|
| ***Timing*** |

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

| ***Connection*** | |
|---|---|
| ***Connection 1*** | |
| Type of connection | Connector |
| Function | Signal OUT<br>Voltage supply |
| Thread size | M12 |
| Type | Male |
| Material | Plastic |
| No. of pins | 4 -pin |
| Encoding | A-coded |

| ***Mechanical data*** | |
|---|---|
| Thread size | M18 x 1 mm |
| Dimension (Ø x L) | 18 mm x 46 mm |
| Housing material | Plastic , ABS |
| Lens cover material | Plastic |
| Net weight | 20 g |
| Housing color | Black<br>Red |

| ***Operation and display*** | |
|---|---|
| Type of display | LED |
| Number of LEDs | 1 Piece(s) |
| Operational controls | Teach button |

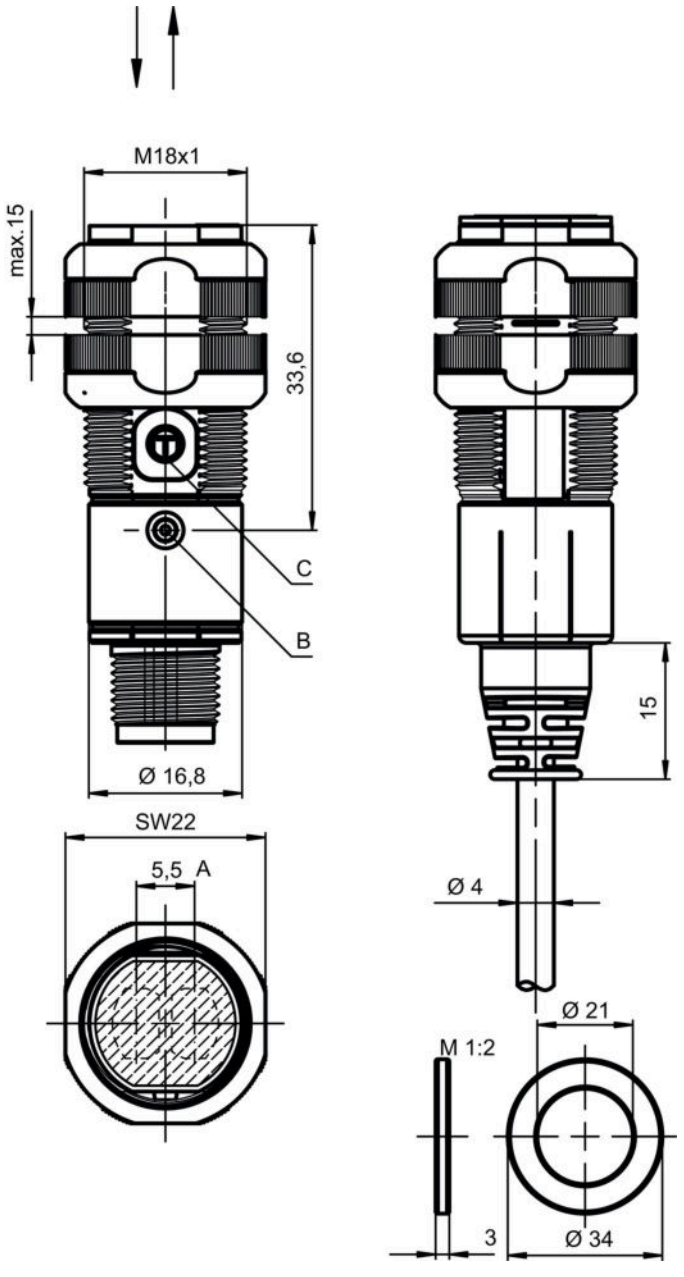
| ***Environmental data*** | |
|---|---|
| Ambient temperature, operation | -40 ... 60 °C |
| Ambient temperature, storage | -40 ... 70 °C |

| ***Certifications*** | |
|---|---|
| Degree of protection | IP 67 |
| Protection class | III |
| Certifications | c UL US |
| Standards applied | IEC 60947-5-2 |

| ***Classification*** | |
|---|---|
| Customs tariff number | 85365019 |
| eCl@ss 8.0 | 27270903 |
| eCl@ss 9.0 | 27270903 |
| ETIM 5.0 | EC001821 |
| ETIM 6.0 | EC001821 |

## Dimensioned drawings

All dimensions in millimeters

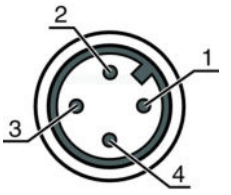



A Optical axis
B Indicator diode
C Teach button

## Electrical connection

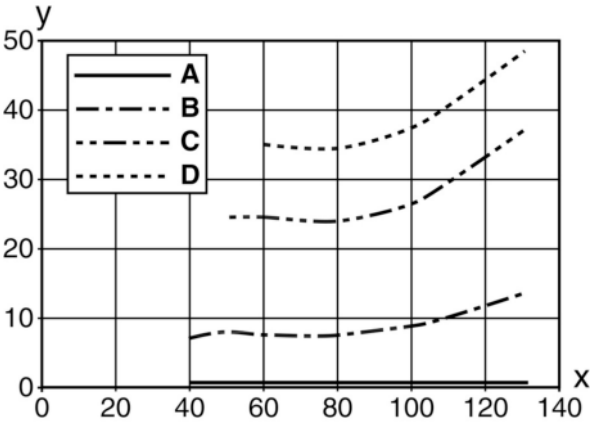
| Connection 1 | |
|---|---|
| Type of connection | Connector |
| Function | Signal OUT<br>Voltage supply |
| Thread size | M12 |
| Type | Male |
| Material | Plastic |
| No. of pins | 4 -pin |
| Encoding | A-coded |

| Pin | Pin assignment |
|---|---|
| 1 | V+ |
| 2 | OUT 2 |
| 3 | GND |
| 4 | OUT 1 |




## Diagrams

Typ. black/white behavior




x Range [mm]
y Reduction of range [mm]
A White 90%
B Gray 50%
C Gray 18%
D Black 6%

**Fading: black/white error < 50 %**
The black/white error is calculated from the operating range against white and the reduction of the operating range against black:
**black/white error = reduction of the operating range against black / operating range against white x 100%**

## Operation and display

LEDs

| LED | Display | Meaning |
|---|---|---|
| 1 | Green, continuous light | Operational readiness |
| | Yellow, continuous light | Object detected |

## Part number code

Part designation: **XXX318BY-AAAF.BB/CC-DDD**

| | |
|---|---|
| XXX318B | **Operating principle:**<br>PRK: retro-reflective photoelectric sensor with polarization filter<br>ET: energetic diffuse reflection sensor<br>FT: diffuse reflection sensor with fading<br>LE: throughbeam photoelectric sensor receiver<br>LS: throughbeam photoelectric sensor transmitter |
| Y | **Light type:**<br>n/a: red light<br>I: infrared light |
| AAAF | **Preset range (optional):**<br>n/a: operating range acc. to data sheet<br>XXXX: preset range [mm] |
| BB | **Equipment:**<br>n/a: axial optics<br>W: 90° angular optics<br>3: teach-in via button<br>X: reinforced fading |
| CC | **Switching output / function (OUT1 = pin 4, OUT2 = pin 2)::**<br>4: PNP transistor output, light switching<br>P: PNP transistor output, dark switching<br>2: NPN transistor output, light switching<br>N: NPN transistor output, dark switching<br>9: input for transmitter deactivation (deactivation with HIGH signal)<br>D: input for transmitter deactivation (deactivation with LOW signal)<br>X: pin not used |
| DDD | **Electrical connection:**<br>n/a: cable, standard length 2000 mm, 4-wire<br>M12: M12 connector, 4-pin (plug)<br>5000: cable, standard length 5000 mm, 4-wire |

| **Note** |
|---|
| A list with all available device types can be found on the Leuze electronic website at www.leuze.com. |

## Notes

| **Observe intended use!** |
|---|
| • This product is not a safety sensor and is not intended as personnel protection.<br>• The product may only be put into operation by competent persons.<br>• Only use the product in accordance with its intended use. |

| **For UL applications:** |
|---|
| • For UL applications, use is only permitted in Class 2 circuits in accordance with the NEC (National Electric Code).<br>• 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) |

- Sum of the output currents for both outputs, 50 mA for ambient temperatures > 40 °C
- With the set scanning range, a tolerance of the operating range is possible depending on the reflection properties of the material surface.

## Accessories

### Connection technology - Connection cables

| | Part no. | Designation | Article | Description |
|---|---|---|---|---|
|  | 50130652 | KD U-M12-4A-V1-050 | Connection cable | Connection 1: Connector, M12, Axial, Female, A-coded, 4 -pin<br>Connection 2: Open end<br>Shielded: No<br>Cable length: 5,000 mm<br>Sheathing material: PVC |
|  | 50130690 | KD U-M12-4W-V1-050 | Connection cable | Connection 1: Connector, M12, Angled, Female, A-coded, 4 -pin<br>Connection 2: Open end<br>Shielded: No<br>Cable length: 5,000 mm<br>Sheathing material: PVC |

### Mounting technology - Mounting brackets

| | Part no. | Designation | Article | Description |
|---|---|---|---|---|
|  | 50113548 | BT D18M.5 | Mounting bracket | Diameter, inner: 18 mm<br>Design of mounting device: Angle, L-shape<br>Fastening, at system: Through-hole mounting<br>Mounting bracket, at device: Screw type<br>Type of mounting device: Rigid<br>Material: Stainless steel |

### Mounting technology - Rod mounts

| | Part no. | Designation | Article | Description |
|---|---|---|---|---|
|  | 50117490 | BTU D18M-D12 | Mounting system | Design of mounting device: Mounting system<br>Fastening, at system: Through-hole mounting<br>Mounting bracket, at device: Screw type<br>Type of mounting device: Clampable, Adjustable, Turning, 360°<br>Material: Metal |

### Mounting technology - Other

| | Part no. | Designation | Article | Description |
|---|---|---|---|---|
|  | 50121904 | BT318B-OM | Fastening | Design of mounting device: Mounting clamp<br>Fastening, at system: Through-hole mounting<br>Mounting bracket, at device: Screw type<br>Type of mounting device: Swiveling, Adjustable, Turning<br>Material: Plastic |

| Note |
|---|
| A list with all available accessories can be found on the Leuze electronic website in the Download tab of the article detailed page. |