



**Part no.: 50133941**  
**FT328I.X3/2N-M12**  
**Energetic diffuse sensor**



Figure can vary

## Contents

- Technical data
- Dimensioned drawings
- Electrical connection
- Diagrams
- Operation and display
- Part number code
- Accessories
- Notes

## Technical data

<b>Basic data</b>	
Series	328
Operating principle	Diffuse reflection principle
Application	Detection of dark objects at short range
<b>Special design</b>	
Special design	V-optics
<b>Optical data</b>	
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 protection class	Exempt group (in acc. with EN 62471)
Transmitted-signal shape	Pulsed
<b>Electrical data</b>	
Protective circuit	Polarity reversal protection Short circuit protected
<b>Performance data</b>	
Supply voltage	10 ... 30 V, DC, Incl. residual ripple
Residual ripple	0 ... 15 %, From $U_B$
Open-circuit current	0 ... 20 mA
<b>Outputs</b>	
Number of digital switching outputs	2 Piece(s)
<b>Switching outputs</b>	
Voltage type	DC
Switching current, max.	100 mA
Switching voltage	low: $\leq 2.5V$ high: $\geq (U_B - 2.5V)$
<b>Switching output 1</b>	
Assignment	Connection 1, pin 4
Switching element	Transistor, NPN
Switching principle	Light switching
<b>Switching output 2</b>	
Assignment	Connection 1, pin 2
Switching element	Transistor, NPN
Switching principle	Dark switching
<b>Timing</b>	

## Part no.: 50133941 – FT328I.X3/2N-M12 – Energetic diffuse sensor

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

### Connection

#### Connection 1

Type of connection	Connector
Function	Voltage supply Signal OUT
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 Stainless steel, V2A, ABS
Lens cover material	Plastic
Net weight	70 g
Housing color	Black Red

### Operation and display

Type of display	LED
Number of LEDs	2 Piece(s)
Operational controls	Teach button

### Environmental data

Ambient temperature, operation	-40 ... 60 °C
Ambient temperature, storage	-40 ... 70 °C

### Certifications

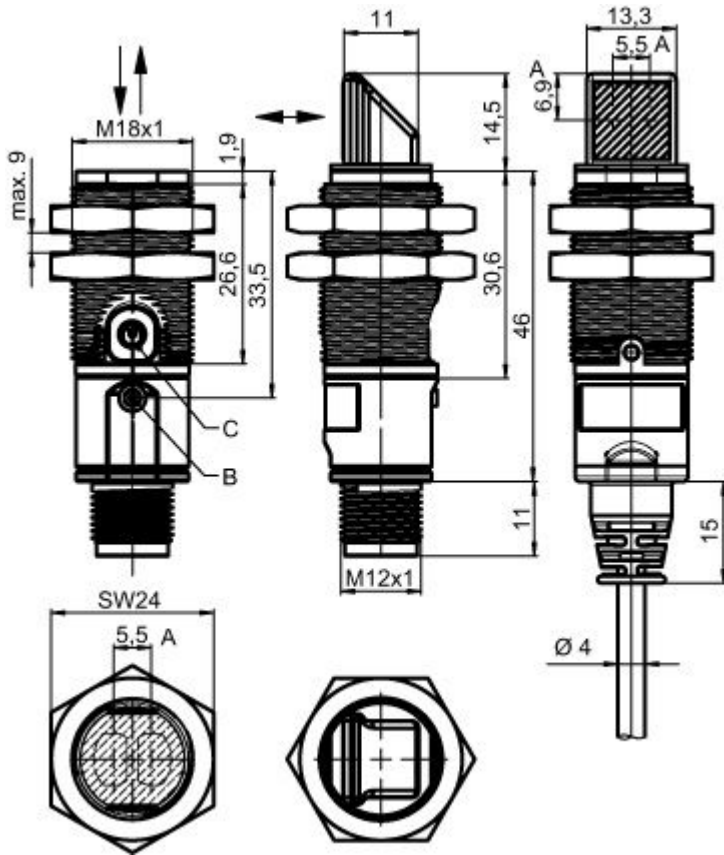
Degree of protection	IP 67
Protection class	III
Certifications	c UL US
Standards applied	IEC 60947-5-2

### Classification

eCl@ss 8.0	27270903
eCl@ss 9.0	27270903
ETIM 5.0	EC001821

## Dimensioned drawings

All dimensions in millimeters

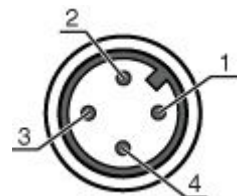


- A Optical axis
- B Indicator diode
- C Teach button

### Electrical connection

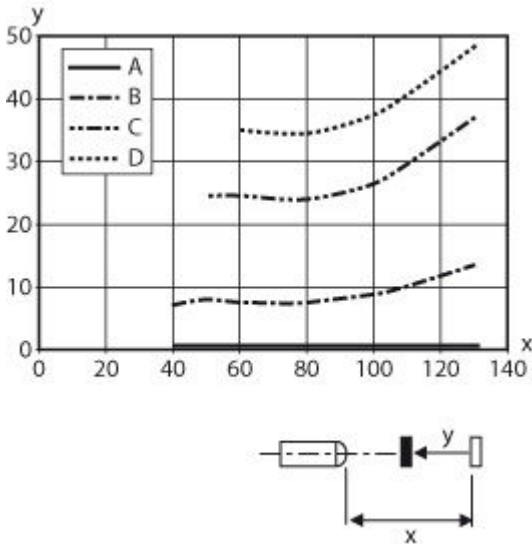
Connection 1	
Type of connection	Connector
Function	Voltage supply Signal OUT
Thread size	M12
Type	Male
Material	Plastic
No. of pins	4 -pin
Encoding	A-coded

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:

$$\text{black/white error} = \frac{\text{reduction of the operating range against black}}{\text{operating range against white}} \times 100\%$$

**Operation and display**

LEDs

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

**Part number code**

Part designation: XXX328BY-AAAF.BB/CC-DDD







XXX328	<p><b>Operating principle:</b>                      PRK: retro-reflective photoelectric sensor with polarization filter                      ET: energetic diffuse reflection sensor                      FT: diffuse reflection sensor with fading                      LE: throughbeam photoelectric sensor receiver                      LS: throughbeam photoelectric sensor transmitter</p>
Y	<p><b>Light type:</b>                      n/a: red light                      I: infrared light</p>
AAAF	<p><b>Pre-set range (optional):</b>                      n/a: operating range acc. to data sheet                      XXXX: pre-set range [mm]</p>

**Part no.: 50133941 – FT328I.X3/2N-M12 – Energetic diffuse sensor**






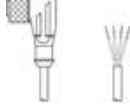
BB	<b>Equipment:</b> n/a: axial optics W: 90° angular optics 3: teach-in via button X: reinforced fading
CC	<b>Switching output / function (OUT1 = pin 4, OUT2 = pin 2)::</b> 4: PNP transistor output, light switching P: PNP transistor output, dark switching 2: NPN transistor output, light switching N: NPN transistor output, dark switching 9: input for transmitter deactivation (deactivation with HIGH signal) D: input for transmitter deactivation (deactivation with LOW signal) X: pin not used
DDD	<b>Electrical connection:</b> n/a: cable, PVC, standard length 2000 mm, 4-wire M12: M12 connector, 4-pin (plug)

## Accessories

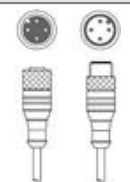


### Connection technology - Connection cables

	Part no.	Designation	Article	Description
	50130654	KD U-M12-4A-P1-020	Connection cable	Connection 1: Connector, M12, Axial, Female, A-coded, 4 -pin Connection 2: Open end Shielded: No Cable length: 2,000 mm Sheathing material: PUR
	50130657	KD U-M12-4A-P1-050	Connection cable	Connection 1: Connector, M12, Axial, Female, A-coded, 4 -pin Connection 2: Open end Shielded: No Cable length: 5,000 mm Sheathing material: PUR
	50130658	KD U-M12-4A-P1-100	Connection cable	Connection 1: Connector, M12, Axial, Female, A-coded, 4 -pin Connection 2: Open end Shielded: No Cable length: 10,000 mm Sheathing material: PUR
	50130648	KD U-M12-4A-V1-020	Connection cable	Connection 1: Connector, M12, Axial, Female, A-coded, 4 -pin Connection 2: Open end Shielded: No Cable length: 2,000 mm Sheathing material: PVC
	50130652	KD U-M12-4A-V1-050	Connection cable	Connection 1: Connector, M12, Axial, Female, A-coded, 4 -pin Connection 2: Open end Shielded: No Cable length: 5,000 mm Sheathing material: PVC
	50130653	KD U-M12-4A-V1-100	Connection cable	Connection 1: Connector, M12, Axial, Female, A-coded, 4 -pin Connection 2: Open end Shielded: No Cable length: 10,000 mm Sheathing material: PVC

**Part no.: 50133941 – FT328I.X3/2N-M12 – Energetic diffuse sensor**

	Part no.	Designation	Article	Description
	50130692	KD U-M12-4W-P1-020	Connection cable	Connection 1: Connector, M12, Angled, Female, A-coded, 4 -pin Connection 2: Open end Shielded: No Cable length: 2,000 mm Sheathing material: PUR
	50130694	KD U-M12-4W-P1-050	Connection cable	Connection 1: Connector, M12, Angled, Female, A-coded, 4 -pin Connection 2: Open end Shielded: No Cable length: 5,000 mm Sheathing material: PUR
	50130695	KD U-M12-4W-P1-100	Connection cable	Connection 1: Connector, M12, Angled, Female, A-coded, 4 -pin Connection 2: Open end Shielded: No Cable length: 10,000 mm Sheathing material: PUR
	50130688	KD U-M12-4W-V1-020	Connection cable	Connection 1: Connector, M12, Angled, Female, A-coded, 4 -pin Connection 2: Open end Shielded: No Cable length: 2,000 mm Sheathing material: PVC
	50130690	KD U-M12-4W-V1-050	Connection cable	Connection 1: Connector, M12, Angled, Female, A-coded, 4 -pin Connection 2: Open end Shielded: No Cable length: 5,000 mm Sheathing material: PVC
	50130691	KD U-M12-4W-V1-100	Connection cable	Connection 1: Connector, M12, Angled, Female, A-coded, 4 -pin Connection 2: Open end Shielded: No Cable length: 10,000 mm Sheathing material: PVC



**Connection technology - Interconnection cables**

	Part no.	Designation	Article	Description
	50130741	KDS U-M12-4A-M12-4A-P1-020	Interconnection cable	Connection 1: Connector, M12, Axial, Female, A-coded, 4 -pin Connection 2: Connector, M12, Axial, Male, A-coded, 4 -pin Shielded: No Cable length: 2,000 mm Sheathing material: PUR
	50130743	KDS U-M12-4A-M12-4A-P1-050	Interconnection cable	Connection 1: Connector, M12, Axial, Female, A-coded, 4 -pin Connection 2: Connector, M12, Axial, Male, A-coded, 4 -pin Shielded: No Cable length: 5,000 mm Sheathing material: PUR
	50130744	KDS U-M12-4A-M12-4A-P1-100	Interconnection cable	Connection 1: Connector, M12, Axial, Female, A-coded, 4 -pin Connection 2: Connector, M12, Axial, Male, A-coded, 4 -pin Shielded: No Cable length: 10,000 mm Sheathing material: PUR




Part no.: 50133941 – FT328I.X3/2N-M12 – Energetic diffuse sensor

## Mounting technology - Mounting brackets

	Part no.	Designation	Article	Description
	50113548	BT D18M.5	Mounting bracket	Diameter, inner: 18 mm Design of mounting device: Angle, L-shape Fastening, at system: Through-hole mounting Mounting bracket, at device: Screw type Type of mounting device: Rigid Material: Stainless steel
	50117257	BT D21M	Mounting bracket	Diameter, inner: 21 mm Design of mounting device: Angle, L-shape Fastening, at system: Through-hole mounting Mounting bracket, at device: Screw type Type of mounting device: Adjustable Material: Metal

## Mounting technology - Rod mounts

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

## Mounting technology - Other

	Part no.	Designation	Article	Description
	50132729	AC D18M-CS	Clamp	Contains: 2x M24 mounting nut Diameter, inner: 18 mm Design of mounting device: Mounting clamp Fastening, at system: Screw type, Through-hole mounting Mounting bracket, at device: insertable, Clampable with limit stop Type of mounting device: Clampable, With limit stop Material: Metal
	50083189	BT 318-ARH	Adjustment fastening part	Design of mounting device: Mounting plate Fastening, at system: Through-hole mounting Mounting bracket, at device: Screw type Type of mounting device: Swiveling, Adjustable Material: Metal
	50117258	BT 318P-LS	Fastening	Contains: 10x Design of mounting device: Mounting clamp Fastening, at system: Through-hole mounting Mounting bracket, at device: Clampable Type of mounting device: Rigid Material: Plastic
	50126631	BT 328M	Fastening	Contains: 2x M18 mounting nut Design of mounting device: Mounting clamp Fastening, at system: For 18 mm rod, Through-hole mounting Mounting bracket, at device: Screw type Type of mounting device: Turning, 360° Material: Stainless steel
	50121904	BT318B-OM	Fastening	Design of mounting device: Mounting clamp Fastening, at system: Through-hole mounting Mounting bracket, at device: Screw type Type of mounting device: Swiveling, Adjustable, Turning Material: Plastic



## 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.

### For UL applications:

- For UL applications, use is only permitted in Class 2 circuits in accordance with the NEC (National Electric Code).
- 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.