# Leuze

# **Technical data sheet Energetic diffuse sensor**

Part no.: 50122593 FT28.3/2N-M12



The Sensor People In der Braike 1, 73277 Owen

Leuze electronic GmbH + Co. KG info@leuze.com • www.leuze.com

Phone: +49 7021 573-0 • Fax: +49 7021 573-199

## **Technical data**

#### **Basic data**

Series Operating principle

28 Diffuse reflection principle

#### Special design

#### **Optical data**

Operating range	Guaranteed operating range
Operating range, white 90%	0.001 0.21 m
Operating range, gray 50%	0.002 0.185 m
Operating range, gray 18%	0.003 0.145 m
Operating range, black 6%	0.005 0.125 m
Operating range limit	Typical operating range
Operating range limit, white 90%	0 0.25 m
Operating range limit, gray 50%	0.002 0.225 m
Operating range limit, gray 18%	0.003 0.175 m
Operating range limit, black 6%	0.005 0.15 m
Light source	LED, Red
LED light wavelength	620 nm
Transmitted-signal shape	Pulsed
LED group	Exempt group (in acc. with EN 62471)

#### **Electrical data**

Protective circuit

Polarity reversal protection
Short circuit protected

0 ... 15 %, From U<sub>B</sub>

0 ... 20 mA

10 ... 30 V, DC, Incl. residual ripple

Performance data	
Supply voltage U <sub>B</sub>	
Residual ripple	
Open-circuit current	

#### Outputs

Number of digital switching outputs 2 Piece(s)

. .

Switching outputs
Voltage type
Switching current, max
Switching voltage

.. . .

100 mA high: ≥( $U_B$ -2.5V) low: ≤2.5V

Switching output 1	
Assignment	Connection 1, pin 4
Switching element	Transistor, NPN
Switching principle	Light switching

DC

Switching output 2	
Assignment	Connection 1, pin 2
Switching element	Transistor, NPN
Switching principle	Dark switching

#### Timing

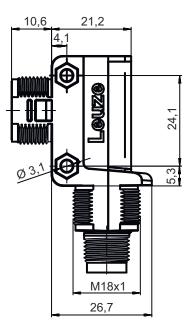
Switching frequency	500 Hz
Response time	1 ms
Readiness delay	300 ms



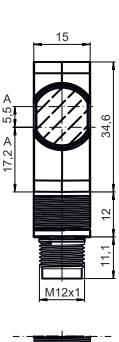
Voltage supplyType of connectionConnectorThread sizeM12TypeMaleMaterialPlasticNo. of pins4 - pinEncodingA-codedMechanical dataM18Dimension (W x H x L)15 mm x 46.5 mmThread sizeM18Length31.8 mmHousing materialPlasticNet weight25 gHousing colorBlackRedOperation and displayLEDNumber of LEDs2 Piece(s)Operational controlsTeach buttonEnvironmental dataAmbient temperature, operation-40 60 °CAmbient temperature, storage-40 70 °CCertificationsc UL USStandards appliedIEC 60947-5-2Classification27270903Customs tariff number8536519ecl@ess 8.027270903ETM 5.0EC001821	Connection 1	Signal OUT
Type of connectionConnectorThread sizeM12TypeMaleMaterialPlasticNo. of pins4 -pinEncodingA-codedWechanical dataVechanical dataDimension (W x H x L)15 mm x 46.5 mmThread sizeM18ength31.8 mmHousing materialPlasticHousing colorBlackRedOperation and displayLEDNumber of LEDs2 Piece(s)Operational controlsTeach buttonEnvironmental dataAmbient temperature, storage-40 60 °CAmbient temperature, storage-40 70 °CCertificationsc UL USStandards appliedIEC 60947-5-2Classification27270903Customs tariff number85365019Call@ss 9.027270903ETIM 5.0EC001821	Function	Signal OUT
Thread sizeM12TypeMaleMaterialPlasticNo. of pins4 -pinEncodingA-codedWechanical dataVisionOthersion (W x H x L)15 mm x 46.5 mmOthersion (W x H x L)15 mm x 46.5 mmChread sizeM18Length31.8 mmHousing materialPlastic, ABSLength25 gHousing colorBlack RedOperation and displayLEDNumber of LEDs2 Piece(s)Operational controlsTeach buttonEnvironmental data-40 60 °CAmbient temperature, operation-40 60 °CCertificationsULUSStandards appliedIEC 60947-5-2Classificationsc UL USStandards appliedES365019Current striff number85365019Categes 8.027270903Categes 9.027270903Categes 9.027270903Categes 9.027270903	<b>T</b>	
TypeMaleMaterialPlasticMo. of pins4 -pinEncodingA-codedWechanical dataIs mm x46.5 mmDimension (W x H x L)15 mm x 46.5 mmThread sizeM18Length31.8 mmHousing materialPlastic, ABSLens cover materialPlasticVet weight25 gHousing colorBlack RedDiperation and displayLEDNumber of LEDs2 Piece(s)Operational controlsTeach buttonEnvironmental data-40 60 °CAmbient temperature, operation-40 70 °CCertificationsIIICertificationsc UL USStandards appliedIEC 60947-5-2Classification27270903Customs tariff number85365019act@ess 8.027270903Cat@ess 9.027270903ETIM 5.0ECO01821		
MaterialPlasticNo. of pins4 -pinEncodingA-codedWechanical data		
No. of pins4 -pinEncodingA-codedWechanical dataWechanical dataDimension (W x H x L)15 mm x 46.5 mmThread sizeM18ength31.8 mmHousing materialPlastic, ABSens cover materialPlasticVet weight25 gHousing colorBlack RedOperation and displayLEDVumber of LEDs2 Piece(s)Operational controlsTeach buttonEnvironmental data-40 60 °CAmbient temperature, operation-40 60 °CAmbient temperature, storage-40 70 °CCertificationsULUSStandards appliedIEC 60947-5-2Classification27270903Customs tariff number85365019act@ss 8.027270903act@ss 9.027270903ETIM 5.0ECOU1821		
EncodingA-codedWechanical dataDimension (W x H x L)15 mm x 46.5 mmThread sizeM18Length31.8 mmHousing materialPlastic, ABSLens cover materialPlasticNet weight25 gHousing colorBlackRedComparison (W x H x L)Deparation and displayLEDNumber of LEDs2 Piece(s)Deparational controlsTeach buttonEnvironmental data-40 60 °CAmbient temperature, operation-40 70 °CCertificationsIIIDegree of protectionIP 67Protection classIIICertificationsc UL USStandards appliedIEC 60947-5-2Classification27270903Customs tariff number85365019acl@ss 8.027270903acl@ss 9.027270903ETIM 5.0EC001821		
Mechanical data     Dimension (W x H x L)   15 mm x 46.5 mm     Thread size   M18     Length   31.8 mm     Housing material   Plastic, ABS     Lens cover material   Plastic     Net weight   25 g     Housing color   Black     Red   Red     Operation and display   LED     Number of LEDs   2 Piece(s)     Operational controls   Teach button     Environmental data   -40 60 °C     Ambient temperature, operation   -40 70 °C     Certifications   c UL US     Standards applied   IEC 60947-5-2     Classification   27270903     Customs tariff number   85365019     acl@ss 8.0   27270903     acl@ss 9.0   27270903     ETIM 5.0   EC001821		•
Dimension (W x H x L)15 mm x 46.5 mmDimension (W x H x L)15 mm x 46.5 mmThread sizeM18Length31.8 mmHousing materialPlastic, ABSLens cover materialPlasticNet weight25 gHousing colorBlack RedOperation and displayLEDNumber of LEDs2 Piece(s)Operational controlsTeach buttonEnvironmental data-40 60 °CAmbient temperature, operation-40 70 °CCertificationsIIIDegree of protectionIP 67Protection classIIIClassificationEC 60947-5-2Classification27270903Customs tariff number85365019eCl@ss 8.027270903eCl@ss 9.027270903ETIM 5.0EC 001821	Encoding	A-coded
Thread sizeM18Length31.8 mmHousing materialPlastic, ABSLens cover materialPlasticNet weight25 gHousing colorBlack RedOperation and displayLEDNumber of LEDs2 Piece(s)Operational controlsTeach buttonEnvironmental data-40 60 °CAmbient temperature, operation-40 70 °CCertificationsIIIDegree of protectionIP 67Protection classIIICertificationsc UL USStandards appliedIEC 60947-5-2Classification27270903Cel@ss 8.027270903eCl@ss 9.027270903ETIM 5.0ECOU1821	Mechanical data	
Length31.8 mmHousing materialPlastic, ABSLens cover materialPlasticNet weight25 gHousing colorBlack RedOperation and displayLEDNumber of LEDs2 Piece(s)Operational controlsTeach buttonEnvironmental data-40 60 °CAmbient temperature, operation-40 60 °CCertificationsIIIDegree of protectionIP 67Protection classIIICertificationsc UL USStandards appliedIEC 60947-5-2Classification27270903Environs tariff number85365019ecl@ss 9.027270903ETIM 5.0EC001821	Dimension (W x H x L)	15 mm x 46.5 mm
Housing material Plastic, ABS Lens cover material Plastic Net weight 25 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 Customs tariff number 85365019 ecl@ss 8.0 ecl@ss 9.0 ETIM 5.0 ETIM 5.0 Eco01821	Thread size	M18
Lens cover materialPlasticNet weight25 gHousing colorBlackRedOperation and displayType of displayLEDNumber of LEDs2 Piece(s)Operational controlsTeach buttonEnvironmental dataAmbient temperature, operation-40 60 °CAmbient temperature, storage-40 70 °CCertificationsIIIDegree of protectionIP 67Protection classIIICartificationsc UL USStandards appliedIEC 60947-5-2Classification27270903Cel@ss 8.027270903ecl@ss 9.027270903ETIM 5.0EC001821	Length	31.8 mm
Net weight25 gHousing colorBlack RedOperation and displayType of displayLEDNumber of LEDs2 Piece(s)Operational controlsTeach buttonEnvironmental dataAmbient temperature, operation-40 60 °CAmbient temperature, storage-40 70 °CCertificationsIIIDegree of protectionIP 67Protection classIIIClassificationsc UL USStandards appliedIEC 60947-5-2Classification27270903Ecl@ss 8.0272270903ecl@ss 9.027270903ETIM 5.0EC001821	Housing material	Plastic, ABS
Housing color Black Red   Operation and display IED   Type of display LED   Number of LEDs 2 Piece(s)   Operational controls Teach button   Environmental data -40 60 °C   Ambient temperature, operation -40 70 °C   Certifications III   Degree of protection IP 67   Protection class III   Certifications c UL US   Standards applied IEC 60947-5-2   Classification 27270903   Ecl@ss 8.0 27270903   ecl@ss 9.0 27270903   ETIM 5.0 EC001821	Lens cover material	Plastic
Red   Operation and display   Type of display   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   Customs tariff number   85365019   eCl@ss 8.0   eCl@ss 9.0   ETIM 5.0	Net weight	25 g
Operation and display   LED     Number of LEDs   2 Piece(s)     Operational controls   Teach button     Environmental data   -40 60 °C     Ambient temperature, operation   -40 70 °C     Certifications   III     Degree of protection   IP 67     Protection class   III     Certifications   c UL US     Standards applied   IEC 60947-5-2     Classification   27270903     Ecl@ss 9.0   27270903     Ecl@ss 9.0   EC001821	Housing color	Black
Type of displayLEDNumber of LEDs2 Piece(s)Operational controlsTeach buttonEnvironmental data-40 60 °CAmbient temperature, operation-40 70 °CCertifications-40 70 °CDegree of protectionIP 67Protection classIIICertificationsc UL USStandards appliedIEC 60947-5-2Classification27270903eCl@ss 8.027270903eCl@ss 9.0EC001821	-	Red
Type of displayLEDNumber of LEDs2 Piece(s)Operational controlsTeach buttonEnvironmental data-40 60 °CAmbient temperature, operation-40 70 °CCertifications-40 70 °CDegree of protectionIP 67Protection classIIICertificationsc UL USStandards appliedIEC 60947-5-2Classification27270903eCl@ss 8.027270903eCl@ss 9.0EC001821		
Number of LEDs2 Piece(s)Operational controlsTeach buttonEnvironmental dataAmbient temperature, operation-40 60 °CAmbient temperature, storage-40 70 °CCertificationsCDegree of protectionIP 67Protection classIIICertificationsc UL USStandards appliedIEC 60947-5-2Classification27270903ecl@ss 8.027270903ecl@ss 9.0EC001821	Operation and display	
Operational controls   Teach button     Environmental data   -40 60 °C     Ambient temperature, operation   -40 70 °C     Certifications   -40 70 °C     Degree of protection   IP 67     Protection class   III     Certifications   c UL US     Standards applied   IEC 60947-5-2     Classification   27270903     ecl@ss 8.0   27270903     ecl@ss 9.0   EC001821	Type of display	LED
Environmental dataAmbient temperature, operation-40 60 °CAmbient temperature, storage-40 70 °CCertificationsCDegree of protectionIP 67Protection classIIICertificationsc UL USStandards appliedIEC 60947-5-2Classification27270903ecl@ss 9.027270903ETIM 5.0EC001821	Number of LEDs	2 Piece(s)
Ambient temperature, storage-40 70 °CCertificationsIP 67Degree of protectionIP 67Protection classIIICertificationsc UL USStandards appliedIEC 60947-5-2Classification27270903Customs tariff number85365019eCl@ss 8.027270903eCl@ss 9.0EC001821	Operational controls	Teach button
Ambient temperature, operation-40 60 °CAmbient temperature, storage-40 70 °CCertificationsIP 67Protection classIIICertificationsc UL USStandards appliedIEC 60947-5-2Classification27270903ecl@ss 9.027270903ETIM 5.0EC001821	Environmentel dete	
Ambient temperature, storage-40 70 °CCertificationsIP 67Degree of protectionIP 67Protection classIIICertificationsc UL USStandards appliedIEC 60947-5-2Classification27270903ecl@ss 8.027270903ecl@ss 9.027270903ETIM 5.0EC001821		
Certifications     Degree of protection   IP 67     Protection class   III     Certifications   c UL US     Standards applied   IEC 60947-5-2     Classification   27270903     ecl@ss 9.0   27270903     ETIM 5.0   EC001821		
Degree of protection   IP 67     Protection class   III     Certifications   c UL US     Standards applied   IEC 60947-5-2     Classification   2000 - 20000 - 2000	Ambient temperature, storage	-40 70 °C
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	Certifications	
Certifications     c UL US       Standards applied     IEC 60947-5-2       Classification     2000       Customs tariff number     85365019       eCl@ss 8.0     27270903       eCl@ss 9.0     27270903       ETIM 5.0     EC001821	Degree of protection	IP 67
Standards applied     IEC 60947-5-2       Classification     85365019       Customs tariff number     85365019       eCl@ss 8.0     27270903       eCl@ss 9.0     27270903       ETIM 5.0     EC001821	Protection class	III
Classification       Customs tariff number     85365019       eCl@ss 8.0     27270903       eCl@ss 9.0     27270903       ETIM 5.0     EC001821	Certifications	c UL US
Customs tariff number     85365019       eCl@ss 8.0     27270903       eCl@ss 9.0     27270903       ETIM 5.0     EC001821	Standards applied	IEC 60947-5-2
Customs tariff number     85365019       eCl@ss 8.0     27270903       eCl@ss 9.0     27270903       ETIM 5.0     EC001821	Classification	
eCl@ss 8.0     27270903       eCl@ss 9.0     27270903       ETIM 5.0     EC001821		85365010
eCl@ss 9.0     27270903       ETIM 5.0     EC001821		
ETIM 5.0 EC001821		
ETHNIO.U EC001821		
		EC001821

## **Dimensioned drawings**

All dimensions in millimeters



37,3



- A Optical axisB Indicator diode
- C Teach button

## **Electrical connection**

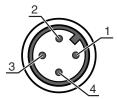
### **Connection 1**

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

Ø 4

#### Pin Pin assignment

1	V+		
2	OUT 2		
3	GND		
4	OUT 1		

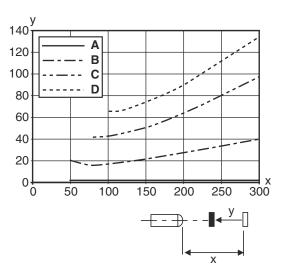


# Leuze

## Diagrams

# Leuze

### 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

## **Operation and display**

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

### Part number code

Part designation: AAA28d.E/ ff-hh

AAA28	Operating principle / construction LS28: throughbeam photoelectric sensor transmitter LE28: throughbeam photoelectric sensor receiver ET28: energetic diffuse reflection sensor FT28: diffuse reflection sensor with fading PRK28: retro-reflective photoelectric sensor with polarization filter
d	Light type n/a: red light I: infrared light
E	Equipment 3: teach-in via button
ff	Switching output / function / OUT1OUT2 (OUT1 = pin 4, OUT2 = pin 2) 2: NPN transistor output, light switching N: NPN transistor output, dark switching 4: PNP transistor output, dark switching D: deactivation input (deactivation with low signal) 9: deactivation input (deactivation with high signal)
hh	Electrical connection n/a: cable, standard length 2000mm, 4-wire 200-M12: cable, length 200mm with M12 connector, 4-pin, axial (plug)

	Note
<b>A</b>	✤ A list with all available device types can be found on the Leuze website at www.leuze.com.
U	

## **Notes**

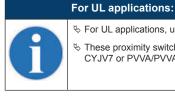
### **Observe intended use!**

CYJV7 or PVVA/PVVA7)

b This product is not a safety sensor and is not intended as personnel protection.

b The product may only be put into operation by competent persons.

b Only use the product in accordance with its intended use.



b 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/

## **Further information**

- 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
W	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
W	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

## Mounting technology - Mounting brackets

 Part no.	Designation	Article	Description
50124651	BT 205M-10SET	Mounting device set	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: Metal

#### 5/6

Leuze

## Accessories

# Leuze

## Mounting technology - Rod mounts

	Part no.	Designation	Article	Description
j.	50117255	BTU 200M-D12	Mounting system	Design of mounting device: Mounting system Fastening, at system: For 12 mm rod, Sheet-metal mounting Mounting bracket, at device: Screw type, Suited for M3 screws Type of mounting device: Clampable, Adjustable, Turning, 360° Material: Metal
<b>Of:</b>	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

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