



the sensor people





Figure can vary

Part no.: 50133596 HT3C.B/4P-200-M12 Diffuse sensor with background suppression











# **Contents**

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



#### **Technical data**

Series 3C Operating principle Diffuse reflection principle with background suppression  Optical data Black-white error < 10% up to 220 mm Operating range Guaranteed operating range Operating range, white 90% 0.005 0.45 m Operating range, gray 18% 0.01 0.34 m Operating range, gray 18% 0.01 0.22 m Operating range limit Typical operating range Operating range limit 0.005 0.45 m Adjustment range 15 450 mm Beam profile Focused LED light source LED, Red LED light wavelength 633 nm LED group Exempt group (in acc. with EN 62471) Transmitted-signal shape Type of light-spot geometry Round Focus Fixed Focal distance 200 mm   Electrical data Protective circuit Polarity reversal protection Short circuit protected  Ereformance data Supply voltage UB 10 30 V , DC , Incl. residual ripple Open-circuit current 0 15 mA  Outputs  Number of digital switching outputs 2 Piece(s)  Switching outputs  Voltage type DC Switching outputs  Fight: 2(Up-2V) Low: £2V	Basic data	
Operating principle  Diffuse reflection principle with background suppression  Optical data  Black-white error  Coperating range  Operating range, white 90%  Operating range, white 90%  Operating range, white 90%  Operating range, spay 18%  Operating range, black 8%  Operating range limit  Doubs 0.45 m  Adjustment range  If 450 mm  Beam profile  Focused  Light source  LED, Red  LED Ight wavelength  Earmpt group (in acc. with EN 62471)  Transmitted-signal shape  Pulsed  Type of light-spot geometry  Round  Focus  Fixed  Focal distance  Polarity reversal protection Short circuit protected  Performance data  Supply voltage UB  Residual ripple  Oper-circuit current  Oper-circuit current  Outputs  Number of digital switching outputs  2 Piece(s)  Switching outputs  Voltage type  DC  Switching outputs  Fight: 2(Us-2V) Low: 52V		3C
Optical data       Black-white error     < 10% up to 220 mm		
Black-white error	operating prints pro	
Black-white error	Ontical data	
Operating range       Guaranteed operating range         Operating range, gray 18%       0.01 0.34 m         Operating range, gray 18%       0.01 0.22 m         Operating range limit       0.005 0.22 m         Operating range limit       0.005 0.245 m         Adjustment range       15 450 mm         Beam profile       Focused         Light source       LED, Red         LED light wavelength       633 mm         LED group       Exempt group (in acc. with EN 62471)         Transmitted-signal shape       Pulsed         Type of light-spot geometry       Round         Focus       Fixed         Focal distance       200 mm         Electrical data       Protective circuit         Protective circuit       Polarity reversal protection Short circuit protected         Performance data       Supply voltage Ug         Supply voltage Ug       10 30 V , DC , Incl. residual ripple         Qen-circuit current       0 15 % , From UB         Open-circuit current       0 15 mA         Outputs       Voltage type       DC         Switching outputs       2 Piece(s)         Switching current, max.       100 mA         Switching voltage       High: ≿(Ug-2V) Low: ≤2V </td <td></td> <td>&lt; 10% up to 220 mm</td>		< 10% up to 220 mm
Operating range, white 90%       0.005 0.45 m         Operating range, gray 18%       0.01 0.34 m         Operating range, black 6%       0.015 0.22 m         Operating range limit       7ypical operating range         Operating range limit       0.005 0.45 m         Adjustment range       15 450 mm         Beam profile       Focused         Light source       LED , Red         LED light wavelength       633 nm         LED group       Exempt group (in acc. with EN 62471)         Transmitted-signal shape       Pulsed         Type of light-spot geometry       Round         Focus       Fixed         Focal distance       200 mm         Electrical data       Polarity reversal protection Short circuit protected         Performance data       Supply voltage UB         Supply voltage UB       10 30 V , DC , Incl. residual ripple         Open-circuit current       0 15 mA         Outputs         Number of digital switching outputs       2 Piece(s)         Switching outputs         Voltage type       DC         Switching current, max       100 mA         Switching voltage       High: ≥(UB-2V) Low: ≤2V		
Operating range, gray 18% Operating range, black 6% Operating range limit Operating range limit Typical operating range Operating range limit Outputs Operating range limit Outputs Operating range limit Outputs Operating range limit Outputs Operating range Operation Operating range Operating range Operation Operating rang		· · · ·
Operating range, black 6%       0.015 0.22 m         Operating range limit       Typical operating range         Operating range limit       0.005 0.45 m         Adjustment range       15 450 mm         Beam profile       Focused         Light source       LED, Red         LED light wavelength       633 nm         LED group       Exempt group (in acc. with EN 62471)         Transmitted-signal shape       Pulsed         Type of light-spot geometry       Round         Focus       Fixed         Focal distance       200 mm         Electrical data         Protective circuit       Polarity reversal protection Short circuit protected         Performance data       Supply voltage UB         Supply voltage UB       10 30 V , DC , Incl. residual ripple         Quencircuit current       0 15 m A         Outputs       2 Piece(s)         Number of digital switching outputs       2 Piece(s)         Switching outputs       DC         Switching outputs       100 mA         Switching voltage       High: ≥(UB-2V) Low: ≤2V		
Operating range limit Operating range Oper		
Operating range limit       0.005 0.45 m         Adjustment range       15 450 mm         Beam profile       Focused         Light source       LED , Red         LED light wavelength       633 nm         LED group       Exempt group (in acc. with EN 62471)         Transmitted-signal shape       Pulsed         Type of light-spot geometry       Round         Focus       Fixed         Focal distance       200 mm         Electrical data         Protective circuit       Polarity reversal protection Short circuit protected         Performance data         Supply voltage UB       10 30 V , DC , Incl. residual ripple         Residual ripple       0 15 % , From UB         Open-circuit current       0 15 mA         Outputs       Number of digital switching outputs       2 Piece(s)         Switching outputs         Voltage type       DC         Switching voltage       High: ≥(UB-2V) Low: ≤2V		
Adjustment range 15 450 mm  Beam profile Focused  Light source LED , Red  LED , Red  LED light wavelength 633 nm  LED group Exempt group (in acc. with EN 62471)  Transmitted-signal shape Pulsed  Type of light-spot geometry Round  Focus Fixed  Focal distance 200 mm   Fixed  Focal distance 200 mm   Foreformance data  Supply voltage UB 10 30 V , DC , Incl. residual ripple  Residual ripple 0 15 % , From UB  Open-circuit current 0 15 mA  Outputs  Number of digital switching outputs 2 Piece(s)  Switching outputs  Voltage type DC  Switching current, max. 100 mA  Switching voltage High: 2(Us-2V)  Low: \$2V		
Beam profile Light source LED , Red LED , Red LED light wavelength Exempt group (in acc. with EN 62471) Transmitted-signal shape Pulsed Type of light-spot geometry Round Focus Fixed Focal distance 200 mm   Electrical data Protective circuit Performance data Supply voltage UB Residual ripple Open-circuit current Outputs Number of digital switching outputs Voltage type Switching outputs Voltage UB Switching current, max. 100 mA Switching voltage High: ≥(UB-2V) Low: ≤2V  I macc. with EN 62471) Exempt group (in acc. with EN 62471) Focused  10 30 macc. with EN 62471) Focused Focused  10 30 V. DC , Incl. residual ripple 0 15 % From UB 0 15 mA  Outputs Number of digital switching outputs Voltage type DC Switching current, max. 100 mA  High: ≥(UB-2V) Low: ≤2V		
Light source       LED , Red         LED light wavelength       633 nm         LED group       Exempt group (in acc. with EN 62471)         Transmitted-signal shape       Pulsed         Type of light-spot geometry       Round         Focus       Fixed         Focal distance       200 mm         Electrical data       Polarity reversal protection short circuit protected         Performance data       Supply voltage UB       10 30 V , DC , Incl. residual ripple         Residual ripple       0 15 % , From UB         Open-circuit current       0 15 mA         Outputs       Number of digital switching outputs       2 Piece(s)         Switching outputs       DC         Switching current, max.       100 mA         Switching voltage       High: ≥(UB-2V) Low: ≤2V		
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LED group       Exempt group (in acc. with EN 62471)         Transmitted-signal shape       Pulsed         Type of light-spot geometry       Round         Focus       Fixed         Focal distance       200 mm         Electrical data         Protective circuit       Polarity reversal protection Short circuit protected         Performance data         Supply voltage UB       10 30 V , DC , Incl. residual ripple         Residual ripple       0 15 % , From UB         Open-circuit current       0 15 mA         Outputs       2 Piece(s)         Switching outputs       2 Piece(s)         Voltage type       DC         Switching current, max.       100 mA         Switching voltage       High: ≥(UB-2V) Low: ≤2V		
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Type of light-spot geometry  Focus  Fixed  Focal distance  200 mm   Electrical data  Protective circuit  Polarity reversal protection Short circuit protected  Performance data  Supply voltage UB  Residual ripple  Open-circuit current  Outputs  Number of digital switching outputs  Voltage type  Switching outputs  Voltage type  Switching voltage  DC  Switching voltage  High: ≥(UB-2V) Low: ≤2V		
Focus Fixed  Focal distance 200 mm   Electrical data  Protective circuit Polarity reversal protection Short circuit protected  Performance data  Supply voltage UB 10 30 V , DC , Incl. residual ripple  Residual ripple 0 15 % , From UB  Open-circuit current 0 15 mA  Outputs  Number of digital switching outputs 2 Piece(s)  Switching outputs  Voltage type DC  Switching current, max. 100 mA  Switching voltage High: ≥(UB-2V)  Low: ≤2V		
Focal distance       200 mm         Electrical data       Polarity reversal protection Short circuit protected         Performance data       10 30 V , DC , Incl. residual ripple         Supply voltage UB       10 30 V , DC , Incl. residual ripple         Residual ripple       0 15 % , From UB         Open-circuit current       0 15 mA         Outputs       2 Piece(s)         Switching outputs       2 Piece(s)         Voltage type       DC         Switching current, max.       100 mA         Switching voltage       High: ≥(UB-2V) Low: ≤2V		Fixed
Electrical data   Protective circuit Polarity reversal protection Short circuit protected   Performance data Supply voltage UB 10 30 V , DC , Incl. residual ripple   Residual ripple 0 15 % , From UB   Open-circuit current 0 15 mA   Outputs Voltage switching outputs 2 Piece(s)   Switching outputs DC   Switching current, max. 100 mA   Switching voltage High: ≥(UB-2V) Low: ≤2V		
Protective circuit  Polarity reversal protection Short circuit protected  Performance data  Supply voltage UB  Residual ripple  Open-circuit current  Outputs  Number of digital switching outputs  Voltage type  DC  Switching current, max.  Switching voltage  High: ≥(UB-2V) Low: ≤2V		
Protective circuit  Polarity reversal protection Short circuit protected  Performance data  Supply voltage UB  Residual ripple  Open-circuit current  Outputs  Number of digital switching outputs  Voltage type  DC  Switching current, max.  Switching voltage  High: ≥(UB-2V) Low: ≤2V	Flectrical data	
Short circuit protected   Performance data 10 30 V , DC , Incl. residual ripple   Residual ripple 0 15 % , From UB   Open-circuit current 0 15 mA   Outputs Number of digital switching outputs   Number of digital switching outputs 2 Piece(s)   Switching outputs DC   Switching current, max. 100 mA   Switching voltage High: ≥(UB-2V) Low: ≤2V		Polarity reversal protection
Supply voltage UB 10 30 V , DC , Incl. residual ripple   Residual ripple 0 15 % , From UB   Open-circuit current 0 15 mA   Outputs 2 Piece(s)   Number of digital switching outputs 2 Piece(s)   Switching outputs DC   Switching current, max. 100 mA   Switching voltage High: ≥(UB-2V) Low: ≤2V		Short circuit protected
Residual ripple 0 15 % , From UB   Open-circuit current 0 15 mA   Outputs 2 Piece(s)   Number of digital switching outputs 2 Piece(s)   Switching outputs DC   Switching current, max. 100 mA   Switching voltage High: ≥(UB-2V) Low: ≤2V		
Open-circuit current 0 15 mA   Outputs 2 Piece(s)   Number of digital switching outputs 2 Piece(s)   Switching outputs DC   Switching current, max. 100 mA   Switching voltage High: ≥(UB-2V) Low: ≤2V	Supply voltage U <sub>B</sub>	10 30 V , DC , Incl. residual ripple
Outputs         Number of digital switching outputs       2 Piece(s)         Switching outputs       DC         Switching current, max.       100 mA         Switching voltage       High: ≥(UB-2V) Low: ≤2V	Residual ripple	0 15 % , From U <sub>B</sub>
Number of digital switching outputs       2 Piece(s)         Switching outputs         Voltage type       DC         Switching current, max.       100 mA         Switching voltage       High: ≥(U <sub>B</sub> -2V) Low: ≤2V	Open-circuit current	0 15 mA
Switching outputs       Voltage type     DC       Switching current, max.     100 mA       Switching voltage     High: ≥(U <sub>B</sub> -2V) Low: ≤2V	Outputs	
Voltage type     DC       Switching current, max.     100 mA       Switching voltage     High: ≥(U <sub>B</sub> -2V) Low: ≤2V	Number of digital switching outputs	2 Piece(s)
Switching current, max.  100 mA  Switching voltage  High: ≥(U <sub>B</sub> -2V)  Low: ≤2V	Switching outputs	
Switching voltage  High: ≥(U <sub>B</sub> -2V)  Low: ≤2V	Voltage type	DC
Low: ≤2V	Switching current, max.	100 mA
	Switching voltage	
Switching output 1		Low: ≤2V
	Switching output 1	
Assignment Connection 1, pin 4		
Switching element Transistor , PNP		
Switching principle Light switching		Light switching
Switching output 2		
Assignment Connection 1, pin 2		
Switching element Transistor , PNP		
	Switching principle	Dark switching
Switching principle Dark switching		
Switching principle Dark switching	Timing	
Switching principle Dark switching  Timing	rining	

0.5 ms

Response time



Readiness delay	300 ms
Response jitter	166 μs

nnection		
Connection 1		
Type of connection	Cable with connector	
Function	Signal OUT Voltage supply	
Cable length	200 mm	
Sheathing material	PUR	
Cable color	Black	
Wire cross section	0.2 mm²	
Thread size	M12	
Туре	Male	
Material	Metal	
No. of pins	4 -pin	
Encoding	A-coded	

Mechanical data		
Dimension (W x H x L)	11.4 mm x 34.2 mm x 18.3 mm	
Housing material	Plastic , PC-ABS	
Lens cover material	Plastic / PMMA	
Net weight	20 g	
Housing color	Red	
Type of fastening	Two M3 threaded sleeves Via optional mounting device	
Compatibility of materials	ECOLAB	

Operation and display		
Type of display	LED	
Number of LEDs	2 Piece(s)	
Operational controls	Multiturn potentiometer	
Function of the operational control	Range adjustment	

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

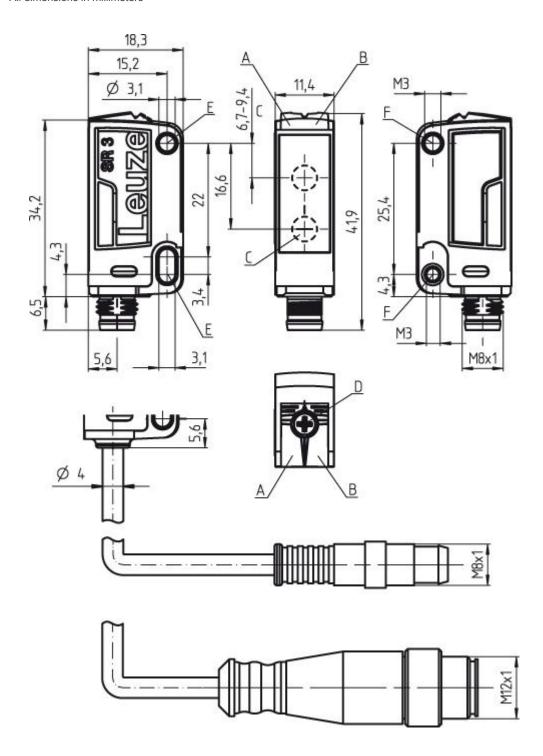
Certifications	
Degree of protection	IP 67 IP 69K
Protection class	III
Certifications	c UL US
Standards applied	IEC 60947-5-2

Classification		
Customs tariff number	85365019	
eCl@ss 8.0	27270904	
eCl@ss 9.0	27270904	
ETIM 5.0	EC002719	

ETIM 6.0 EC002719

### **Dimensioned drawings**

All dimensions in millimeters



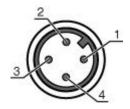
- A Green LED
- B Yellow LED
- C Optical axis
- D Multiturn potentiometer
- E Mounting sleeve (standard)
- F Threaded sleeve (3C.B series)



#### **Electrical connection**

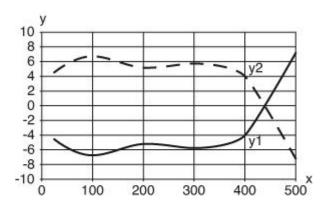
Connection 1	
Type of connection	Cable with connector
Function	Signal OUT Voltage supply
Cable length	200 mm
Sheathing material	PUR
Cable color	Black
Wire cross section	0.2 mm <sup>2</sup>
Thread size	M12
Туре	Male
Material	Metal
No. of pins	4 -pin
Encoding	A-coded

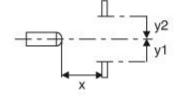
Pin	Pin assignment
1	V+
2	OUT 2
3	GND
4	OUT 1



### **Diagrams**

Typ. response behavior (white 90 %)

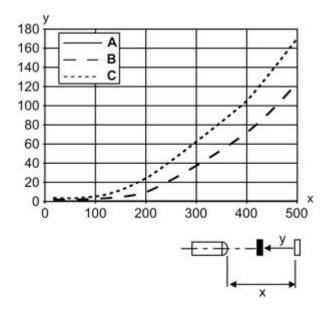




x Distance [mm] y Misalignment [mm]



### Typ. black/white behavior



Range [mm]
Reduction of range [mm] y A B C

White 90%

Gray 18% Black 6%

### **Operation and display**

#### **LEDs**

LED	Display	Meaning
1	Green, continuous light	Ready
2	Yellow, continuous light	Object detected

#### Part number code

Part designation: AAA 3C d EE-f.GG H/i J-K

AAA3C	Operating principle / construction: HT3C: diffuse reflection sensor with background suppression LS3C: throughbeam photoelectric sensor transmitter LE3C: throughbeam photoelectric sensor receiver PRK3C: retro-reflective photoelectric sensor with polarization filter
d	Light type: n/a: red light l: infrared light
EE	Light source: n/a: LED L1: laser class 1 L2: laser class 2
f	Pre-set range (optional): n/a: operating range acc. to data sheet XXXX: pre-set range [mm]



GG	Equipment: n/a: standard A: autocollimation principle (single lens) for positioning tasks B: housing model with two M3 threaded sleeves, brass F: permanently set range L: long light spot S: small light spot T: autocollimation principle (single lens) for highly transparent bottles without tracking TT: autocollimation principle (single lens) for highly transparent bottles with tracking V: V-optics XL: extra long light spot
Н	Operating range adjustment:  n/a with HT: range adjustable via 8-turn potentiometer  n/a with retro-reflective photoelectric sensors (PRK): operating range not adjustable  1: 270° potentiometer  3: teach-in via button  6: auto-teach
i	Switching output/function OUT 1/IN: Pin 4 or black conductor:  2: NPN transistor output, light switching N: NPN transistor output, dark switching 4: PNP transistor output, light switching P: PNP transistor output, dark switching 6: push-pull switching output, PNP light switching, NPN dark switching G: push-pull switching output, PNP dark switching, NPN light switching /L: IO-Link 8: activation input (activation with high signal) X: pin not used
J	Switching output / function OUT 2/IN: pin 2 or white conductor:  2: NPN transistor output, light switching N: NPN transistor output, dark switching 4: PNP transistor output, light switching P: PNP transistor output, dark switching 6: push-pull switching output, PNP light switching, NPN dark switching G: push-pull switching output, PNP dark switching, NPN light switching W: warning output X: pin not used 8: activation input (activation with high signal) 9: deactivation input (deactivation with high signal) T: teach-in via cable
К	Electrical connection:  n/a: cable, standard length 2000 mm, 4-wire 5000: cable, standard length 5000 mm, 4-wire M8: M8 connector, 4-pin (plug) M8.3: M8 connector, 3-pin (plug) 200-M8: cable, length 200 mm with M8 connector, 4-pin, axial (plug) 200-M8.3: cable, length 200 mm with M8 connector, 3-pin, axial (plug) 200-M12: cable, length 200 mm with M12 connector, 4-pin, axial (plug)

#### 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.
- 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)

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- Light source: Average life expectancy 100,000 h at an ambient temperature of 25 °C
- Response time: For short decay times, an ohmic load of approx. 5 kOhm is recommended
- Sum of the output currents for both outputs, 50 mA for ambient temperatures > 40 °C

#### **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 Connection 2: Open end Shielded: No Cable length: 5,000 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

# Mounting technology - Mounting brackets

Par	art no.	Designation	Article	Description
5006	060511 E	BT 3		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

# Mounting technology - Rod mounts

Par	art no.	Designation	Article	Description
5011	17255 B	3TU 200M-D12	3 ,	Contains: 2x M3 x 16 screw, 2x M3 x 20 screw, 2x position washers Design of mounting device: Mounting system Fastening, at system: For 12 mm rod, Sheet-metal mounting Mounting bracket, at device: Screw type Type of mounting device: Clampable, Adjustable, Turning, 360° Material: Metal