en 03-2015/09 50123661

1 … 850mm

10 - 30 V DC

500 Hz

- Energetic reflection light scanner
- Scanning range adjustment via teach-in
- Visible red light
- Active suppression of extraneous light A²LS
- Fast alignment through *brightVision*®
- Universal option for M18 hole mounting at the front and connector side
- Easy through-hole assembly with anti-rotation protection for mounting nuts on the housing
- Full control through green and yellow indicator LEDs
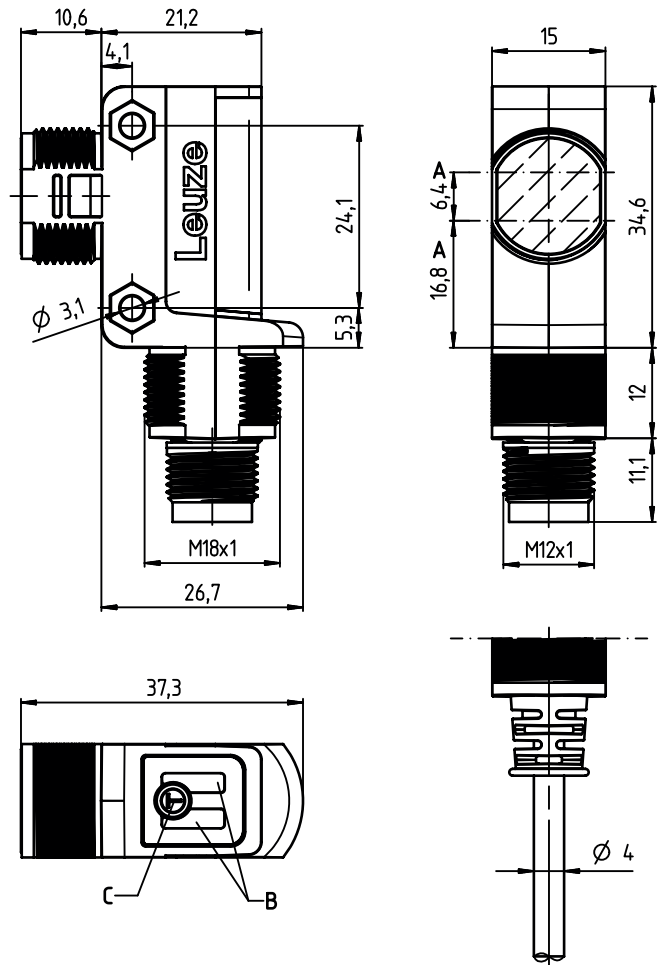- Robust plastic housing acc. to IP 67 for industrial application

CE UL LISTED

IEC 60947... IEC 60947... IP 67

We reserve the right to make changes • DS_ET28_en_50123661.fm
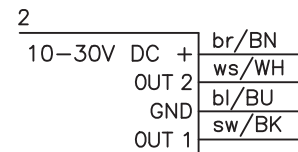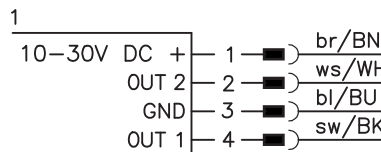
Accessories:

(available separately)

- Mounting systems (BTU 200 ..., BT 200…, BT 205M)
- M12 connectors (KD …)
- Ready-made cables (K-D …)

Dimensioned drawing

A   Optical axis
B   Indicator diodes
C   Teach button

Electrical connection

Specifications

Optical data
Scanning range limit [1]	1 … 850 mm
Scanning range [2]	see tables
Light source	LED (modulated light)
Wavelength	620 nm (visible red light)

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

Electrical data
Operating voltage U_B [3]		10 … 30 VDC (incl. residual ripple)
Residual ripple		≤ 15 % of U_B
Open-circuit current		≤ 20 mA
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. 100 mA [4]

Indicators
Green LED	ready
Yellow LED	reflection (object detected)

Mechanical data
Housing	plastic
Optics cover	plastic
Weight	25 g with M12 connector
	45 g with 200 mm cable and M12 connector
	75 g with 2 m cable
Connection type	M12 connector, 4-pin
	cable 200 mm with M12 connector, 4-pin
	cable 2 m, 4 x 0.20 mm²

Environmental data
Ambient temp. (operation/storage)	-40 °C … +60 °C/-40 °C … +70 °C
Protective circuit [5]	2, 3
VDE safety class	III
Degree of protection	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 [3] [6]

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, 50 mA 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)
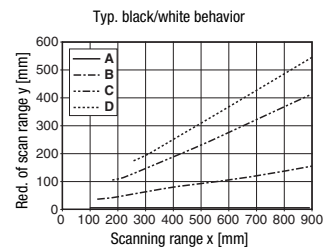
Tables

1	1		650	850
2	2	540	740	
3	10	350	430	
4	12	250	350	

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

Red. of scan range y [mm] vs Scanning range x [mm]

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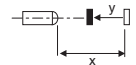
Remarks

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.

ET 28	Energetic reflection light scanner

Order guide

The sensors listed here are preferred types; current information at www.leuze.com.

	Designation	Part no.
With 4-pin M12 connector		
Pin 4: PNP light switching, pin 2: PNP dark switching	ET28.3/4P-M12	50122596
Pin 4: NPN light switching, pin 2: NPN dark switching	ET28.3/2N-M12	50122599
With 200 mm cable and M12 connector		
Pin 4: PNP light switching, pin 2: PNP dark switching	ET28.3/4P-200-M12	50122597
Pin 4: NPN light switching, pin 2: NPN dark switching	ET28.3/2N-200-M12	50122600
With cable, cable length 2m		
Pin 4: PNP light switching, pin 2: PNP dark switching	ET28.3/4P	50122598
Pin 4: NPN light switching, pin 2: NPN dark switching	ET28.3/2N	50122601

Part number code

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E T 2 8 . 3 / 4 P - 2 0 0 - M 1 2
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Operating principle	
ET	Energetic reflection light scanner
Series	
28	28 Series
Equipment	
.3	Teach-in via teach button

Switching output/function /OUT1OUT2 (OUT1 = Pin 4, OUT2 = Pin 2)

4	PNP, light switching
P	PNP, dark switching
2	NPN, light switching
N	NPN, dark switching
X	Pin not used

Electrical connection
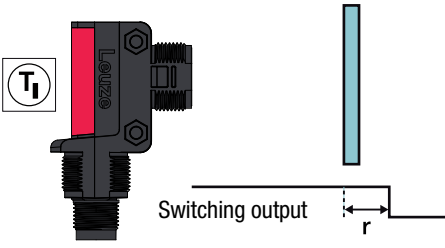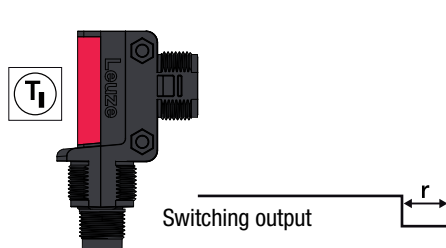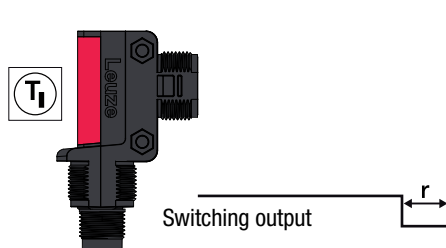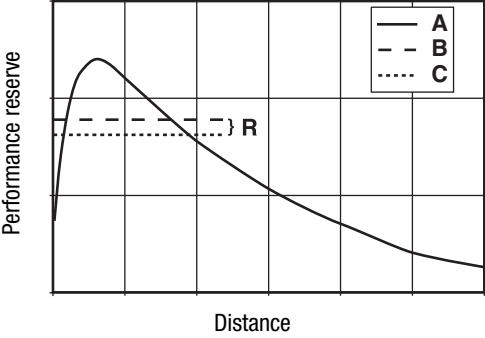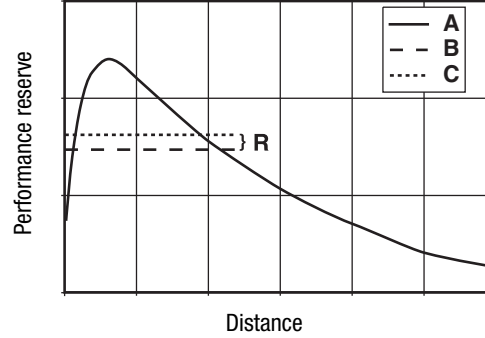
-M12	M12 connector, 4-pin
N/A	Cable, standard length 2 m
-200-M8	200 mm cable with M8 connector
-200-M12	200 mm cable with M12 connector

Teach-in method

| Teach	Operating level 1	Operating level 2
Standard Teach	**Teach on object:** With 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 tight signal reserve **R**. Thus, the object is detected even if the distance increases by the value **r** with respect to the distance during the teach.	**Teach on background:** 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 **R**). Thus, objects can be detected up to a distance of **r** in front of the background.
	Switching output	Switching output
	A Signal - object B Teach on object C Switching threshold	A Signal - background B Teach on background C Switching threshold

Operation via teach button

Teach in operating level 1

- Press teach button until both LEDs flash **simultaneously**.
- Release teach button.
- Ready.

2 ... 7s

LED **yellow**   LED **green**

simultaneously flashing at 3 Hz
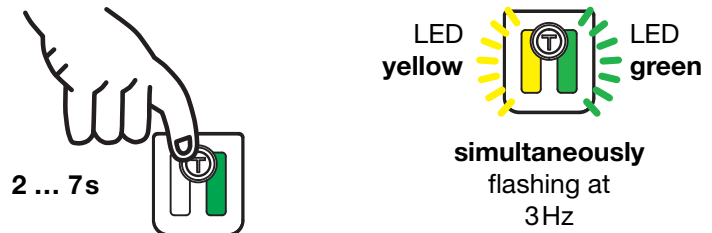
Teach in operating level 2

- Press teach button until both LEDs flash **alternatingly**.
- Release teach button.
- Ready.

7 ... 12s

LED **yellow**   LED **green**
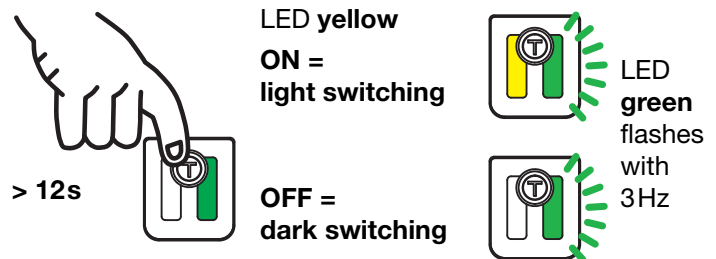
alternatingly flashing at 3 Hz
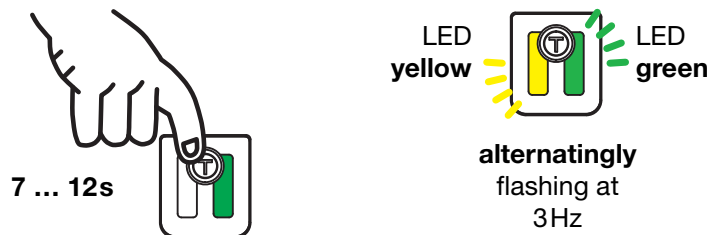
Adjusting the switching behavior of the switching output – light/dark switching

This function permits inversion of the sensors' switching logic.

- Press the teach button until only the green LED flashes. The yellow LED then shows the inverted switching logic:

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

- Release teach button.
- Ready.

> 12s

LED **yellow**

ON = light switching

OFF = dark switching

LED **green** flashes with 3 Hz