FT 28

Reflection light scanner with fading

A²LS

10 - 30 V DC

500 Hz

1 … 250 mm

- Reflection light scanner with fading
- V-optics allow for reliable detection of dark objects in the short range
- 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

IEC 60947...

IEC 60947...

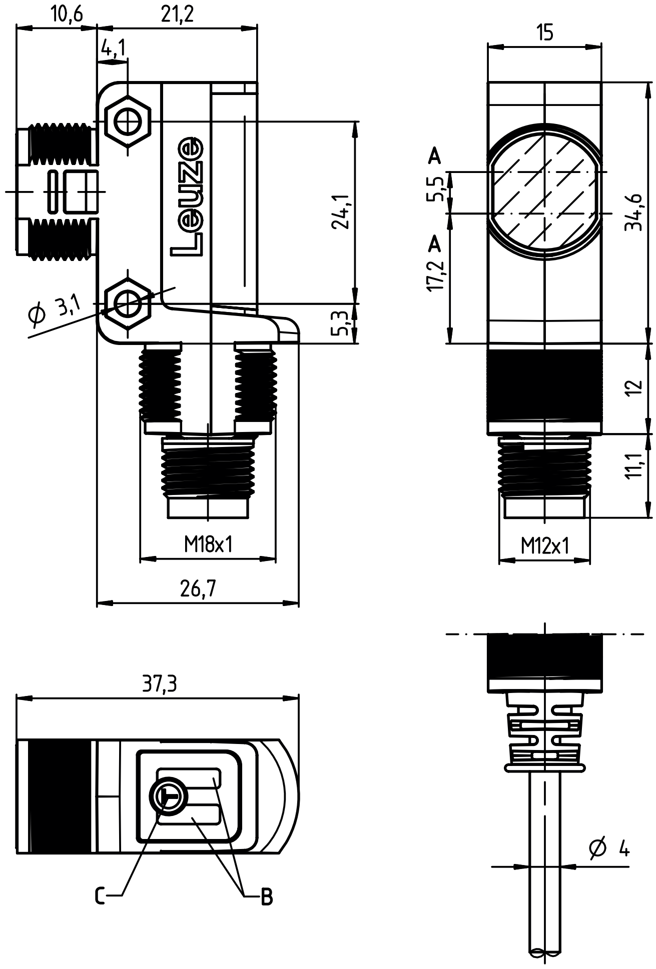
IP 67

Accessories:

(available separately)

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

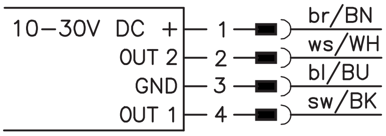
Dimensioned drawing


10,6
21,2
4,1
Leuze
24,1
5,3
Ø 3,1
M18x1
26,7
15
A
5,5
A
17,2
34,6
12
11,1
M12x1
37,3
C
B
Ø 4

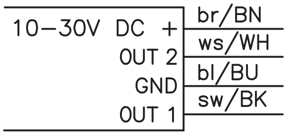
A Optical axis
B Indicator diodes
C Teach button

Electrical connection

1


10–30V DC +
OUT 2
GND
OUT 1
1
2
3
4
br/BN
ws/WH
bl/BU
sw/BK

2


10–30V DC +
OUT 2
GND
OUT 1
br/BN
ws/WH
bl/BU
sw/BK

Specifications

Optical data

Scanning range limit [1]		1 … 250 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-2.5 V)/≤ 2.5 V
Output current		max. 100 mA [4]

Indicators

Green LED		ready
Yellow LED		reflection (object detected)
Yellow LED, flashing		reflection, no performance reserve

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, 4x0.20 mm²

Environmental data

Ambient temp. (operation/storage)		-40 °C … +60 °C/-40 °C … +70 °C
Protective circuit [5]		2, 3
VDE safety class		III
Protection class		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 30 V, 0.5 A min, in the field installation, or equivalent (categories: CYJV/CYJV7 or PVVA/PVVA7)

Fading: black/white error < 50%
The black/white error is calculated from the scanning range against white and the reduction of the scanning range against black:

$$\textbf{Black/white error} = \frac{\textbf{Reduction of the scanning range against black}}{\textbf{Scanning range against white}} \times 100\,\%$$

Example:

Setting: "teach on object" at 160 mm on white 90 %

- **Detection**:
  Black object, 6%, is detected at approx. 100 mm, the black/white error here is:
  60 mm / 160 mm = approx. 38 %

Setting:"teach on object" at 120 mm on black 6 %

- **Situation in background**:
  White object, 90 %, is no longer detected at distance > 210 mm, the black/white error here is:
  90 mm / 210 mm = 43 %

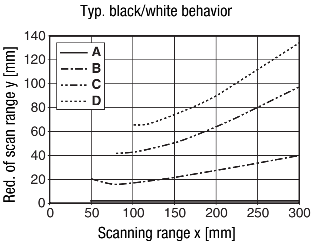
Tables

		Scanning range [mm]	Typ. scanning range limit [mm]
1	1	210	250
2	2	185	225
3	3	145	175
4	5	125	150

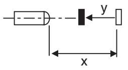
1	white 90%
2	gray 50%
2	gray 18%
2	black 6%

☐	Scanning range [mm]
▨	Typ. scanning range limit [mm]

Diagrams



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.

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	FT28.3/4P-M12	50122590
	Pin 4: NPN light switching, pin 2: NPN dark switching	FT28.3/2N-M12	50122593
With 200mm cable and M12 connector			
	Pin 4: PNP light switching, pin 2: PNP dark switching	FT28.3/4P-200-M12	50122591
	Pin 4: NPN light switching, pin 2: NPN dark switching	FT28.3/2N-200-M12	50122594
With cable, cable length 2m			
	Pin 4: PNP light switching, pin 2: PNP dark switching	FT28.3/4P	50122592
	Pin 4: NPN light switching, pin 2: NPN dark switching	FT28.3/2N	50122595

Part number code

FT28.3/4P-200-M12

Operating principle

FT	Reflection light scanner with fading

Series

28	28 Series

Equipment

.3	Teach-in via teach button

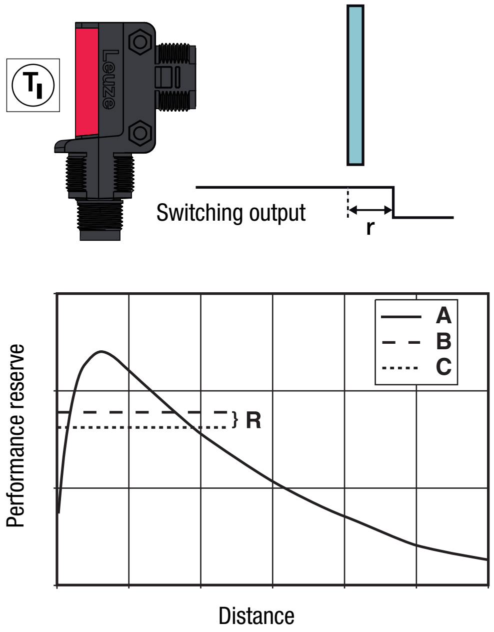
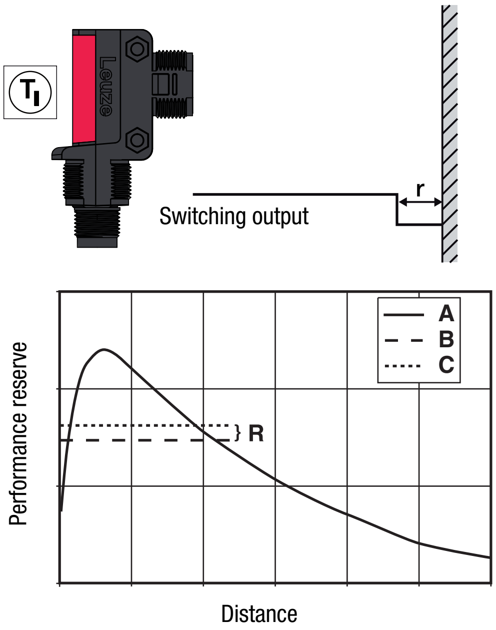
Switching output/function /OUT1OUT2 (OUT1 = Pin 4, OUT2 = Pin 2)

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 2m
-200-M8	200mm cable with M8 connector
-200-M12	200mm cable with M12 connector

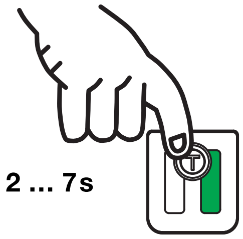
Teach-in method

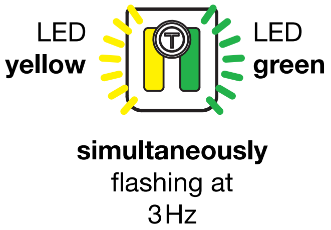
Teach	Operating level 1	Operating level 2
Standard Teach	**Teach on object:** With this teach event, the object is located in front of the sensor. The switching threshold is set by the teach so that the object is detected with tight signal reserve **R**. Thus, the object is detected even if the distance increases by the value **r** with respect to the distance during the teach.  Leuze Switching output r A B C R Performance reserve Distance **A** Signal - object **B** Teach on object **C** Switching threshold	**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.  Leuze Switching output r A B C R Performance reserve Distance **A** Signal - background **B** Teach on background **C** Switching threshold

Operation via teach button

Teach in operating level 1

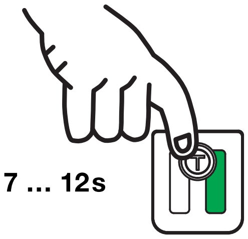
- Press teach button until both LEDs flash **simultaneously**.
- Release teach button.
- Ready.

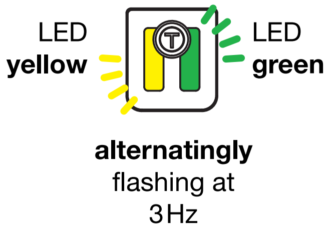



LED
yellow
LED
green
simultaneously
flashing at
3Hz

Teach in operating level 2

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




LED
yellow
LED
green
alternatingly
flashing at
3Hz

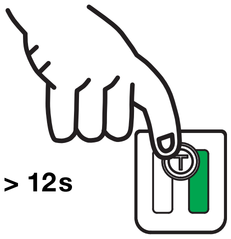
Adjusting the switching behavior of the switching output – light/dark switching

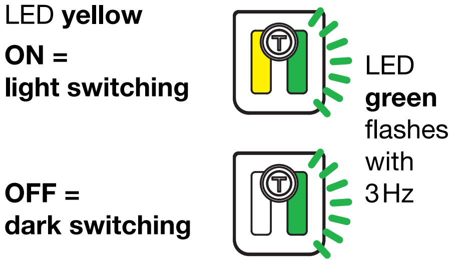
This function permits inversion of the sensors' switching logic.

- 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.




LED **yellow**
ON =
light switching
OFF =
dark switching
LED
green
flashes
with
3Hz