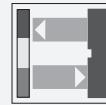




Print mark contrast sensor

DK12-11-5215

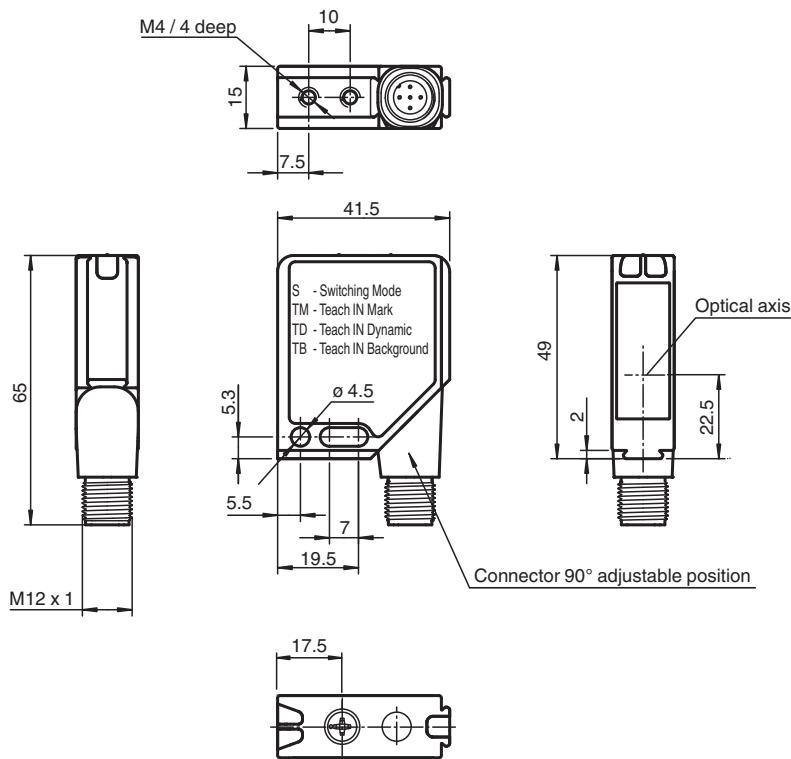


- Diffuse mode sensor for recording any print mark
- TEACH-IN, static and dynamic
- 50 μ s response time, suitable for extremely rapid scanning processes

Print mark contrast sensor, 11 mm detection range, red light, light/dark on, external Teach-In, 2 push-pull outputs, M12 plug



Dimensions



Technical Data

Release date: 2023-04-04 Date of issue: 2023-04-04 Filename: 239510_eng.pdf

General specifications

Sensor range

11 mm \pm 2 mm

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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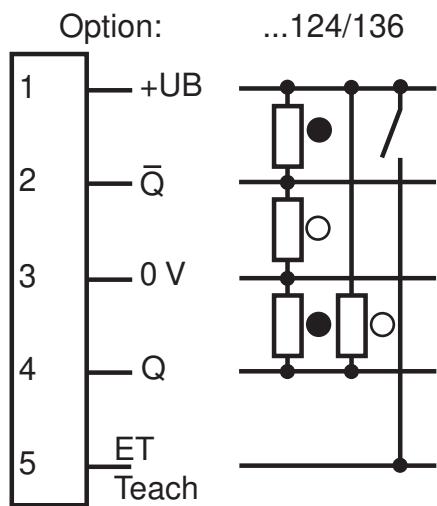
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Technical Data

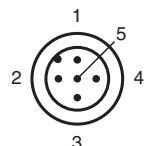
Light source	LED	
Light type	modulated visible red light , 660 nm	
Light spot representation	0.7 mm (effective light spot diameter)	
Angle deviation	max. $\pm 3^\circ$	
Teach-In	static and dynamic Teach-In	
Functional safety related parameters		
MTTF _d	750 a	
Mission Time (T _M)	20 a	
Diagnostic Coverage (DC)	60 %	
Indicators/operating means		
Operation indicator	LED green, statically lit Power on , short-circuit : LED green flashing (approx. 4 Hz)	
Function indicator	2 LEDs yellow, light up in case of detection	
Teach-In indicator	Teach-In mark: LED green/yellow equiphase flashing; 2,5 Hz . Teach-In background: LED green/yellow non equiphase flashing; 2,5 Hz . Teach-In dynamic: LED green/yellow equiphase flashing; 1.0 Hz . Teach Error:LED green/yellow non equiphase flashing; 8.0 Hz .	
Control elements	Teach-In rotary switch for Switching operation, Teach-In mark, Teach-In background and dynamic Teach-In	
Electrical specifications		
Operating voltage	U _B	10 ... 30 V DC
Ripple		10 %
No-load supply current	I ₀	≤ 80 mA
Input		
Function input	Ext. Teach-In input (ET)	
Output		
Switching type	light/dark on	
Signal output	2 push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected	
Switching voltage	max. 30 V DC	
Switching current	max. 100 mA	
Switching frequency	f	10 kHz
Response time		50 μ s
Conformity		
Product standard	EN 60947-5-2	
Approvals and certificates		
Protection class	II, rated voltage ≤ 250 V AC with pollution degree 1-2 according to IEC 60664-1	
UL approval	cULus Listed , Class 2 power source	
CCC approval	CCC approval / marking not required for products rated ≤ 36 V	
Ambient conditions		
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	
Storage temperature	-40 ... 75 °C (-40 ... 167 °F)	
Mechanical specifications		
Housing width	41.5 mm	
Housing height	49 mm	
Housing depth	15 mm	
Degree of protection	IP67	
Connection	Metal connector, M12, 5-pin, 90° rotatable	
Material		
Housing	Frame: nickel plated, die cast zinc, Laterals: glass-fiber reinforced plastic PC	
Optical face	Plastic pane	
Mass	60 g	

Connection Assignment

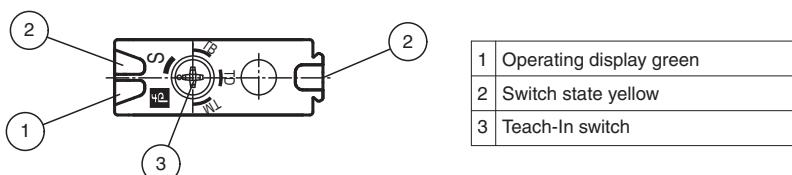


○ = Background
● = Mark

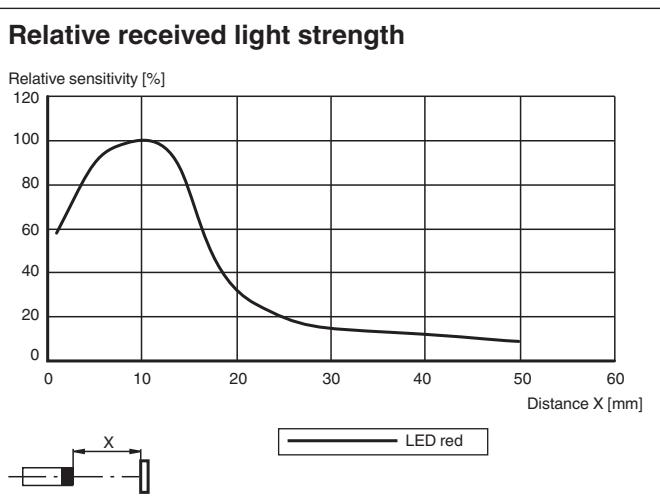
Connection Assignment



Assembly



Characteristic Curve



Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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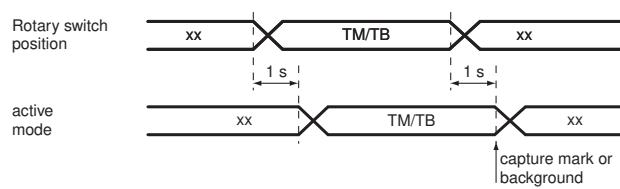
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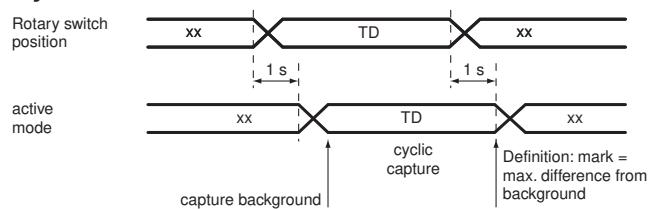
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Characteristic Curve

Static TEACH-IN



Dynamic TEACH-IN



Teach-In

If the object surfaces are reflective or shiny, tilt the sensor approximately 10° toward the surface of the material.

Teach-in via rotary switch: Teach-in via rotary switch is possible in four positions.

- TM position: Teach-in mark
- TB position: Teach-in background
- TD position: Teach-in dynamic
- S position: Switching mode

To change the switch position, a time lock of approximately 1 second must be adhered to in each case. This means that the rotary switch must remain in a new position constantly for 1 second in order for the sensor to accept the required mode. The mode can be identified by the how the flashing function of the signal indicators changes.

Static teach-in (TM/TB): The mark or the background can be taught-in in static teach-in mode, either together (in any order) or separately. Therefore it is not mandatory to always teach-in the mark and the background.

- **TM position:** The teach-in procedure starts. Continuous value transfer takes place, and the color of the scanned object can be changed. When leaving TM position, the sensor assumes the last value. In "teach-in mark" mode, the green and yellow signal indicators flash simultaneously at $f = 2.5$ Hz.
- **TB position:** Same functionality as in TM position. In "teach-in background" mode, the green and yellow signal indicators flash alternately at $f = 2.5$ Hz.

Teach-in dynamic (TD/S)

- **TD position:** The teach-in process starts. Continuous value transfer takes place, and the sensor interprets the first recorded signals as a background after entering "dynamic teach-in" mode. For the duration of "dynamic teach-in" mode, the sensor indicates the greatest deviation from the background as a mark. In "teach-in dynamic" mode, the green and yellow signal indicators flash simultaneously at $f = 1.0$ Hz.
- **S position:** The current teach-in mode is terminated. The received signals of all three emitter light colors for the mark and background are evaluated.

External teach-in input: The desired operating mode can be set to switch position S by applying a high pulse with a specific width.

- Teach-in dynamic (TD): 420 ms ... 450 ms
- Teach-in background (TB): 320 ms ... 350 ms
- Teach-in mark (TM): 220 ms ... 250 ms
- Switching mode (S): 120 ms ... 150 ms

The descriptions of the individual operating modes correspond to the teach-in via rotary switch. The function of the rotary switch is deactivated during external teach-in. An external teach-in procedure must be completed with a signal to request switching mode (S).

Teach-In

Recommended setting

1. Turn the Teach-In switch to position "S".
2. Position the light beam on the white part of the mark (W).



3. Turn the Teach-In switch to position "TM" and wait until the green and yellow LEDs start flashing simultaneously.
4. Turn the Teach-In switch to position "TB" and wait about 1 second.
5. Now position the light beam on the black part of the mark (B).
6. Turn the Teach-In switch to position "S" and wait about 1 second.

-> The mark is now taught in.

More information about settings can be found in the "Setting information" section.