



Print mark contrast sensor

DK12-11/124/136

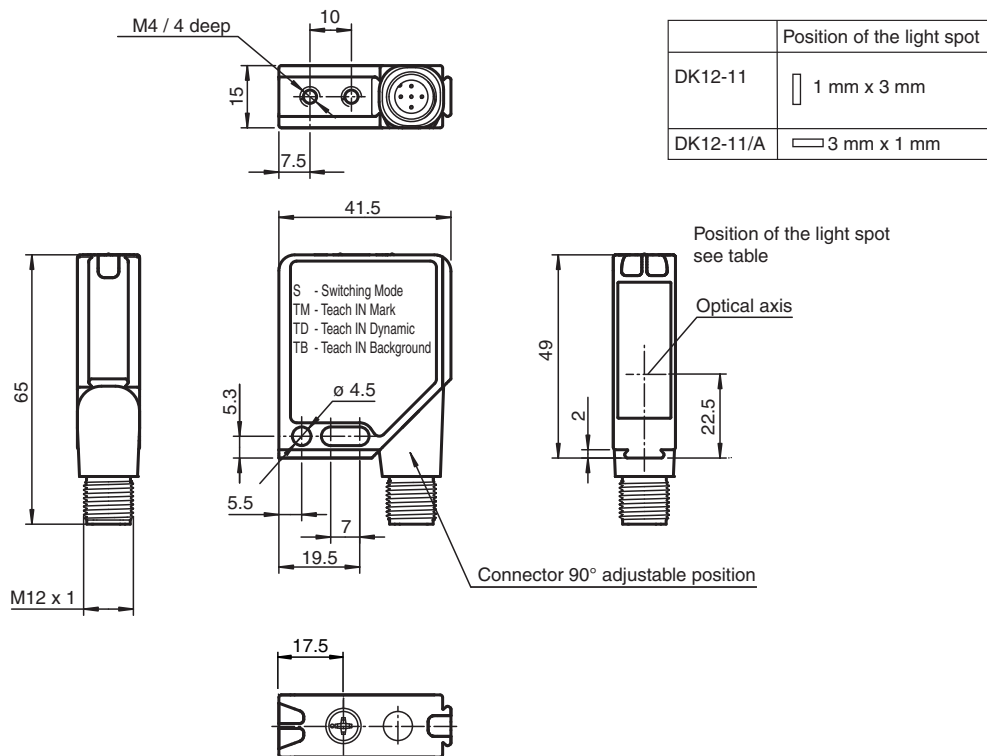


- Diffuse mode sensor for recording any print mark
- TEACH-IN, static and dynamic
- 50 μ s response time, suitable for extremely rapid scanning processes
- 3 emitter colors: green, red and blue

Print mark contrast sensor, 11 mm detection range, RGB light parallel with the longitudinal direction of the housing, light/dark ON, external Teach-In, 2 push-pull outputs, M12 plug



Dimensions



Technical Data

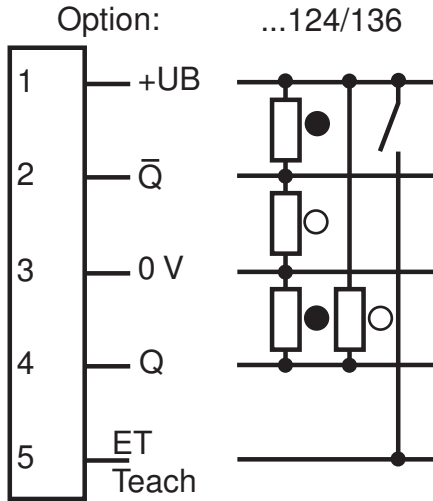
General specifications

| | |
|--------------|------------------|
| Sensor range | 11 mm \pm 2 mm |
|--------------|------------------|

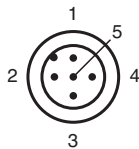
Technical Data

| | | |
|---|----------------|---|
| Light source | | 3 LEDs (R,G,B) |
| Light type | | Visible green/red/blue, modulated light |
| Light spot representation | | 1 mm x 3 mm , light spot parallel to housing |
| 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 μs |
| Conformity | | |
| Product standard | | EN 60947-5-2 |
| Approvals and certificates | | |
| EAC conformity | | TR CU 020/2011 |
| 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



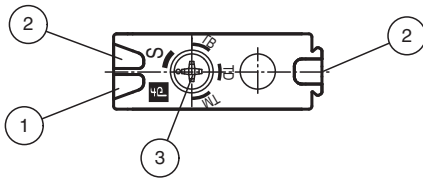
Connection Assignment



Wire colors in accordance with EN 60947-5-2

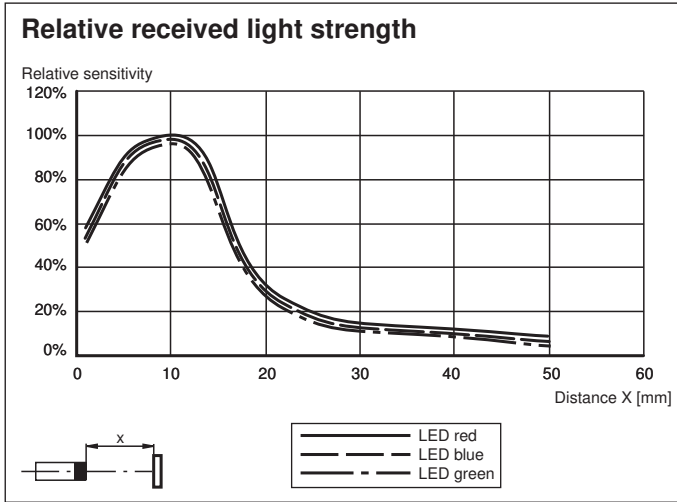
| | | |
|---|----|---------|
| 1 | BN | (brown) |
| 2 | WH | (white) |
| 3 | BU | (blue) |
| 4 | BK | (black) |
| 5 | GY | (gray) |

Assembly

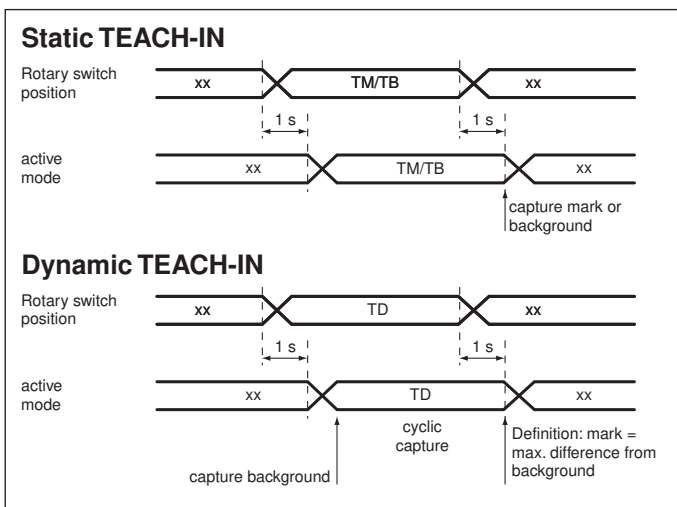


| | |
|---|-------------------------|
| 1 | Operating display green |
| 2 | Switch state yellow |
| 3 | Teach-In switch |

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Characteristic Curve



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 $f = 2.5 \text{ Hz}$.
- **TB position:** Same functionality as in TM position. In "teach-in background" mode, the green and yellow signal indicators flash alternately at $f = 2.5 \text{ Hz}$.

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 $f = 1.0 \text{ Hz}$.
- **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).

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