

## Model Number

**DKE20-9,5/9s20/110/124**

Print mark contrast sensor  
with 5-pin, M12 x 1 connector

## Features

- Diffuse mode sensor for recording any print mark
- Static TEACH-IN: automatic switching threshold adaptation
- Optical system exchangeable by 90°
- 30 µs response time, suitable for extremely rapid scanning processes
- 3 emitter colors: green, red and blue
- Time function
- Stainless steel housing

## Product information

The contrast sensor series DK10, DK2X, DKE2X and DK3X have an extreme robust and IP67 tight industrial standard housing with eight M5 metal reinforced inserts for sensor mounting. The lenses are made of high grade glass. All sensors offer different light spot shapes and orientations and have powerful push-pull outputs (NPN/PNP/push-pull).

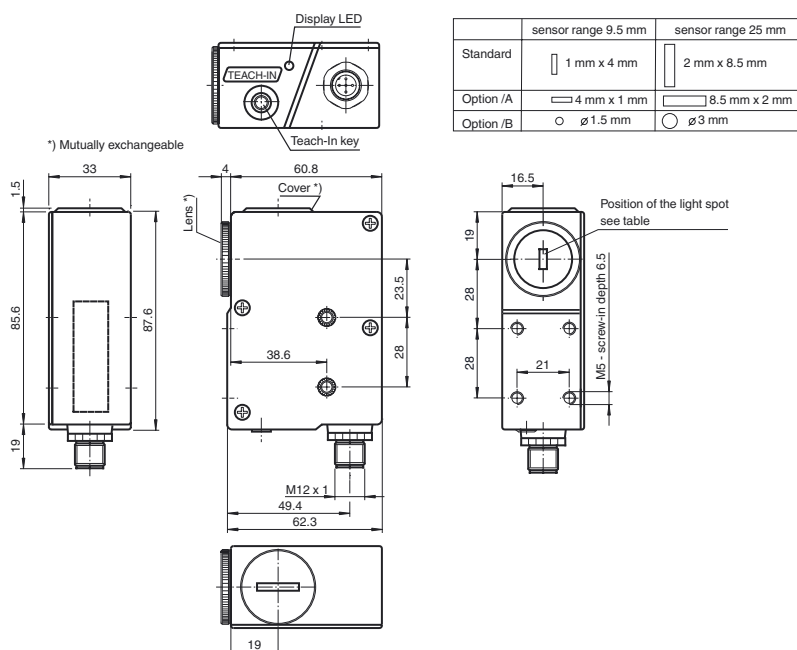
The DK10 sensor series offers laser and LED light sources, a manual sensitivity adjustment and high sensing ranges up to 800 mm.

The DK20/DK21/DKE2X standard contrast sensor series offers a very good contrast recognition and are available in extreme robust stainless-steel housings (DKE).

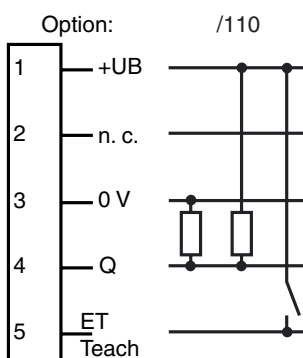
The DK31/DK34/DK35 sensor series is designed for cutting edge contrast recognition at highest sensitivity level.

The series DK20/DK34 offer a static Teach-In, the DK21/DKE21/DK31/DK35 series offer a dynamic Teach-In.

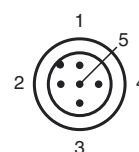
## Dimensions



## Electrical connection



## Pinout



**Technical data****General specifications**

Sensor range	9,5 mm +/-3 mm
Light source	LED
Light type	Visible green/red/blue, modulated light
Light spot representation	rectangular 1 mm x 4 mm
Angle deviation	max. $\pm 3^\circ$
Ambient light limit	
Continuous light	7000 Lux
Teach-In	static Teach-In

**Functional safety related parameters**

MTTF <sub>d</sub>	650 a
Mission Time (T <sub>M</sub> )	20 a
Diagnostic Coverage (DC)	0 %

**Indicators/operating means**

Function indicator	LED yellow; switching operation: lights up if print mark is detected Teach-In operation: flashing slowly alarm display: flashing quickly, if no safe operation is possible
Control elements	Teach-In key

**Electrical specifications**

Operating voltage	U <sub>B</sub>	10 ... 30 V DC
Ripple		10 %
No-load supply current	I <sub>0</sub>	≤ 70 mA

**Input**

Function input	Teach-In input
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**Output**

Switching type	light/dark on switchable, results from the order of the Teach-In	
Signal output	Push-pull output, short-circuit protected, reverse polarity protected	
Switching voltage	PNP: $\geq (+U_B - 2.5 \text{ V})$ , NPN: $\leq 1.5 \text{ V}$	
Switching current	max. 200 mA	
Switching frequency	f	16.5 kHz
Response time	30 $\mu$ s	
Timer function	rising edge , mono stable	
Pulse length	20 ms	

**Ambient conditions**

Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Storage temperature	-20 ... 75 °C (-4 ... 167 °F)

**Mechanical specifications**

Protection degree	IP67
Connection	M12 x 1 connector, 5-pin
Material	
Housing	Stainless steel
Optical face	glass
Mass	530 g

**Compliance with standards and directives**

Standard conformity	
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007
Shock and impact resistance	IEC / EN 60068. half-sine, 40 g in each X, Y and Z directions
Vibration resistance	IEC / EN 60068-2-6. Sinus. 10 -150 Hz, 5 g in each X, Y and Z directions

**Approvals and certificates**

CCC approval	CCC approval / marking not required for products rated $\leq 36 \text{ V}$
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**Accessories****V15-G-5M-PVC**

Female cordset, M12, 5-pin, PVC cable

**V15-W-5M-PVC**

Female cordset, M12, 5-pin, PVC cable

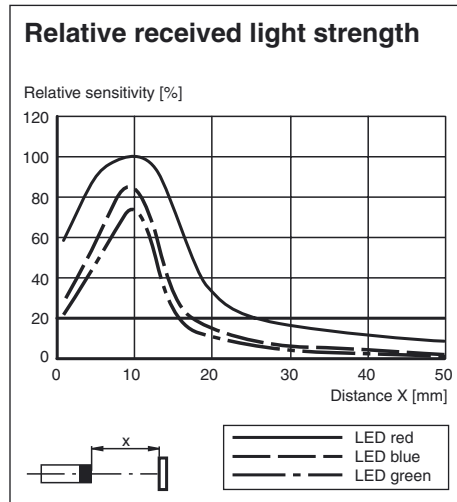
**OMH-DK**

Right-Angled Mounting Bracket

**OMH-DK-1**

Flat Mounting Bracket

Other suitable accessories can be found at [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com)



## Additional information

### Adjustment

1. Adjust light spot to print mark. In case of mirroring or shiny object surface tilt Sensor by  $10^\circ \dots 15^\circ$ .
2. Press Teach-In key, or apply a positive pulse (+UB) for at least 50 ms to the external TEACH-IN input. Now the indication LED flashes slowly (approx. 1 Hz).
3. Adjust light spot to the background
4. Press Teach-In key, or apply a positive pulse (+UB) for at least 50 ms to the external Teach-In input once more.
5. Teach-In successful: sensor in switching mode, LED is off

Alarme-function: contrast for all emitter colours too weak; a reliable sensor operation cannot be guaranteed. Indicator LED flashes quickly (approx. 4 Hz). Return to switch mode by keystroke.

The switching level is centered between the evaluated print mark/background-contrast values.

The sensor automatically selects and stores the most suitable emitter colour for the best print mark/background-contrast.

For exact contrast evaluation, the DK... can optionally be equipped with an additional analogue output.

### Switching type:

The output switches at the receiver signal that has been first taught-in after +UB. The light-on/dark-on switching results from the changed sequence of the teach-in procedure and is therefore reversible.

### Emitter-test function:

1. Connection of +UB at active Teach-In signal (keystroke or ext. Teach-In).
2. After teach-in is finished (keystroke or ext. Teach-In signal) the green emitter is switched.
3. The red emitter is switched after the second Teach-In.
4. The blue emitter is switched after the third Teach-In.
5. After the fourth Teach-In: switching operation

The switching of the output is suppressed during the test operation.

