



Model Number

DK10-LAS/76a/110/124

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

Features

- Laser print mark contrast sensor for recording very small print marks
- Large focus depth range from 3 mm ... 300 mm
- Laser class 2, eyesafe
- Adjustable sensitivity
- 30 µs response time, suitable for extremely rapid scanning processes

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).

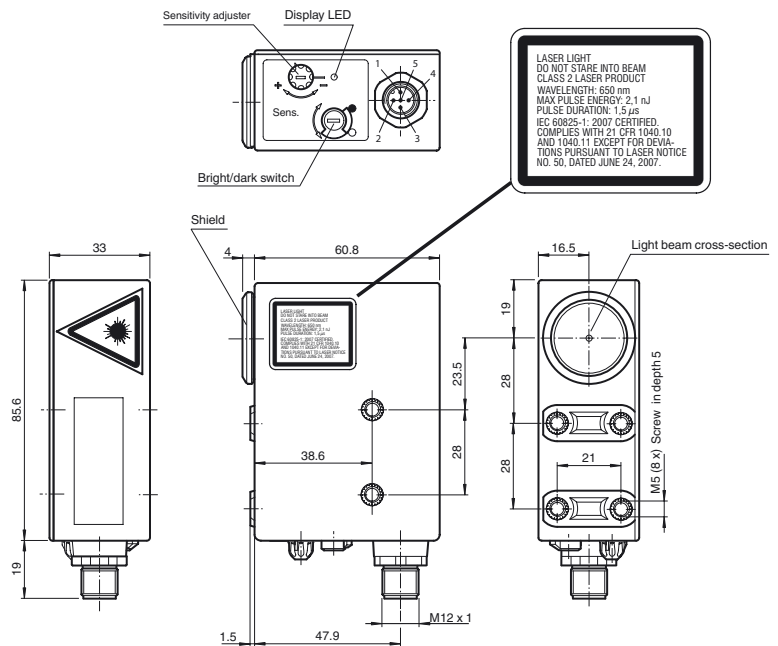
The DK10 sensor series offers laser and LED light sources, a manual sensitivity adjustment and high sensing ranges up to 800 mm.

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

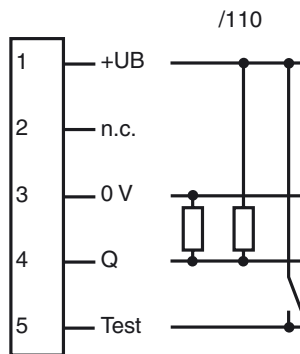
The DK31/DK34/DK35 sensor series is designed for cutting edge contrast recognition at highest sensitivity level.

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

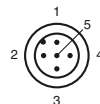
Dimensions



Electrical connection



Pinout



Wire colors in accordance with EN 60947-5-2

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

Technical data**General specifications**

Sensor range	300 mm
Detection range	3 ... 300 mm
Light source	laser diode
Light type	modulated visible red light
Laser nominal ratings	
Note	LASER LIGHT , DO NOT STARE INTO BEAM
Laser class	2
Wave length	650 nm
Beam divergence	< 1.5 mrad
Pulse length	1.5 µs
Repetition rate	108.7 kHz
max. pulse energy	2.1 nJ
Light spot representation	approx. 0.8 mm at a distance of 300 mm
Ambient light limit	
Continuous light	40000 Lux

Functional safety related parameters

MTTF _d	550 a
Mission Time (T _M)	20 a
Diagnostic Coverage (DC)	60 %

Indicators/operating means

Function indicator	LED yellow: lights up if receiver is lit (light on), lights up if receiver is not lit (dark on)
Control elements	Light-on/dark-on changeover switch, sensitivity adjuster

Electrical specifications

Operating voltage	U _B	10 ... 30 V DC
Ripple		10 %
No-load supply current	I ₀	≤ 55 mA

Input

Test input	emitter deactivation with +U _B
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Output

Switching type	light/dark on switchable	
Signal output	Push-pull output, short-circuit protected, reverse polarity protected	
Switching voltage	PNP: U _B - 2.5 V / NPN: U _{Rest} 1.5 V	
Switching current	max. 200 mA	
Switching frequency	f	16.5 kHz
Response time	30 μs	

Conformity

Product standard	EN 60947-5-2
Laser safety	IEC 60825-1:2007

Ambient conditions

Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Storage temperature	-20 ... 75 °C (-4 ... 167 °F)

Mechanical specifications

Housing width	33 mm
Housing height	85.6 mm
Housing depth	60.8 mm
Degree of protection	IP67
Connection	5-pin, M12 x 1 connector
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	glass
Mass	200 g

Compliance with standards and directives

Standard conformity	
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

UL approval	cULus Listed , Class 2 power source
CCC approval	CCC approval / marking not required for products rated ≤36 V

Accessories**V15-G-5M-PVC**

Female cordset, M12, 5-pin, PVC cable

V15-W-5M-PVC

Female cordset, M12, 5-pin, PVC cable

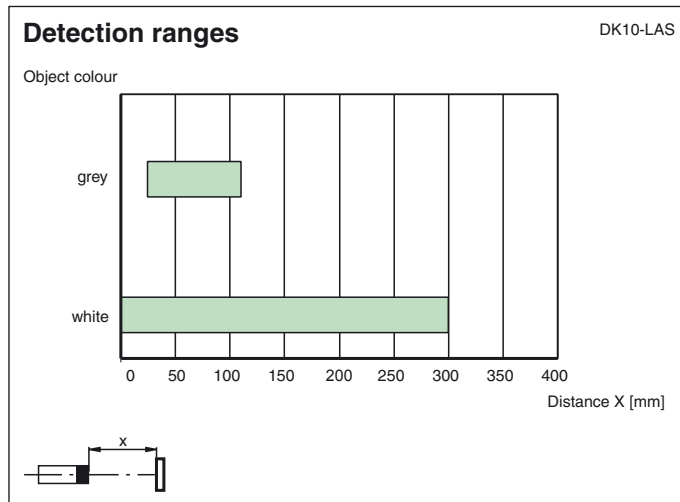
OMH-DK

Right-Angled Mounting Bracket

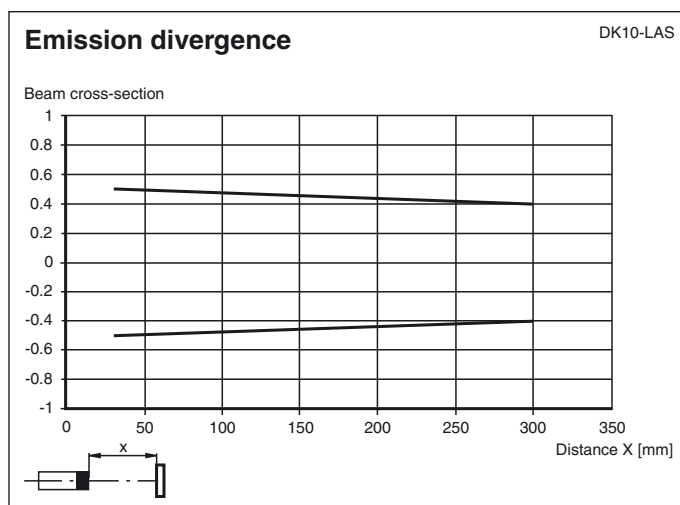
OMH-DK-1

Flat Mounting Bracket

Other suitable accessories can be found at www.pepperl-fuchs.com



Curves/Diagrams



Adjustment instructions

Switching threshold adjustment

The required switching threshold is adjusted with the sensitivity control. Please proceed as follows:

1. Switch the light/dark change-over switch to the light setting.
2. Point the light spot at the light part of the surface being scanned.
3. If the yellow indicator LED lights up, turn the sensitivity control to the left until the indicator LED goes off again.
If the yellow indicator LED does not light up, miss out this step.
4. Turn the sensitivity control to the right until the indicator LED just lights up.
5. Point the light spot at the dark part of the surface being scanned.
6. The indicator LED must have gone off.
7. Turn the sensitivity control to the right again until the indicator LED lights up again. Counting the number of turns.
8. Turn the sensitivity control back to the left by half the number of counted turns.

Once the DK10 colour mark scanner has been adjusted in this way, the switching threshold is exactly in the middle of the measured light and dark values. The greater the number the number of times the sensitivity control is turned between the light and the dark marks, the greater the contrast.

Recommendation: The number of turns should be to > 0.5.

Switching mode adjustment:

Setting of light/dark switch	Receiver	Output PNP	Output NPN
H	exposed	inactive	active
	unexposed	active	inactive
D	exposed	active	inactive
	unexposed	inactive	active

**Laser notice laser class 2**

- The irradiation can lead to irritation especially in a dark environment. Do not point at people!
- Caution: Do not look into the beam!
- Maintenance and repairs should only be carried out by authorized service personnel!
- Attach the device so that the warning is clearly visible and readable.
- Caution – Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.