Model Number

DK10-LAS/9S20

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
- Time function

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).

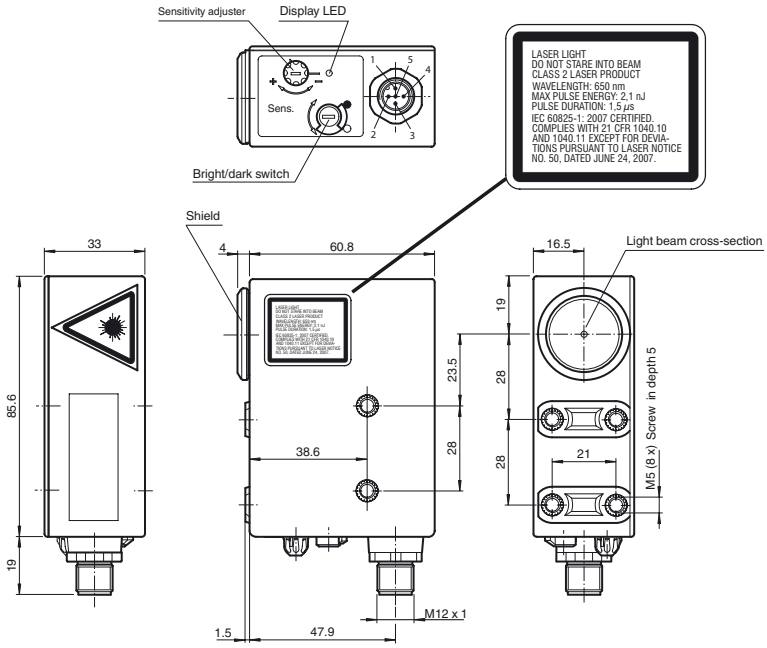
The DK10 sensor series offers laser and LED light sources, a manual sensitivity adjustment and high sensing ranges up to 800 mm.

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.

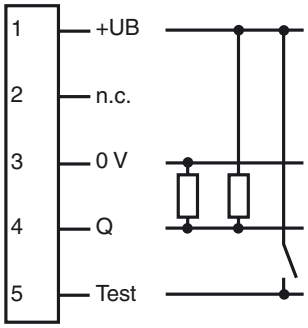
The series DK20/DK34 offer a static Teach-In, the DK21/DKE21/DK31/DK35 series offer a dynamic Teach-In.

Dimensions

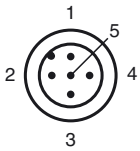


Electrical connection

/110



Pinout



Release date: 2013-09-18 11:10 Date of issue: 2013-10-07 418070_eng.xml

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/Dark 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 +Ub
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
Timer function		rising edge , mono stable
Pulse length		20 ms
Ambient conditions		
Ambient temperature		-10 ... 50 °C (14 ... 122 °F)
Storage temperature		-20 ... 75 °C (-4 ... 167 °F)
Mechanical specifications		
Protection degree		IP67
Connection		M12 x 1 connector, 5-pin
Material		
Housing		PC (glass-fiber-reinforced Makrolon)
Optical face		glass
Mass		200 g
Compliance with standards and directives		
Directive conformity		EMC Directive 2004/108/EC
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
Laser class		IEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007
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

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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0001 fa-info@us.pepperl-fuchs.com
Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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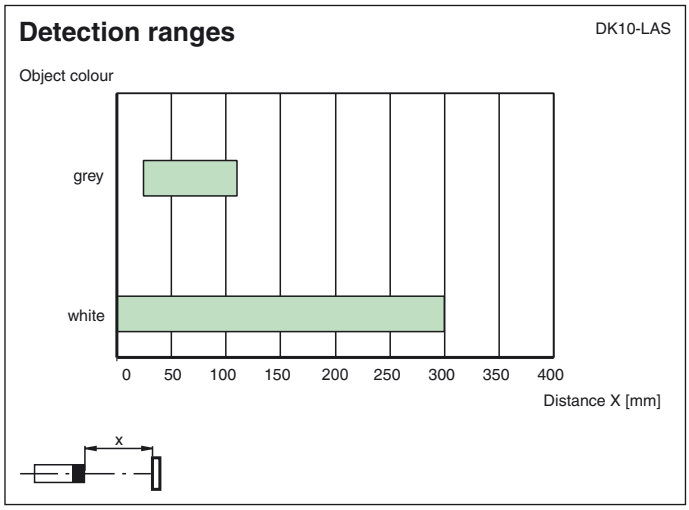
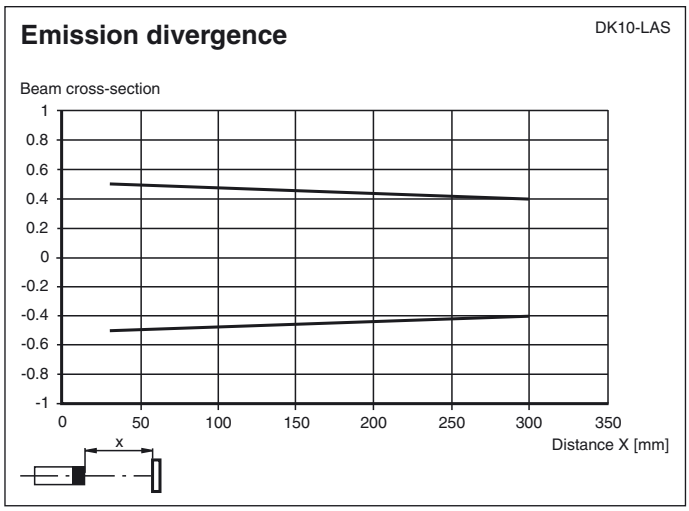


Curves/Diagrams



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 thres-hold 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

Release date: 2013-09-18 11:10 Date of issue: 2013-10-07 418070_eng.xml

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.

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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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