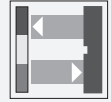


# Print mark contrast sensor

## DK20-2497(/49)

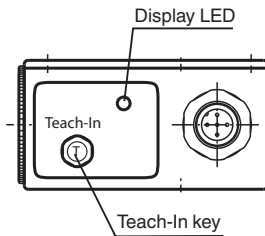


- Diffuse mode sensor for recording any print mark
- Static TEACH-IN: automatic switching threshold adaptation
- 30  $\mu$ s response time, suitable for extremely rapid scanning processes
- 3 emitter colors: green, red and blue

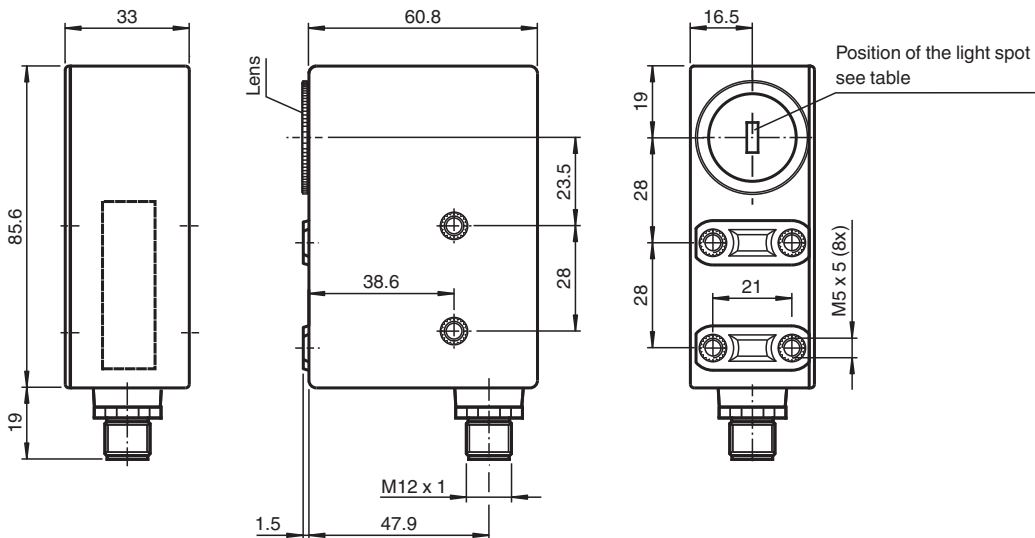
Print mark contrast sensor with plastic lens, 9.5 mm detection range, RGB light, light/dark on, external Teach-in, NPN output, PNP output, M12 plug



### Dimensions



	sensor range 9.5 mm	sensor range 25 mm
Standard	1 mm x 4 mm	2 mm x 8.5 mm
Option /A	4 mm x 1 mm	8.5 mm x 2 mm
Option /B	$\varnothing$ 1.5 mm	$\varnothing$ 3 mm



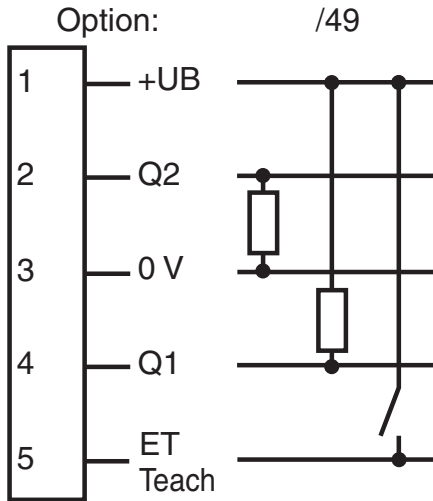
Release date: 2022-03-30 Date of issue: 2022-03-30 Filename: 418086\_eng.pdf

## Technical Data

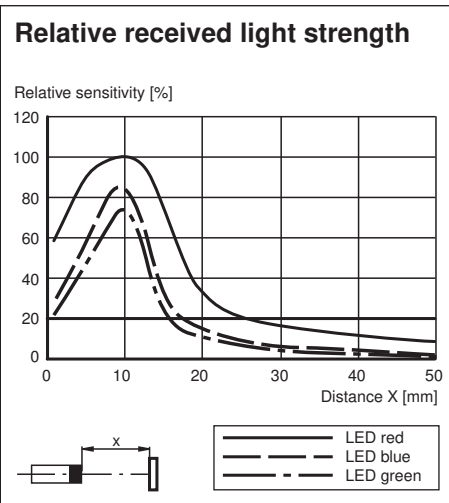
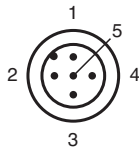
General specifications			
Sensor range		9.5 mm ± 3 mm	
Light source		LED	
Light type		Visible green/red/blue, modulated light	
Light spot representation		rectangular 1 mm x 4 mm ,	
Angle deviation		max. ± 3°	
Ambient light limit			
Continuous light		7000 Lux	
Teach-In		static Teach-In	
Functional safety 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	
Output			
Switching type		light/dark on switchable, results from the order of the Teach-In	
Signal output		1 PNP and 1 NPN short-circuit protected, open collector, synchronized-switching	
Switching voltage		PNP: ≥ (+U <sub>B</sub> -2.5 V) , NPN: ≤ 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	
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			
EAC conformity		TR CU 020/2011	
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		-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		plastic	
Mass		200 g	

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**Connection Assignment**



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**Accessories**

	<b>V15-G-5M-PVC</b>	Female cordset single-ended M12 straight A-coded, 5-pin, PVC cable grey
	<b>V15-W-5M-PVC</b>	Female cordset single-ended M12 angled A-coded, 5-pin, PVC cable grey
	<b>OMH-DK</b>	Right-Angled Mounting Bracket
	<b>OMH-DK-1</b>	Flat Mounting Bracket

**Teach-In**

**Adjustment**

1. Adjust light spot to print mark. In case of mirroring or shiny object surface tilt Sensor by 10° ... 15°.
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 +U<sub>B</sub>. 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 +U<sub>B</sub> 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.

