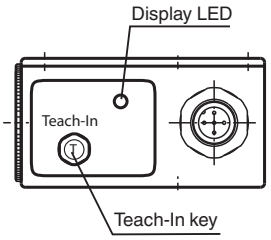
Print mark contrast sensor

DK20-2497(/49)

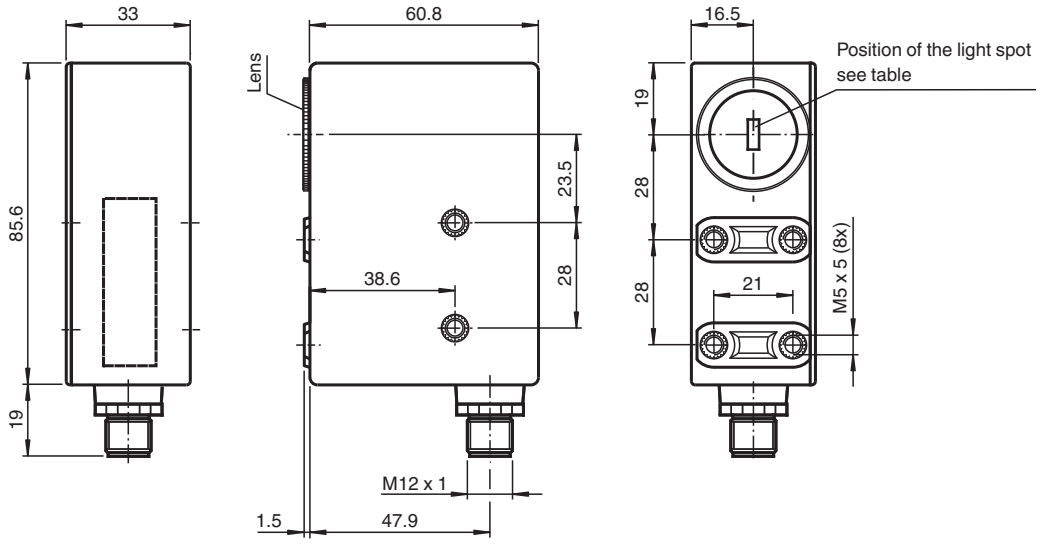
- Diffuse mode sensor for recording any print mark
- Static TEACH-IN: automatic switching threshold adaptation
- 30 µs response time, suitable for extremely rapid scanning processes
- 3 emitter colors: green, red and blue

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	⌀1.5 mm	⌀3 mm



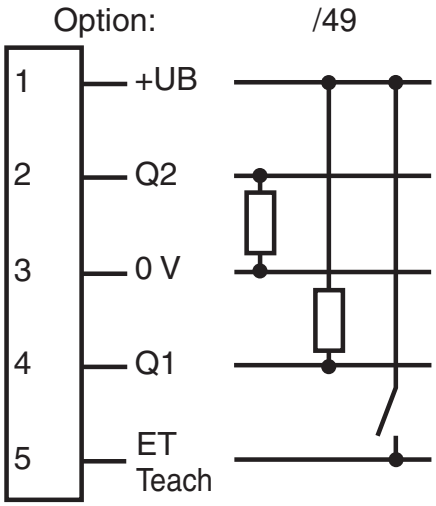
Release date: 2022-03-30 Date of issue: 2022-03-30 Filename: 418086_eng.pdf

Technical Data

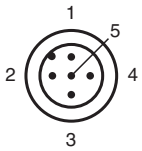
General specifications		
Sensor range		9.5 mm ± 3 mm
Light source		LED
Light type		Visible green/red/blue, modulated light
Light spot representation		rectangular 1 mm x 4 mm ,
Angle deviation		max. ± 3°
Ambient light limit		
Continuous light		7000 Lux
Teach-In		static Teach-In
Functional safety related parameters		
$MTTF_d$		650 a
Mission Time (T_M)		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_B	10 ... 30 V DC
Ripple		10 %
No-load supply current	I_0	≤ 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_B -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

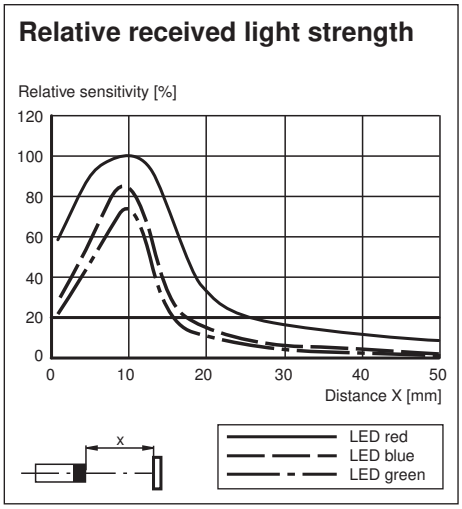
Release date: 2022-03-30 Date of issue: 2022-03-30 Filename: 418086_eng.pdf

Connection Assignment



Connection Assignment





Accessories

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

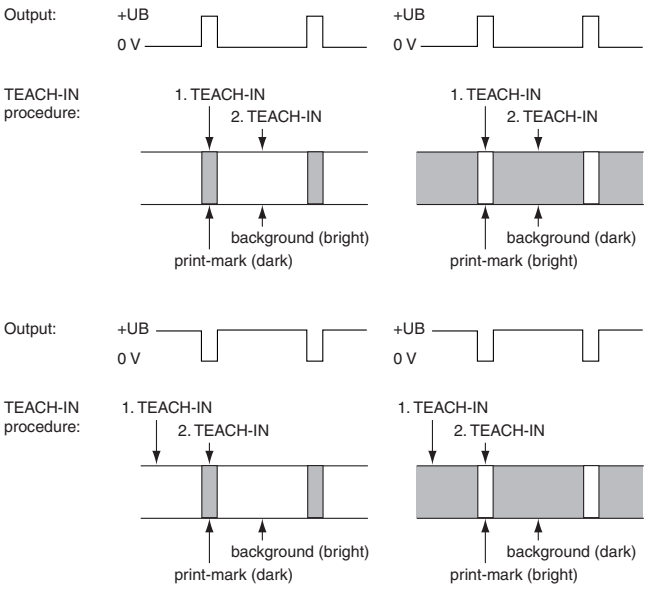
Release date: 2022-03-30 Date of issue: 2022-03-30 Filename: 418086_eng.pdf

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 $+U_B$. 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 $+U_B$ 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 forth Teach-In: switching operation

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

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