

Multicolor contrast sensor, White light contrast sensor, Laser contrast sensor

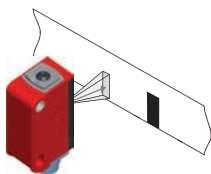
KRT3CM, KRT3CW, KRT3CL1



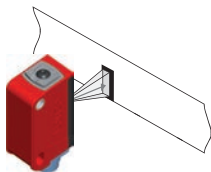
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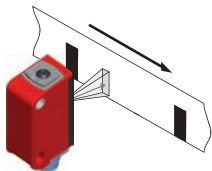


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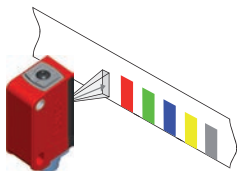


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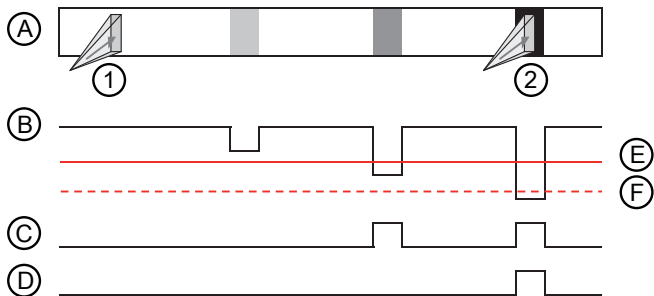
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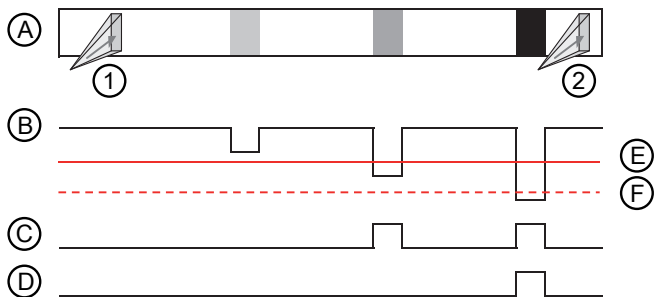
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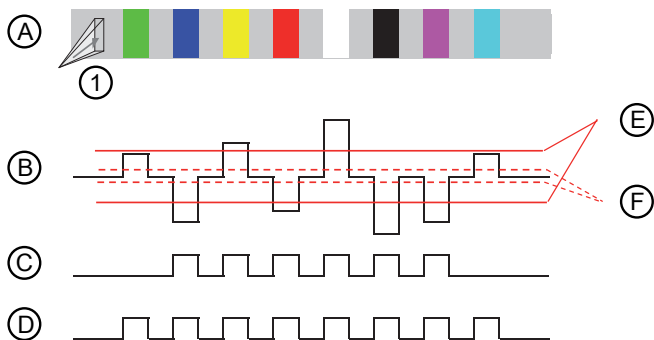
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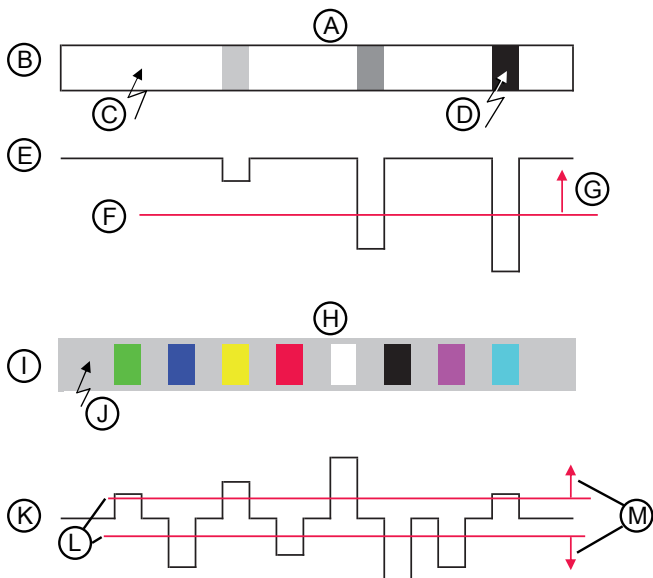


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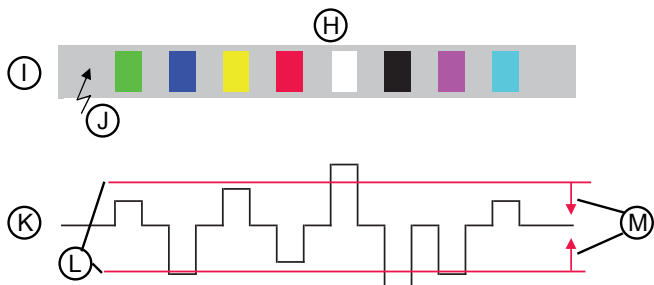
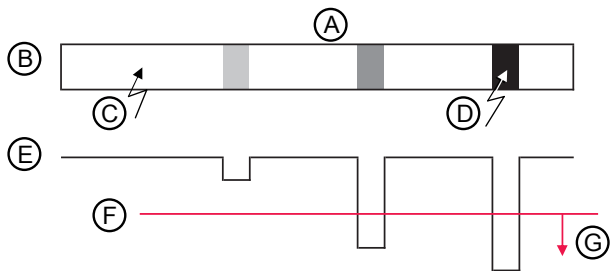


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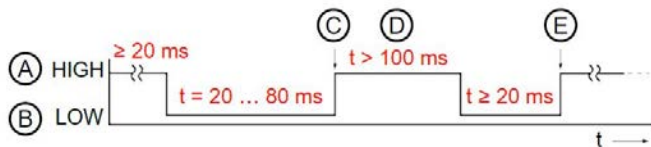
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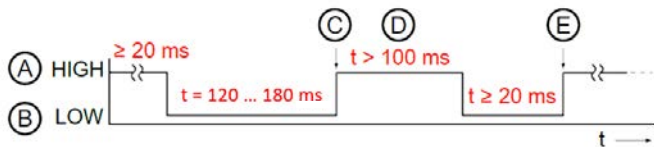


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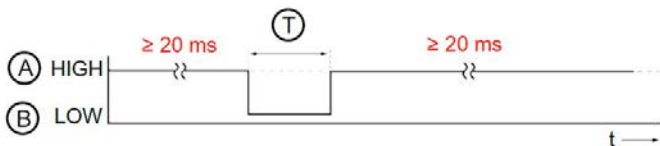


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Safety

The laser safety notice applies only for device type KRT3CL1... with a laser as the light source.

 **ATTENTION**
**LASER RADIATION – CLASS 1 LASER PRODUCT**

The device satisfies the requirements of IEC 60825-1:2014 / EN 60825-1:2014+A11:2021 safety regulations for a product of **laser class 1** as well as the U.S. 21 CFR 1040.10 regulations with deviations corresponding to Laser Notice No. 56 from May 8, 2019.

↳ Observe the applicable statutory and local laser protection regulations.

↳ The device must not be tampered with and must not be changed in any way.

There are no user-serviceable parts inside the device.

CAUTION! Opening the device can lead to dangerous exposure to radiation!

Repairs must only be performed by Leuze electronic GmbH + Co. KG.

Mounting**1**

With glossy objects, fasten the sensor at an inclination of approx. 10° relative to the object surface.

Sensor adjustment (teach) via teach button**Static 2-point teach**

Suitable for manual positioning of the marks (device type KRT3C...S2/...).

Switching threshold in center	Switching threshold near the mark
2	
Position the light spot of the sensor in front of the background.	
Press the teach button for 2 ... 7 s.	Press the teach button for 7 ... 12 s.
The value for the background is accepted. The LEDs flash synchronously.	The value for the background is accepted. The LEDs flash alternately.

Switching threshold in center	Switching threshold near the mark
3	
Position the light spot of the sensor on the mark.	
Press the teach button briefly.	
The value for the mark is accepted. The device is in RUN mode. The yellow LED illuminates. The switching threshold is set in the center.	The value for the mark is accepted. The device is in RUN mode. The yellow LED illuminates. The switching threshold is set near the mark.

Dynamic 2-point teach

Suitable for marks moved during automated machine processes (device type KRT3C...D2/...).

Switching threshold in center	Switching threshold near the mark
2	
Position the light spot of the sensor in front of the background.	
Press the teach button for 2 ... 7 s.	Press the teach button for 7 ... 12 s.
The measurement window opens. The LEDs flash synchronously.	The measurement window opens. The LEDs flash alternately.
4	
Allow the marks to pass through dynamically.	
Press the teach button briefly.	
The measurement window closes. The device is in RUN mode. The yellow LED is off. The switching threshold is set in the center.	The measurement window closes. The device is in RUN mode. The yellow LED is off. The switching threshold is set near the mark.

Static 1-point teach

Suitable for detecting all marks outside of the reference value (device type KRT3C...S1/...).

Standard sensitivity	High sensitivity
<div style="background-color: black; color: white; padding: 5px; font-weight: bold; font-size: 24px; margin-bottom: 5px;">5</div> <p style="text-align: center;">Position the light spot of the sensor in front of the reference value.</p>	
Press the teach button for 2 ... 7 s until the LEDs flash synchronously.	Press the teach button for 7 ... 12 s until the LEDs flash alternately.
Release the teach button.	
The reference value is accepted. The device is in RUN mode. The yellow LED is off. The standard sensitivity is set.	The reference value is accepted. The device is in RUN mode. The yellow LED is off. The high sensitivity is set.

Switching threshold diagrams

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Static 2-point teach

- A Label with marks
- B Received signal
- C Switching output for switching threshold in center
- D Switching output for switching threshold near the mark
- E Switching threshold in center
- F Switching threshold near the mark
- 1 1. Teach point on background
- 2 2. Teach point on mark

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Dynamic 2-point teach

- A Label with marks
- B Received signal
- C Switching output for switching threshold in center
- D Switching output for switching threshold near the mark
- E Switching threshold in center
- F Switching threshold near the mark
- 1 Open measurement window
- 2 Close measurement window

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Static 1-point teach

- A Label with marks
- B Received signal
- C Switching output for standard sensitivity
- D Switching output for high sensitivity
- E Standard sensitivity
- F High sensitivity
- 1 Teach reference value

Pulse stretching function

Switching pulse stretching on or off
Hold down the teach button longer than 12 s until only the green LED flashes.
Release the teach button. The green LED flashes for 2 s more, while the yellow LED displays the state: <ul style="list-style-type: none"> – Yellow LED on: pulse stretching ON – Yellow LED off: pulse stretching OFF
The change is accepted.
If the other state is to be set, repeat the process.

EasyTune function – Fine tuning of the switching threshold

Status of the function following power-on and completed teach event:

- Green LED continuous light: Ready
- Yellow LED continuously on: Mark detected
- Yellow LED continuously off: Mark not detected

Increase the switching threshold	Reduce the switching threshold
Raise the switching threshold by pressing and holding the button for between 200 ms and 2 s. Every button press raises the switching threshold incrementally.	Lower the switching threshold by briefly pressing the button for between 2 ms and 200 ms. Every button press lowers the switching threshold incrementally.
The button press is confirmed if the green LED flashes briefly once. The new switching threshold is accepted.	

Increase the switching threshold	Reduce the switching threshold
9 A: 2-point teach B: Label with marks C: 1. Teach point on background D: 2. Teach point on mark E: Received signal F: Switching threshold G: Increasing the switching threshold H: 1-point teach I: Label with marks J: Teach reference value K: Received signal L: Switching threshold M: Increasing the switching threshold	10 A: 2-point teach B: Label with marks C: 1. Teach point on background D: 2. Teach point on mark E: Received signal F: Switching threshold G: Reducing the switching threshold H: 1-point teach I: Label with marks J: Teach reference value K: Received signal L: Switching threshold M: Reducing the switching threshold



If the upper or lower end of the adjustment range is reached, the green and yellow LEDs flash at a considerably higher frequency of 15Hz for the duration of one second.

Sensor adjustments via the IN input (pin 2)



The following description applies to PNP switching logic:

Signal level LOW $\leq 2\text{ V}$
 Signal level HIGH $\geq (U_g - 2\text{ V})$

With types with NPN switching logic, the signal levels are inverted.

Teach-in

To teach, a teach signal is applied to the teach input (pin 2). The duration of the teach signal (LOW level on the teach input) determines the teach-in function.

NOTICE



Before a LOW level is applied for teaching-in functions, a HIGH level must be applied for at least 20 ms.

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Switching threshold in center / standard sensitivity

- A Buttons locked
- B Buttons can be operated
- C Teach is started – Accept 1st teach value (background, reference value / open measurement window)
- D Teach duration
- E Teach is ended – Accept 2nd teach value (mark / close measurement window)

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Switching threshold near the mark / high sensitivity

- A Buttons locked
- B Buttons can be operated
- C Teach is started – Accept 1st teach value (background, reference value / open measurement window)
- D Teach duration
- E Teach is ended – Accept 2nd teach value (mark / close measurement window)

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- A Buttons locked
- B Buttons can be operated
- T Duration of the teach signal

Duration T [ms]	Function
20 ... 80	Standard-sensitivity teaching
120 ... 180	High-sensitivity teaching
220 ... 280	Activate pulse stretching
320 ... 380	Deactivate pulse stretching
420 ... 480	Configure the switching behavior of the switching output: light switching
520 ... 580	Configure the switching behavior of the switching output: dark switching

Locking teach button via the IN input (pin 2)



A static HIGH signal (≥ 20 ms) at the teach input locks the teach button on the device, such that no manual operation is possible (e.g. protection from erroneous operation or manipulation).

If the teach input is not connected or if there is a static LOW signal, the button is unlocked and can be operated freely.