# **KRTM 20**



50116669 en 01-2011/06



20mm 50mm

#### 12 - 30 V տոոո DC 50/25 kHz

- Dynamic teach-in
- RGB transmitter
- Response time analog/digital (10µs/10µs or 10µs/20µs)
- Digital switching frequency 50kHz or • 25kHz
- Resolution of 70 gray levels at the digital • output
- Resolution of 400 gray levels at the analog • output
- Analog output 1 ... 10mA •
- Changeover to the switching threshold •
- Changeover to the analysis depth
- L/D switching
- Pulse stretching

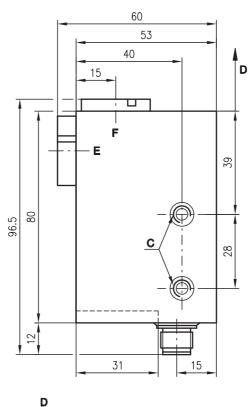
## ŰĽ US LISTED IP 6 IEC 60947 IEC 60947

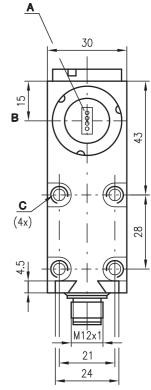
## Accessories:

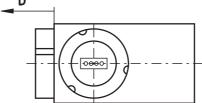
- (available separately)
- M12 connectors, 5-pin (KD ...)
- Ready-made cables (K-D ...)
- Interchangeable objectives
- Tool for changing objectives

# **High Resolution Multicolor Contrast Scanner**

# **Dimensioned drawing**



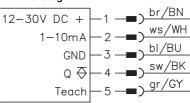




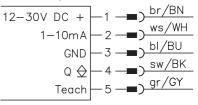
- Light spot orientation vertical Α
- в Optical axis
- С M5/5.5mm deep
- D Scanning range
- Е Front F Head

# **Electrical connection**

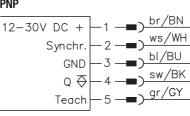
## PNP + analog

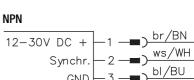


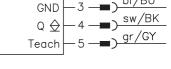












# **Specifications**

### **Optical data**

Scanning range with objective 1 <sup>1</sup>) Scanning range with objective 2 <sup>2</sup>) Scanning range with objective 3 <sup>1</sup>) Light spot dimension with objective 1 <sup>1</sup>) Light spot dimension with objective 2 <sup>2</sup>) Light spot dimension with objective 3 <sup>1</sup>) Light spot orientation Light source

### Timing

Switching frequency digital output Response time digital output Response jitter digital output Response time of analogue output Delay before start-up

### Electrical data

Operating voltage U<sub>B</sub> Residual ripple Switching output Function characteristics Analog output Signal voltage high/low Output current Open-circuit current

### Indicators

After power-on: ON LED on ON LED flashing slowly

After teach-in: ON LED on

ON LED flashing slowly

Q/T LED flashing quickly In run mode: ON LED on Delay LED L/D LED Q/T LED on Q/T LED flashing quickly In configuration mode: ON LED flashing quickly Delay LED off Delay LED on L/D LED off L/D LED on

### Mechanical data

Housing Optics cover Weight Connection type

### Environmental data

Ambient temp. (operation/storage) Protection class LED class VDE safety class Protective circuit <sup>3</sup> Standards applied

### Options

Synchronous input PNP: Stop/Start measurement NPN: Stop/Start measurement Synchronization delay Teach input PNP: active / not active NPN: active/not active Teach delay Pulse stretching Device configuration Changeover switching threshold

Changeover response time

1) Interchangeable objective, available as accessory

2) Standard objective, state on delivery

3) 2=polarity reversal protection, 3=short-circuit protection for all outputs

## Order guide

See section Preferred types

KRTM 20... HR dyn. Teach - 01

12mm ± 1mm 20mm ± 2mm 50mm ± 5mm 3.0mmx1.0mm or round light spot D = 0.5mm 4.0mmx1.2mm or round light spot D = 0.6mm 10.0mmx2.0mm or round light spot D = 1.0mm vertical or horizontal LEDs (red, green, blue)

25 kHz/50 kHz reversible (see remarks)  $20 \mu \text{s}/10 \mu \text{s}$  reversible (see remarks)  $10 \mu \text{s}$  $10 \mu \text{s}$  $\leq 250 \text{ms}$ 

 $12\ldots 30VDC$  (incl. residual ripple)  $\leq 15\%$  of  $U_B$  PNP, NPN light or dark switching, reversible via button  $1\ldots 10mA \geq (U_B-2V)/\leq 2V$  max.  $100mA \leq 60mA$ 

device set to factory settings device not set to factory settings (display only for approx. 10s after power-on)

switching threshold set to factory settings -> switching threshold in center switching threshold was reconfigured -> switching threshold close to the mark teaching error

ready pulse stretching on/off light/dark switching mark detected device error

device is in configuration mode 2x analysis depth (response time 20µs) 1x analysis depth (response time 10µs) switching threshold in center switching threshold close to the mark

diecast zinc glass 300g M12 connector, stainless steel, 5-pin

-25°C ... +60°C/-40°C ... +70°C IP 67 1 (acc. to EN 60825-1) II 2, 3 IEC 60947-5-2

 $U_B/0V$  or not connected  $0V/U_B$  or not connected  $\leq 0.5\,ms$ 

 $\begin{array}{l} U_B/0V \text{ or not connected} \\ 0V/U_B \text{ or not connected} \\ \leq 10ms \\ 20ms, \ can be activated via button \\ continue to press the teach button during power-on \\ see remarks \\ see remarks \end{array}$ 

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# **KRTM 20**

## Remarks

- Approved purpose: This product may only be used by qualified personnel and must only be used for the approved purpose. This sensor is not a safety sensor and is not to be used for the protection of persons.
- With shiny objects, the sensor is to be mounted at an angle to the object surface.

## • Device configuration:

- 1. Configuration mode is activated by holding down the teach button during power-on (ON LED flashes).
- 2. The analysis depth is changed over using the Delay button:

Delay LED off = 2x analysis depth (response time 20µs) Delay LED on = 1x analysis depth (response time 10µs)

**3.** The switching threshold is changed over using the L/D button:

L/D LED off= Switching threshold in center

## L/D LED on=

Switching threshold close to the mark

- **4.** Press the teach button to end device configuration.
- 5. Back to factory settings: Simultaneously hold down the Delay button and the L/D button during poweron to reset the sensor to factory settings.

# **KRTM 20**

## **High Resolution Multicolor Contrast Scanner**

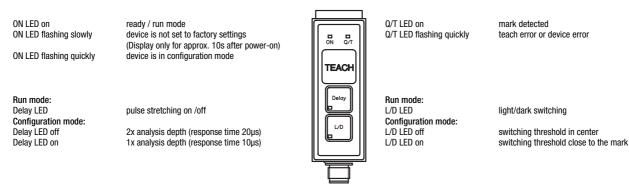
## Function principle of the contrast scanner

These contrast scanners are devices that can, with the aid of multiple transmitter colors (red, green, blue), distinguish between minimal gray levels (contrasts). By means of the automatic transmitter selection after a teach-in, the optimum functional safety for the respective contrast is determined and set by the device itself. As a result, any combination of marks or backgrounds can be detected with optimum functional safety. Through constant measurement and regulation of the emitted light, the devices operate with very good temperature stability. Re-teaching of the mark is, thus, no longer necessary.

Each transmitter color consists of 4 LEDs. A longish light spot with four points is formed in the focal point. This very small, extremely bright light spot guarantees a high repeatability and positioning accuracy. For the case that the mark or background is not optimally printed, the light spot can be focused by slightly changing the scanning distance in such a way that a homogeneous, rectangular light spot is formed.

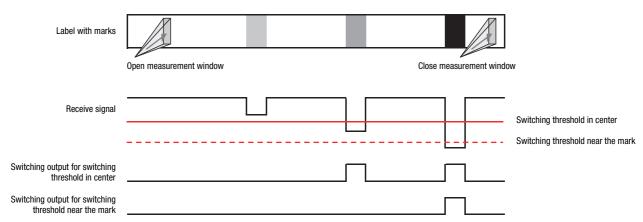
With this teaching type, background and mark must be placed statically below the light spot. Using the synchronization input, the switching output can be activated or deactivated.

# **Controls and indicators**



# Signal response during teach-in

### **Dynamic 2-point teach**



## **Teach process**

The teach process is performed with the aid of the teach button or external teach lines. The two processes work in the same way.

Operation	Transmitter	Indicator LED				
Position the light spot on the background	Red, green or blue light spot visible					
Press the teach button approx. 0.5s <b>or</b> set the teach line to high level	All colors are on White light spot visible	Q/T, Delay and L/D LEDs flash				
Advance paper sheet for at least one pattern length	All colors are on White light spot visible	Q/T, Delay and L/D LEDs flash				
Briefly press teach button <b>or</b> teach line to low level	Changeover to red, green or blue Red, green or blue light spot visible	ON LED on or flashes 3x Q/T LED on Q/T LED flashing -> error				
Teaching error start new teaching process	All colors off	ON LED on Q/T LED flashing -> error				

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## **KRTM 20**

# Calibration - analog output 1 ... 10mA

This is an uncalibrated measurement value. The current value that is output is proportional to the last contrast ascertained by means of teach-in.

For rough calibration of the analog output, a teach-in with the following sequence is recommended .

- **1. Teach point on background** -> on white paper.
- 2. Teach point on mark
- -> without object (into open space).

## **Preferred types**

Selection table Equipment ↓		Order code ➔	KRTM 20M/P-12-6420-S12 Part No. 50116474				
Scanning range	12mm		•				
	20 mm						
	50 mm						
Light spot orientation	vertical		•				
	horizontal						
	round						
Optical outlet	front						
	head		•				
Output wiring	PNP		•				
	NPN						
	analogue current						
Other features	static teach-in						
	dynamic teach-in		•				
	synchronous input		•				

Additional types on request