

## SELECTION GUIDE

### Contrast scanners

#### Operating principle



Contrast scanners detect markings, even those with only slight contrast with respect to the background, at very high processing speeds. Automatic adaptation of the wavelength allows the slightest changes in grey value to be detected, independent of the colour combination of the marking and background.

#### Products and typ. scanning ranges [mm]



**KRTG 8**  
Scanning ranges: **10**

from **page 288** onwards



**KRTM 20**  
Scanning ranges: **12 / 20 / 50**

from **page 288** onwards



**KRTG 20**  
Scanning ranges: **12 / 20 / 50**

from **page 288** onwards

#### Features

- Multicolour and green-light contrast scanners available
- Detection of the slightest differences in contrast by means of highly dynamic transmitter regulation
- Various teach-in variants for optimum process integration
- Special functions can be enabled via a keyboard
- Temperature compensation ensures stable scanning over a long operating period

### Colour sensors

#### Operating principle



Colour sensors detect the colour of an object by comparing with a taught-in reference colour. They generate a switching signal when both colours match within a specified tolerance range.

#### Products and typ. scanning ranges [mm]



**CRT 20B**  
Scanning ranges: **12.5 / 60**

from **page 300** onwards



**CRTM 20**  
Scanning ranges: **12 / 20 / 50**

from **page 300** onwards



**CRT 442**  
Scanning ranges: **12.5**

from **page 300** onwards

#### Features

- Multicolour LED transmitter
- Colour detection with incident light and transmitted light
- Detection of different colours via 2/4 digital outputs or via an analog output
- Up to four reference colours can be stored
- Programming via teach-in
- Analogue evaluation with transmitter switchover

**Luminescence scanners**

Operating principle



A luminescent material which is illuminated with blue light reflects light with a longer wavelength. This effect, combined with appropriate filtering, makes it possible to detect luminescent markings or materials, even on optically critical surfaces.

Products and typ. scanning ranges [mm]



**LRT 8**  
Scanning ranges: **0 ... 50**

from **page 306** onwards



**LRT 40**  
Scanning ranges: **5 ... 20**

from **page 306** onwards



**LRT 440**  
Scanning ranges: **0 ... 150**

from **page 306** onwards

Features

- UV LED transmitter
- Detection of visible and invisible luminescent material
- Luminescence scanners in various housings
- Filtering options
- PNP, NPN and analog outputs

# OVERVIEW OF CONTRAST SCANNERS



Slit and hole recognition



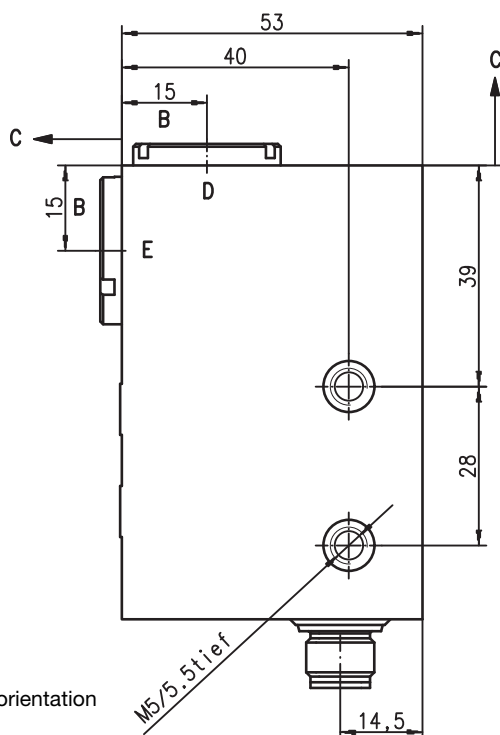
Mark detection



Dimensioned drawing KRTG 8... see 8 Series standard sensors on page 40.

## Dimensioned drawing

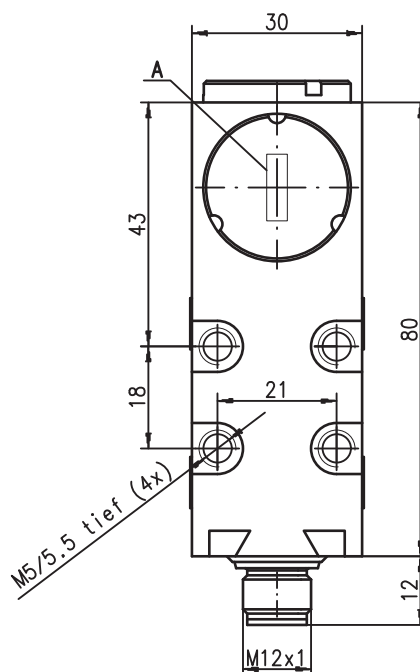
**KRTG 20, KRTM 20**



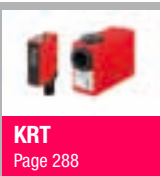
- A** Vertical light spot orientation
- B** Optical axis
- C** Scanning range
- D** Head
- E** Front






Further details can be found in the respective data sheet.



We reserve the right to make changes • KRT\_Overview\_GB.fm



## KRT 8 / 20

Contrast scanners	Scanning ranges	Page
 <b>Green-light contrast scanner KRTG 8</b>	1 ... 10mm	290
 <b>Green-light contrast scanner KRTG 20</b>	12 ... 50mm	290
 <b>Multi-colour contrast scanner KRTM 20</b>	12 ... 50mm	294

### Additional products - special sensors:

 Colour sensors	CRTM 20, CRT 20B, CRT 442	300
 Luminescence scanners	LRT 8, LRT 40, LRT 440	306

### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30/12 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 35\text{mA}/\leq 60\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2\text{V})/\leq 2\text{V}$
<b>Indicators</b>	Green LED	Ready, teach-in
	Yellow LED	Obj. detected, teach-in
<b>Mechanical data</b>	Housing	Metal
	Optics cover	Glass
	Weight (...8/...20)	70g/300g
<b>Environmental data</b>	Ambient temperature (operation)	...8: $-40^\circ\text{C} \dots +60^\circ\text{C}$
		...20: $-25^\circ\text{C} \dots +60^\circ\text{C}$
	VDE safety class	II
	Protection class	IP 67 (LKRTG 8: IP 65)
	LED class	1 acc. to EN 60825-1
	Standards applied	IEC 60947-5-2, UL 508

Mounting systems for this series can be found from page 375 onwards



### Features

- Interchangeable objectives with scanning ranges of 12mm, 20mm and 50mm
- Models with memory for up to 128 different labels
- Analog 6.25 $\mu\text{s}$  and digital 20 $\mu\text{s}$  high-speed interface
- Automatic amplifier adaptation for shiny and dull cut marks



### Optical Sensor ABCs

- Contrast scanners Page 411

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Forked Sensors

Special Sensors

Fibre Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

AS-interface Sensors

## GREEN-LIGHT CONTRAST SCANNERS

Part description Part No.:	Scanning range	Operating voltage	Switching frequency	Light source Light spot	Output
<b>Green light contrast scanners</b>					
<b>KRTG 8 / 24 - 10 - S12</b> 500 36376	10 ± 1 mm	10 ... 30VDC	8 kHz	Green light 2.0 x 2.0 mm <sup>2</sup>	1 x PNP 1 x NPN
<b>KRTG 20 M/P - 12 - 1320 - S12</b> 500 32791	12 ± 1 mm <sup>1)</sup>	12 ... 30VDC	25 kHz (digital)	Green light 4.0 x 2.0 mm <sup>2</sup>	PNP
<b>KRTG 20 M/P - 20 - 1320 - S12</b> 500 32792	20 ± 2 mm <sup>1)</sup>	12 ... 30VDC	25 kHz (digital)	Green light 4.0 x 2.0 mm <sup>2</sup>	PNP
<b>KRTG 20 M/P - 20 - 1820 - S12</b> 500 36504	20 ± 2 mm <sup>1)</sup>	12 ... 30VDC	25 kHz (digital)	Green light 4.0 x 2.0 mm <sup>2</sup>	PNP
<b>KRTG 20 M/N - 20 - 1320 - S12</b> 500 32796	20 ± 2 mm <sup>1)</sup>	12 ... 30VDC	25 kHz (digital)	Green light 4.0 x 2.0 mm <sup>2</sup>	NPN
<b>KRTG 20 M/N - 20 - 1820 - S12</b> 500 36506	20 ± 2 mm <sup>1)</sup>	12 ... 30VDC	25 kHz (digital)	Green light 4.0 x 2.0 mm <sup>2</sup>	NPN
<b>KRTG 20 M/P - 50 - 1320 - S12</b> 500 32793	50 ± 5 mm <sup>1)</sup>	12 ... 30VDC	25 kHz (digital)	Green light 4.0 x 2.0 mm <sup>2</sup>	PNP

1) Other scanning ranges of 12 ± 1 mm, 20 ± 2 mm or 50 ± 5 mm are possible by changing the objective.

### Accessories / connection cables

More accessories can be found from **page 364** onwards

Part No.	Designation	Features
a 501 04558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
b 501 04557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
c 500 34051	OB 12 - KRT 20	Objective for 12mm scanning range
d 500 34050	OB 20 - KRT 20	Objective for 20mm scanning range
e 500 34049	OB 50 - KRT 20	Objective for 50mm scanning range
f 500 34118	WZ - OB - KRT 20	Tool for changing objectives



**KRT**  
Page 288



**CRT**  
Page 300



**LRT**  
Page 306

# KRTG 8 / 20

Green light contr. scanners



Connection	Option	Accessories
M12 connector	1, 4, 5, 7	a, b
M12 connector	2, 4, 5, 6, 7	a, b, c, d, e, f
M12 connector	2, 4, 5, 6, 7	a, b, c, d, e, f
M12 connector	3, 4, 5, 6, 7	a, b, c, d, e, f
M12 connector	2, 4, 5, 6, 7	a, b, c, d, e, f
M12 connector	3, 4, 5, 6, 7	a, b, c, d, e, f
M12 connector	2, 4, 5, 6, 7	a, b, c, d, e, f

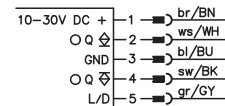


### Optical Sensor ABCs

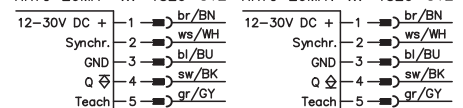
- Contrast scanners Page 411
- Connection types Page 414
- Outputs Page 414

### Electrical connection

KRTG 8/24-10-S12



KRTG 20M/P-...-1320-S12    KRTG 20M/N-...-1320-S12  
 KRTG 20M/P-...-1820-S12    KRTG 20M/N-...-1820-S12



### Options

- Static teach-in via rotary switch
- Static teach-in on mark and background via teach button/line
- Static teach-in on background via teach button/line
- Switchable pulse stretching
- Light/dark switching
- Synchronous input for measurement start/stop
- UL approval

[www.leuze.de/special\\_sensors/](http://www.leuze.de/special_sensors/)

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Forked Sensors

Special Sensors

Fibre Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

AS-interface Sensors

## MULTICOLOUR CONTRAST SCANNERS

Part description Part No.:	Scanning range <sup>1)</sup>	Operating voltage	Switching frequency	Light source Light spot	Output
<b>RGB multicolour contrast scanners</b>					
<b>KRTM 20 M/P - 12 - 1320 - S12</b> 500 32780	12 ± 1 mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	PNP
<b>KRTM 20 M/P - 12 - 1420 - S12</b> 500 33866	12 ± 1 mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	PNP
<b>KRTM 20 M/P - 12 - 1720 - S12</b> 500 33867	12 ± 1 mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	PNP
<b>KRTM 20 M/N - 12 - 1320 - S12</b> 500 32781	12 ± 1 mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	NPN
<b>KRTM 20 M/N - 12 - 1420 - S12</b> 500 33962	12 ± 1 mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	NPN
<b>KRTM 20 M/N - 12 - 1720 - S12</b> 500 33968	12 ± 1 mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	NPN

1) Other scanning ranges of 20 ± 2mm or 50 ± 5mm are possible by changing the objective.

### Accessories / connection cables

More accessories can be found from **page 364** onwards

Part No.	Designation	Features
a 501 04558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
b 501 04557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
c 500 34051	OB 12 - KRT 20	Objective for 12mm scanning range
d 500 34050	OB 20 - KRT 20	Objective for 20mm scanning range
e 500 34049	OB 50 - KRT 20	Objective for 50mm scanning range
f 500 34118	WZ - OB - KRT 20	Tool for changing objectives

We reserve the right to make changes • KRTM\_20\_1\_GB.fm



**KRT**  
Page 288

**CRT**  
Page 300

**LRT**  
Page 306

**KRTM 20**  
Multicolour contr. scanner



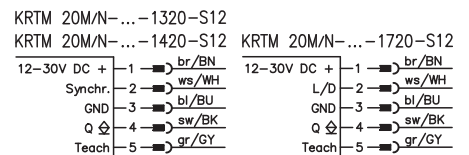
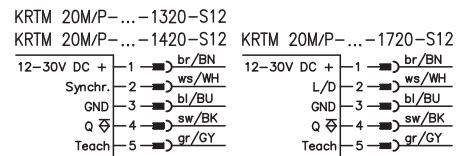
Connection	Option	Accessories
M12 connector	1, 6, 7, 8, 9	a, b, c, d, e, f
M12 connector	2, 6, 7, 8, 9	a, b, c, d, e, f
M12 connector	2, 3, 6, 7, 9	a, b, c, d, e, f
M12 connector	1, 6, 7, 8, 9	a, b, c, d, e, f
M12 connector	2, 6, 7, 8, 9	a, b, c, d, e, f
M12 connector	2, 3, 6, 7, 9	a, b, c, d, e, f



**Optical Sensor ABCs**

- Contrast scanners Page 411
- Connection types Page 414
- Outputs Page 414

**Electrical connection**



**Options**

- 1 Static teach-in via teach button/line
- 2 Dynamic teach-in via teach button/line
- 3 Light/dark mark preselection via L/D input
- 4 Cut-marking system with memory for 128 data sets
- 5 Freely programmable via protocol interface (buttons disabled)
- 6 Switchable pulse stretching
- 7 Light/dark switching
- 8 Synchronous input for measurement start/stop
- 9 UL approval

[www.leuze.de/special\\_sensors/](http://www.leuze.de/special_sensors/)

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Forked Sensors

Special Sensors

Fibre Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

AS-interface Sensors



## MULTICOLOUR CONTRAST SCANNERS

Part description Part No.:	Scanning range <sup>1)</sup>	Operating voltage	Switching frequency	Light source Light spot	Output
<b>RGB multicolour contrast scanners</b>					
<b>KRTM 20 M/P - 20 - 1320 - S12</b> 500 32782	20 ± 2mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	PNP
<b>KRTM 20 M/P - 20 - 1420 - S12</b> 500 33963	20 ± 2mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	PNP
<b>KRTM 20 M/P - 20 - 1720 - S12</b> 500 33969	20 ± 2mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	PNP
<b>KRTM 20 M/N - 20 - 1320 - S12</b> 500 32783	20 ± 2mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	NPN
<b>KRTM 20 M/N - 20 - 1420 - S12</b> 500 33964	20 ± 2mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	NPN
<b>KRTM 20 M/N - 20 - 1720 - S12</b> 500 33970	20 ± 2mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	NPN

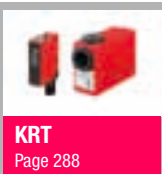
1) Other scanning ranges of 12 ± 1mm or 50 ± 5mm are possible by changing the objective.

We reserve the right to make changes • KRTM\_20\_2\_GB\_fm

### Accessories / connection cables

More accessories can be found from **page 364** onwards

Part No.	Designation	Features
a 501 04558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
b 501 04557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
c 500 34051	OB 12 - KRT 20	Objective for 12mm scanning range
d 500 34050	OB 20 - KRT 20	Objective for 20mm scanning range
e 500 34049	OB 50 - KRT 20	Objective for 50mm scanning range
f 500 34118	WZ - OB - KRT 20	Tool for changing objectives



**KRTM 20**  
Multicolour contr. scanner



Connection	Option	Accessories
M12 connector	1, 6, 7, 8, 9	a, b, c, d, e, f
M12 connector	2, 6, 7, 8, 9	a, b, c, d, e, f
M12 connector	2, 3, 6, 7, 9	a, b, c, d, e, f
M12 connector	1, 6, 7, 8, 9	a, b, c, d, e, f
M12 connector	2, 6, 7, 8, 9	a, b, c, d, e, f
M12 connector	2, 3, 6, 7, 9	a, b, c, d, e, f



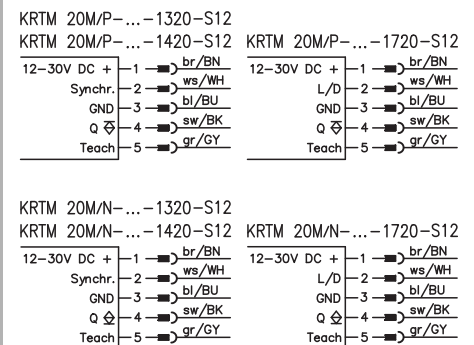
**Optical Sensor ABCs**

- Contrast scanners Page 411
- Connection types Page 414
- Outputs Page 414

**Options**

- 1 Static teach-in via teach button/line
- 2 Dynamic teach-in via teach button/line
- 3 Light/dark mark preselection via L/D input
- 4 Cut-marking system with memory for 128 data sets
- 5 Freely programmable via protocol interface (buttons disabled)
- 6 Switchable pulse stretching
- 7 Light/dark switching
- 8 Synchronous input for measurement start/stop
- 9 UL approval

**Electrical connection**



## MULTICOLOUR CONTRAST SCANNERS

Part description Part No.:	Scanning range <sup>1)</sup>	Operating voltage	Switching frequency	Light source Light spot	Output
<b>RGB multicolour contrast scanners</b>					
<b>KRTM 20 M/V - 20 - 1526 - S12</b> 500 33859	20 ± 2mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	Analog/mA PNP
<b>KRTM 20 M/V - 20 - 0004 - S12</b> 500 41007	20 ± 2mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	Analog/mA PNP
<b>KRTM 20 M/V - 20 - 1427 - S12</b> 500 35220	20 ± 2mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	Analog/mA PNP
<b>KRTM 20 M/V - 20 - 1727 - S12</b> 500 35226	20 ± 2mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	Analog/mA PNP
<b>KRTM 20 M/V - 20 - 0001 - S12</b> 500 35674	20 ± 2mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	Analog/mA PNP
<b>KRTM 20 M/V - 20 - 1626 - S12</b> 500 33861	20 ± 2mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	Analog/mA NPN
<b>KRTM 20 M/V - 20 - 1428 - S12</b> 500 35221	20 ± 2mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	Analog/mA NPN
<b>KRTM 20 M/V - 20 - 1728 - S12</b> 500 35227	20 ± 2mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	Analog/mA NPN

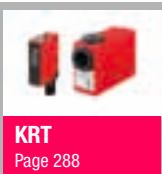
1) Other scanning ranges of 12 ± 1mm or 50 ± 5mm are possible by changing the objective.

We reserve the right to make changes • KRTM\_20\_3\_GB.fm

### Accessories / connection cables

More accessories can be found from **page 364** onwards

Part No.	Designation	Features
a 501 04558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
b 501 04557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
c 500 34051	OB 12 - KRT 20	Objective for 12mm scanning range
d 500 34050	OB 20 - KRT 20	Objective for 20mm scanning range
e 500 34049	OB 50 - KRT 20	Objective for 50mm scanning range
f 500 34118	WZ - OB - KRT 20	Tool for changing objectives



**KRTM 20**  
Multicolour contr. scanner



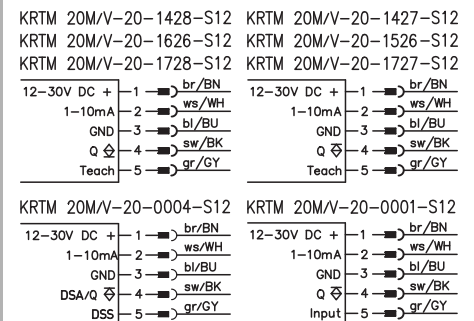
Connection	Option	Accessories
M12 connector	1, 6, 7, 9	a, b, c, d, e, f
M12 connector	1, 4, 6, 7, 9	a, b, c, d, e, f
M12 connector	2, 6, 7, 9	a, b, c, d, e, f
M12 connector	2, 3, 6, 7, 9	a, b, c, d, e, f
M12 connector	5, 9	a, b, c, d, e, f
M12 connector	1, 6, 7, 9	a, b, c, d, e, f
M12 connector	2, 6, 7, 9	a, b, c, d, e, f
M12 connector	2, 3, 6, 7, 9	a, b, c, d, e, f



**Optical Sensor ABCs**

- Contrast scanners Page 411
- Connection types Page 414
- Outputs Page 414

**Electrical connection**



**Options**

- 1 Static teach-in via teach button/line
- 2 Dynamic teach-in via teach button/line
- 3 Light/dark mark preselection via L/D input
- 4 Cut-marking system with memory for 128 data sets
- 5 Freely programmable via protocol interface (buttons disabled)
- 6 Switchable pulse stretching
- 7 Light/dark switching
- 8 Synchronous input for measurement start/stop
- 9 UL approval

[www.leuze.de/special\\_sensors/](http://www.leuze.de/special_sensors/)

## MULTICOLOUR CONTRAST SCANNERS

Part description Part No.:	Scanning range <sup>1)</sup>	Operating voltage	Switching frequency	Light source Light spot	Output
<b>RGB multicolour contrast scanners</b>					
<b>KRTM 20 M/P - 50 - 1320 - S12</b> 500 32784	50 ± 5 mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	PNP
<b>KRTM 20 M/P - 50 - 1420 - S12</b> 500 33965	50 ± 5 mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	PNP
<b>KRTM 20 M/P - 50 - 1720 - S12</b> 500 33971	50 ± 5 mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	PNP
<b>KRTM 20 M/N - 50 - 1320 - S12</b> 500 32785	50 ± 5 mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	NPN
<b>KRTM 20 M/N - 50 - 1420 - S12</b> 500 33966	50 ± 5 mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	NPN
<b>KRTM 20 M/N - 50 - 1720 - S12</b> 500 33972	50 ± 5 mm	12 ... 30VDC	25kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	NPN

1) Other scanning ranges of 12 ± 1 mm or 20 ± 2 mm are possible by changing the objective.

### Accessories / connection cables

More accessories can be found from **page 364** onwards

Part No.	Designation	Features
a 501 04558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
b 501 04557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
c 500 34051	OB 12 - KRT 20	Objective for 12mm scanning range
d 500 34050	OB 20 - KRT 20	Objective for 20mm scanning range
e 500 34049	OB 50 - KRT 20	Objective for 50mm scanning range
f 500 34118	WZ - OB - KRT 20	Tool for changing objectives



**KRT**  
Page 288



**CRT**  
Page 300



**LRT**  
Page 306

**KRTM 20**  
Multicolour contr. scanner



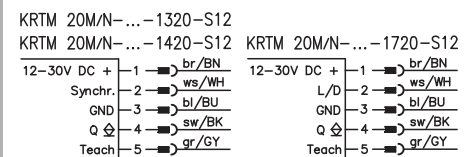
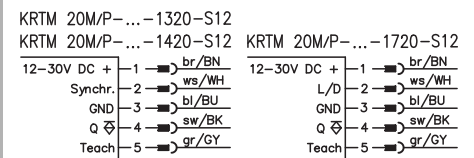
Connection	Option	Accessories
M12 connector	1, 6, 7, 8, 9	a, b, c, d, e, f
M12 connector	2, 6, 7, 8, 9	a, b, c, d, e, f
M12 connector	2, 3, 6, 7, 9	a, b, c, d, e, f
M12 connector	1, 6, 7, 8, 9	a, b, c, d, e, f
M12 connector	2, 6, 7, 8, 9	a, b, c, d, e, f
M12 connector	2, 3, 6, 7, 9	a, b, c, d, e, f



**Optical Sensor ABCs**

- Contrast scanners Page 411
- Connection types Page 414
- Outputs Page 414

**Electrical connection**



**Options**

- 1 Static teach-in via teach button/line
- 2 Dynamic teach-in via teach button/line
- 3 Light/dark mark preselection via L/D input
- 4 Cut-marking system with memory for 128 data sets
- 5 Freely programmable via protocol interface (buttons disabled)
- 6 Switchable pulse stretching
- 7 Light/dark switching
- 8 Synchronous input for measurement start/stop
- 9 UL approval

[www.leuze.de/special\\_sensors/](http://www.leuze.de/special_sensors/)

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Forked Sensors

Special Sensors

Fibre Optic Sensors

Light Curtains



Protective Sensors



Ex Sensors

AS-interface Sensors



**CRT(M) 20(B) / 442**

Colour sensors	Scanning ranges	Page
 <b>Colour sensors - analog output CRTM 20</b>	12 / 20 / 50mm	302
 <b>Colour sensors - digital output CRT 442, CRT 20B</b>	12.5 / 60mm	302



Additional products - special sensors:			
 Contrast scanners	KRTM 20, KRTG 20, (L)KRTG 8	288	
 Luminescence scanners	LRT 8, LRT 40, LRT 440	306	



Common technical data			
<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30/12 ... 30VDC	
	Residual ripple	$\leq 15\%$ of $U_B$	
	Open-circuit current	$\leq 80\text{mA}/\leq 60\text{mA}$	
	Signal voltage high/low	$\geq (U_B - 2\text{V})/\leq 2\text{V}$	
<b>Indicators</b>	Green LED	Ready to operate	
	Yellow LED	Switching state/error	
	Orange LED (CRT 448...)	Teach-in	
<b>Mechanical data</b>	Housing	ABS / metal	
	Optics cover	Glass	
	Weight (...448/...20)	11g/125g/300g	
<b>Environmental data</b>	Ambient temperature (operation)	-10°C ... +55°C	
		...20: -25°C ... +55°C	
	Protection class	IP 67	
	LED class	1 acc. to EN 60825-1	
	Standards applied	IEC 60947-5-2, UL 508	
<b>Mounting systems for this series can be found from page 376 onwards</b>			

**Features**

- Interchangeable objective for scanning ranges from 12mm to 50mm
- Simple assignment of colours with teach function
- Reversible transmitter colours for sensitive measurement tasks
- Analog 6.25µs high-speed interface
- Analog or digital switching outputs

Optical Sensor ABCs	
● Colour sensors	Page 411

[www.leuze.de/special\\_sensors/](http://www.leuze.de/special_sensors/)

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Forked Sensors

Special Sensors

Fibre Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

AS-interface Sensors



## COLOUR SENSORS

Part description Part No.:	Scanning range	Operating voltage	Switching frequency	Light source Light spot	Output
<b>Colour sensors with analog output</b>					
<b>CRTM 20 M/V - 20 - 0004 - S12</b> 501 02847	20 ± 5 mm <sup>1)</sup>	12 ... 30VDC		RGB light 4.0 x 1.2 mm <sup>2</sup>	Analog/mA PNP
<b>CRTM 20 M/V - 50 - 0001 - S12</b> 500 36094	50 ± 5 mm <sup>2)</sup>	12 ... 30VDC		RGB light 10.0 x 2.0 mm <sup>2</sup>	Analog/mA PNP
<b>Colour sensors with digital output</b>					
<b>CRT 20B M/P - 60 - 001 - S12</b> 501 09597	60 mm	10 ... 30VDC	6 kHz	RGB light 13.0 x 13.0 mm <sup>2</sup>	1 x PNP
<b>CRT 20B M/P - 60 - 004 - S12</b> 501 09601	60 mm	10 ... 30VDC	3.5 kHz	RGB light 13.0 x 13.0 mm <sup>2</sup>	4 x PNP
<b>CRT 20B M/N - 60 - 001 - S12</b> 501 09595	60 mm	10 ... 30VDC	6 kHz	RGB light 13.0 x 13.0 mm <sup>2</sup>	1 x NPN
<b>CRT 20B M/N - 60 - 004 - S12</b> 501 09599	60 mm	10 ... 30VDC	3.5 kHz	RGB light 13.0 x 13.0 mm <sup>2</sup>	4 x NPN
<b>CRT 20B M/P - 12 - 001 - S12</b> 501 09596	12.5 mm	10 ... 30VDC	6 kHz	RGB light 4.0 x 2.0 mm <sup>2</sup>	1 x PNP
<b>CRT 20B M/P - 12 - 004 - S12</b> 501 09600	12.5 mm	10 ... 30VDC	3.5 kHz	RGB light 4.0 x 2.0 mm <sup>2</sup>	4 x PNP
<b>CRT 20B M/N - 12 - 001 - S12</b> 501 09594	12.5 mm	10 ... 30VDC	6 kHz	RGB light 4.0 x 2.0 mm <sup>2</sup>	1 x NPN
<b>CRT 20B M/N - 12 - 004 - S12</b> 501 09598	12.5 mm	10 ... 30VDC	3.5 kHz	RGB light 4.0 x 2.0 mm <sup>2</sup>	4 x NPN

### Accessories / connection cables

More accessories can be found from **page 364** onwards

Part No.	Designation	Features
a 501 04557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
b 501 04590	K - D M12A - 8P - 5m - PUR	Connection cable 5000mm, M12 axial, 8-pin, PUR
c 500 34051	OB 12 - KRT 20	Objective for 12mm scanning range
d 500 34118	WZ - OB - KRT 20	Tool for changing objectives

We reserve the right to make changes • CRT\_1\_GB.fm



**KRT**  
Page 288



**CRT**  
Page 300



**LRT**  
Page 306

**CRT(M) 20(B)**  
Colour sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Forked Sensors

Special Sensors

Fibre Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

AS-interface Sensors

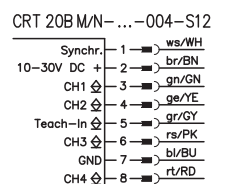
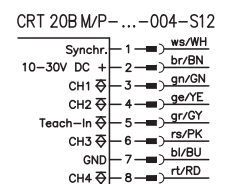
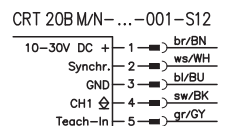
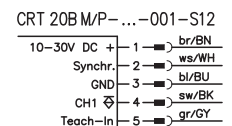
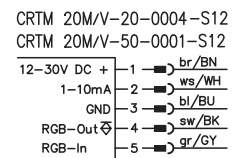
Connection	Option	Accessories
M12 connector	1, 4	a, c, d
M12 connector	1, 4	a, c, d
M12 connector	2, 4	a
M12 connector	3, 4	b
M12 connector	2, 4	a
M12 connector	3, 4	b
M12 connector	2, 4	a
M12 connector	3, 4	b
M12 connector	2, 4	a
M12 connector	3, 4	b



**Optical Sensor ABCs**

- Colour sensors Page 411
- Connection types Page 414
- Outputs Page 414

**Electrical connection**



- 1) Other scanning ranges of  $12 \pm 5$ mm or  $50 \pm 5$ mm are possible by changing the objective.
- 2) Other scanning ranges of  $12 \pm 5$ mm or  $20 \pm 5$ mm are possible by changing the objective.

**Options**

- 1 Analog output, RGB remote changeover via line
- 2 Colour sensor with 1 channel, teach-in of reference colour
- 3 Colour sensor with 4 channels, teach-in of reference colour
- 4 UL approval

## COLOUR SENSORS

Part description Part No.:	Scanning range	Operating voltage	Switching frequency	Light source Light spot	Output
<b>Colour sensors with digital output</b>					
<b>CRT 442 K/P - 12 - 001 - S12</b> 501 09603	12.5 ± 2mm	24VDC ± 20%	1.5kHz	RGB light 1.5 x 6.5mm <sup>2</sup>	1 x PNP
<b>CRT 442 K/N - 12 - 001 - S12</b> 501 09602	12.5 ± 2mm	24VDC ± 20%	1.5kHz	RGB light 1.5 x 6.5mm <sup>2</sup>	1 x NPN

### Accessories / connection cables

More accessories can be found from **page 364** onwards

Part No.	Designation	Features
a 501 04543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 501 04542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 501 04545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 501 04544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 501 04547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 501 04546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC



**KRT**  
Page 288



**CRT**  
Page 300



**LRT**  
Page 306

**CRT 442**  
Colour sensors



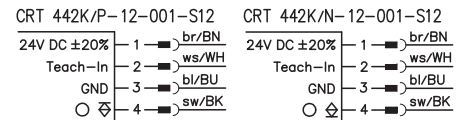
Connection	Option	Accessories
M12 connector	1, 2	a, b, c, d, e, f
M12 connector	1, 2	a, b, c, d, e, f



**Optical Sensor ABCs**

- Colour sensors Page 411
- Connection types Page 414
- Outputs Page 414

**Electrical connection**



**Options**

- 1 Teach-in of reference colour
- 2 UL approval

[www.leuze.de/special\\_sensors/](http://www.leuze.de/special_sensors/)

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Forked Sensors

Special Sensors

Fibre Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

AS-interface Sensors

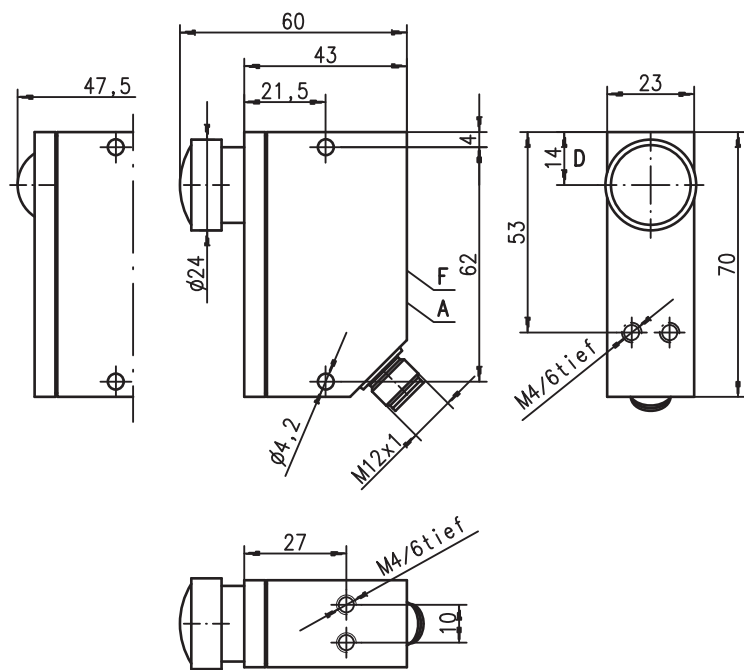
# OVERVIEW OF LUMINESCENCE SCANNERS



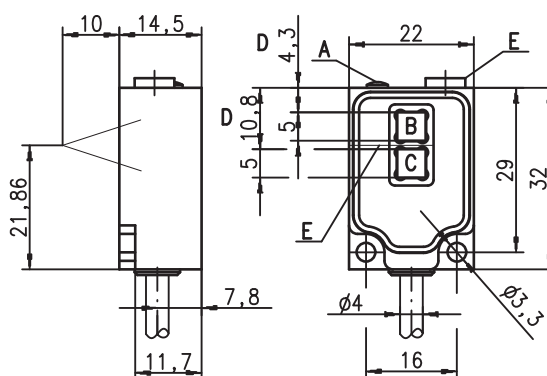
Dimensioned drawing LRT 8... see 8 Series standard sensors on page 40.

## Dimensioned drawing

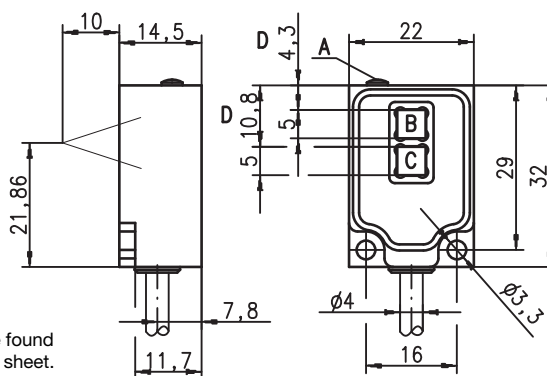
**LRT 440 / 24 - 50 - ...**    **LRT 440 / 24 - 150 - ...**



**LRT 40 / 4 - 10 - 1...**



**LRT 40 / 4 - 10 - 0...**



- A** Indicator diode
- B** Transmitter
- C** Receiver
- D** Optical axis
- E** Sensitivity adjustment
- F** Control button panel



Further details can be found in the respective data sheet.

We reserve the right to make changes • LRT\_Overview\_GB.fm



**KRT**  
Page 288






**CRT**  
Page 300




**LRT**  
Page 306

## LRT 8 / 40 / 440

Luminescence scanners	Scanning ranges	Page
 <b>Luminescence scanner LRT 8</b>	0 ... 50mm / 0 ... 100mm	308
 <b>Luminescence scanner LRT 40</b>	5 ... 20mm	308
 <b>Luminescence scanner LRT 440</b>	0 ... 150mm	308

### Additional products - special sensors:

 Contrast scanners	KRTM 20, KRTG 20, (L)KRTG 8	288
 Colour sensors	CRTM 20, CRT 20B, CRT 442	300

### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 35\text{mA}/\leq 4\text{mA}/\leq 40\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2\text{V})/\leq 2\text{V}$
<b>Indicators</b>	Yellow LED	Obj. detected/Reflection
<b>Mechanical data</b>	Housing	Metal
	Optics cover	Glass
	Weight (...8/...40/...440)	70g/250g/250g
<b>Environmental data</b>	Ambient temperature (operation)	-20°C ... +60°C
	Protection class	IP 67
	Standards applied	IEC 60947-5-2, UL 508 <sup>1)</sup>

1) LRT 8 only

Mounting systems for this series can be found from page 376 onwards



### Features

- Scanning ranges up to 150mm
- Among others, luminescence scanners in compact housings
- Filter possibility for distinguishing between different-coloured luminescences
- Analog sensitivity adjustment via connector interface



### Optical Sensor ABCs

- Luminescence scanners Page 411

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Forked Sensors

Special Sensors

Fibre Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

AS-interface Sensors

## LUMINESCENCE SCANNERS

Part description Part No.:	Scanning range	Operating voltage	Switching frequency	Light source	Output
<b>Luminescence scanners</b>					
<b>LRT 8 / 24.00 - 50 - S12</b> 500 41839	0 ... 50mm	10 ... 30VDC	1500Hz	UV light, LED class 1M	1 x PNP 1 x NPN
<b>LRT 8 / 24.04 - 50 - S12</b> 500 41840	0 ... 50mm	10 ... 30VDC	1500Hz	UV light, LED class 1M	1 x PNP 1 x NPN
<b>LRT 8 / 24.04 - 100 - S12</b> 501 09343	0 ... 100mm	10 ... 30VDC	1500Hz	UV light, LED class 1M	1 x PNP 1 x NPN
<b>LRT 40 / 4 - 10 - 16</b> 500 40491	5 ... 20mm	10 ... 30VDC	2000Hz	UV light, LED class 1	PNP
<b>LRT 40 / 4 - 10 - 14</b> 500 38115	5 ... 20mm	10 ... 30VDC	2000Hz	UV light, LED class 1	PNP
<b>LRT 40 / 4 - 10 - 06, 5000</b> 500 40490	5 ... 20mm	10 ... 30VDC	2000Hz	UV light, LED class 1	PNP
<b>LRT 40 / 4 - 10 - 04, 5000</b> 500 38116	5 ... 20mm	10 ... 30VDC	2000Hz	UV light, LED class 1	PNP
<b>LRT 440 / 24 - 150 - 004 - S12</b> 500 37909	0 ... 150mm	10 ... 30VDC	600Hz	UV light, laser class 3R	1 x PNP 1 x NPN
<b>LRT 440 / 24 - 50 - 104 - S12</b> 500 37910	0 ... 50mm	10 ... 30VDC	600Hz	UV light, laser class 1	Analog/mA 1xPNP 1xNPN

We reserve the right to make changes • LRT\_8\_40\_440\_GB.fm

### Accessories / connection cables

More accessories can be found from **page 364** onwards

Part No.	Designation	Features
a 501 04543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 501 04542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 501 04545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 501 04544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 501 04558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
f 501 04557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC



**KRT**  
Page 288



**CRT**  
Page 300



**LRT**  
Page 306

**LRT 8 / 40 / 440**  
Luminescence scanners



Connection	Option	Accessories
M12 connector	1, 4, 8, 9	e, f
M12 connector	1, 4, 5, 6, 8, 9	e, f
M12 connector	1, 4, 5, 6, 8, 9	e, f
Cable, 2m	1, 6	
Cable, 2m	1, 4, 5, 6, 7	
Cable, 5m	2, 6	
Cable, 5m	2, 4, 5, 6, 7	
M12 connector	3, 5, 6	a, b, c, d
M12 connector	3, 5, 6	e, f

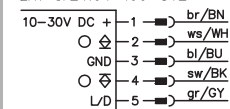


**Optical Sensor ABCs**

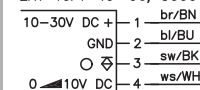
- Luminescence scanners Page 411
- Connection types Page 414
- Outputs Page 414

**Electrical connection**

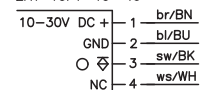
LRT 8/24.00-50-S12  
LRT 8/24.04-50-S12  
LRT 8/24.04-100-S12



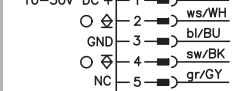
LRT 40/4-10-04, 5000  
LRT 40/4-10-06, 5000



LRT 40/4-10-14  
LRT 40/4-10-16



LRT 440/24-150-004-S12



LRT 440/24-50-104-S12



**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Sensitivity adjustment via remote calibration
- 3 Sensitivity adjustment in 256 levels via buttons
- 4 For detecting red luminescence
- 5 For detecting blue/colourless luminescence
- 6 For detecting yellow/yellow-green luminescence
- 7 For detecting orange luminescence
- 8 Light/dark switching
- 9 UL approval

[www.leuze.de/special\\_sensors/](http://www.leuze.de/special_sensors/)