

the **sensor** people

CRT Color Sensors, LRT Luminescence Scanners, KRT Contrast Scanners

Extensive family of scanners
for a wide range of
detection tasks



Color? Luminescence? Contrast?
Everything from a single source –
Everything compatible for you.

It's good to have a **broad portfolio** – **it's better to have** compatibility in mounting and operation.

Our broad product line of scanners includes, in addition to various sensor technologies, various designs and housing materials. Thus, with Leuze electronic, you will find the right solution both for all materials that need to be detected as well as for diverse installation situations and environmental conditions. Some call it "one-stop" – we just call it customer orientation.

A big plus point of the Leuze electronic product line is the compatibility of the individual systems with respect to both mounting as well as to configuration and electrical connection.





Three technologies – endless possibilities.



The **color sensors** – of the CRT family

This sensor type detects colors and compares them to a stored reference value. They are the right solution whenever the color of an object or marking can serve as a sorting or inspection criteria. Depending on the configuration and specified tolerance values of the system, the result is output as a switching signal. Relevant factors here include the process speed and the sensor response time, as well as simple handling and teaching in practical use.

Color sensors are used primarily in these areas:

- Sorting
- Inspection
- Color detection
- Mark detection



The **luminescence scanners** – of the LRT family

This sensor detects both visible as well as invisible luminescent markings with very high depth of field nearly independent of base material. It sends the result as a signal to the switching output and is used primarily for sorting and inspection tasks in areas in which other detection methods fail to supply reliable results or where the markings should or must not be visible.

Luminescence scanners are used primarily in these areas:

- Material detection
- Mark detection
- Package inspection
- Positioning tasks
- Label inspection



The **contrast scanners** – of the KRT family

This sensor type can use various light sources – such as white light, laser-generated red light or RGB light – to very precisely detect and compare contrasts and report the results to the process with minimal signal jitter. Through the automatic selection of the right transmitter colors, various color or gray value combinations can be reliably detected.

Contrast scanners are used primarily in these areas:

- Mark detection
- Cover alignment
- Gloss suppression
- Counting Pharmacodes
- Detection of small parts
- Fine positioning

Color sensors of the CRT family:

In just a fraction of a second, precisely measure and compare color values and make decisions.



Small but powerful

Color is an important characteristic for the control and monitoring of automated processes. These sensors detect the color of an object and compare it within specified tolerances with a taught reference value. Decisive here is, above all, a fast and simple teach process, a high processing speed and the reliable detection of even very small differences in color.

CRT 442

- 12.5 mm scanning range
- Very small plastic construction
- Simple teach-in of the reference color
- One color channel
- Adjustable color tolerance
- 1.5 kHz switching frequency
- M12 connector



The flexible standard

CRT 20B

- 12.5 mm or 60 mm scanning range
- Very robust metal construction
- Simple teach-in of up to four reference colors
- Sensitivity adjustment following teach-in
- 1/4 color channels
- Color tolerance separately adjustable per color channel
- Switching frequency up to 6 kHz
- Extensive configuration options
- Turnable M12 connector



Luminescence scanners of the LRT family:

Reliably detect visible and invisible luminescent materials and marks.



Reliability doesn't need to be any larger than this

LRT 8

- Scanning ranges up to 200 mm
- Very compact metal construction
- 1.5 kHz switching frequency
- Sensitivity adjustment via potentiometer
- Turnable M12 connector
- Filter variants



A high-performance all-rounder

LRT 440

- Scanning ranges up to 300 mm
- Very compact metal construction
- Switching frequency up to 6 kHz
- Sensitivity adjustment via two buttons
- M12 connector
- Filter variants

These luminescence scanners are energetic diffuse reflection scanners that illuminate luminescent materials by means of their special UV transmission light. The resulting visible light is detected by the luminescence sensor. Some of these luminescent materials are invisible and are available in a variety of solid and liquid forms. These can also be used to apply markings that are invisible under normal lighting conditions.



Contrast scanners of the KRT family:

Reliably detect minimal gray value differences with extremely fast response time.



So small and yet still full-featured

KRT 3B

- Plastic housing
- Scanning range 14.5 / 60 mm
- RGB, white or laser light
- Various teach-in processes
- Teach-in with switching-threshold adjustment
- Switching-threshold correction via EasyTune
- Min. response time 50 µs
- Switching frequency up to 10 kHz
- Remote teach and keyboard lockout
- Pulse stretching
- IO-Link interface

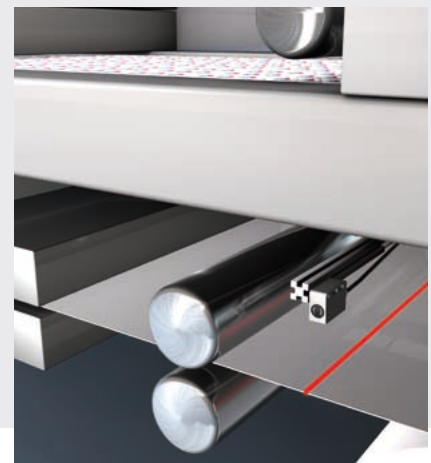
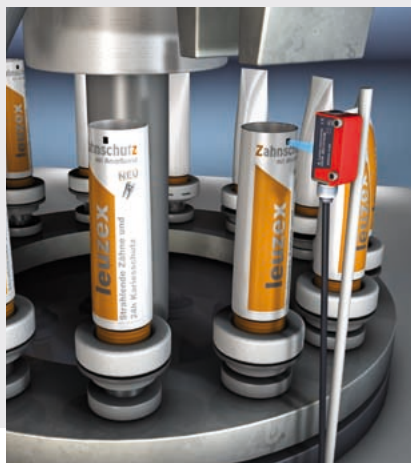


Whenever absolute cleanliness is needed

KRT 55

- Stainless steel housing AISI 316L
- Scanning range 13 mm
- RGB or white light
- Various teach-in processes
- Teach-in with switching-threshold adjustment
- Switching-threshold correction via EasyTune
- Response time 50 µs
- Switching frequency 10 kHz
- Remote teach and keyboard lockout
- Pulse stretching
- IO-Link interface

In many areas, the fast and reliable detection of gray value differences on a wide range of surfaces is of decisive importance. Operating on the reflection principle, these sensors detect even the smallest differences and, with the simple teaching process and their unique additional features, such as YellowBoost for preventing the "yellow hole" and the innovative EasyTune for intuitive fine adjustment of the switching threshold, are the most efficient and reliable choice.





Ultra-fast and high-resolving
Speed version

KRT 20

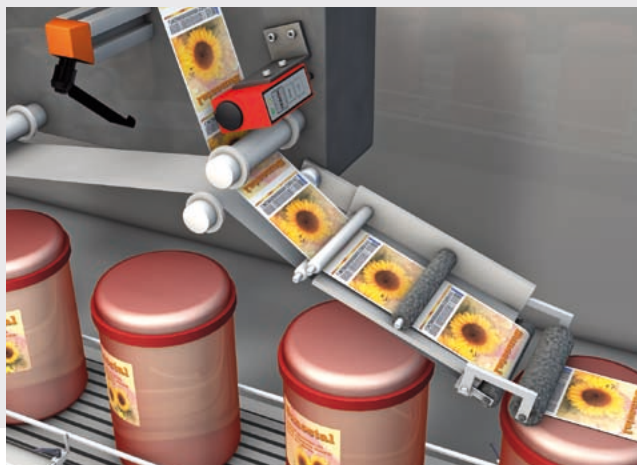
- Metal housing with interchangeable objectives
- Scanning ranges of 12/20mm and 50mm
- Very high resolution
- Response time 16µs
- Switching frequency 31.25 kHz
- Switching and analog output
- Temperature compensation
- Pulse stretching
- Switching-threshold changeover



All-rounder with unique features in the
Standard or Advanced version

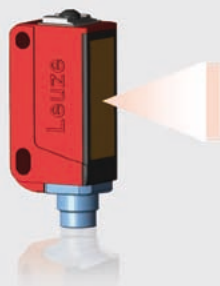
KRT 20B

- High-strength plastic housing with metal threaded sockets
- Scanning range 13.5mm
- RGB or white light
- Various teach-in processes
- Teach-in with switching-threshold adjustment
- Switching-threshold correction via EasyTune
- Min. response time 50µs
- Max. switching frequency 10 kHz
- Remote teach and keyboard lockout
- Pulse stretching
- IO-Link interface



The right design and transmitter color for every contrast scanner application.

Depending on the color and surface structure of the material that is to be detected, the light color emitted by the scanner is decisive for high-contrast and reliable detection. For this reason, we offer contrast scanners with three different light transmitters and a total of five transmitter colors.



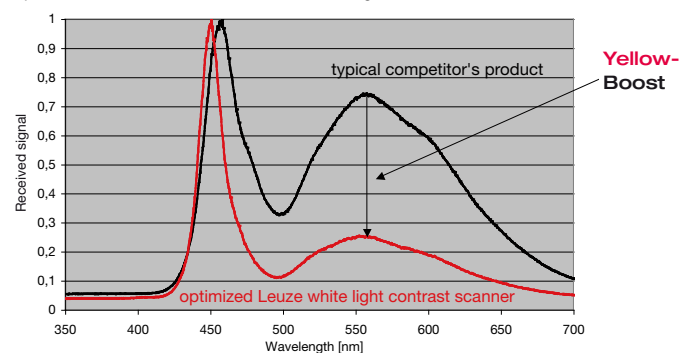
Optical variants	White light	Multicolor	Laser
Light type	Contrast scanner with white-light LED	Contrast scanner with RGB LEDs (red, green or blue light)	Contrast scanner with red-light laser (laser class 1)
Application	For differentiating between any colors and gray values from a reference gray value with uniform resolution of the contrast	For the optimized differentiation of particular color or gray value combinations through the use of a specific transmitter color	For the optimized differentiation of very small marks and distance measurements through the use of a very small laser light spot



YellowBoost? What is that?

With YellowBoost, developed by us, the "yellow hole" familiar from the white-light device disappears. But all other visible wavelengths are also better distinguished from the reference contrast.

Optimized contrast detection with Leuze white light contrast scanners



The **three ways** to tell your contrast scanner what it should do.

Environmental conditions and tasks are not always the same, and machines and systems can't always be freely manipulated in order to teach a sensor. For this reason, you can select from three different teach variants with our contrast scanners. For example, depending on your machine process, you can decide which teach variant ensures the easiest and fastest machine commissioning.

The 3 possible **teach variants**

Static 2-point teach

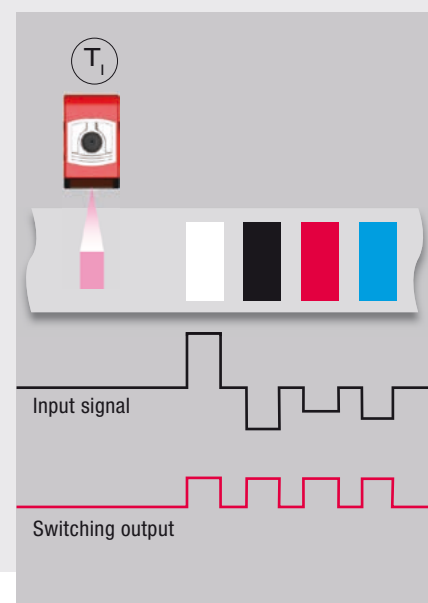
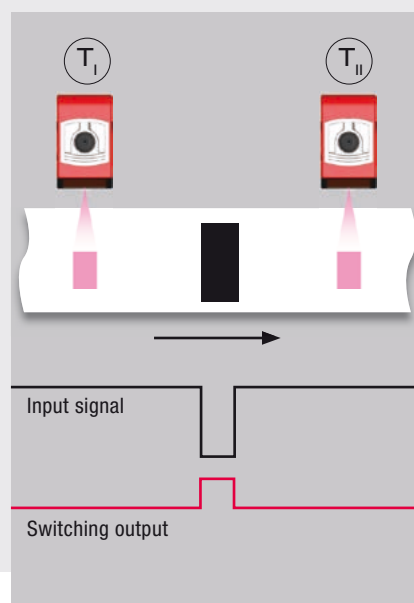
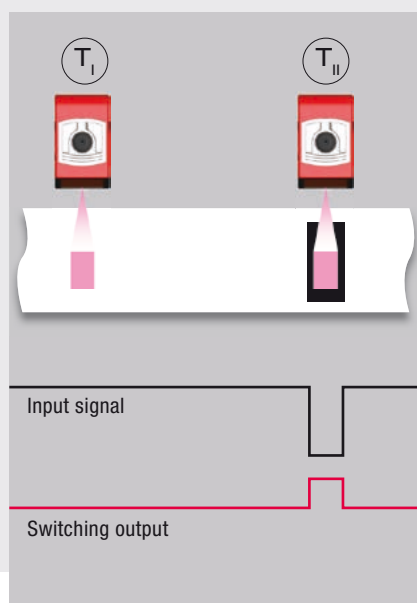
- Suitable for manual positioning of mark and background
- Teach process in which the mark and background are taught statically (with system process at a standstill)
- All marks in the direction of the mark reflection are detected

Dynamic 2-point teach

- Suitable for moved marks within automated machine processes
- Teach process in which the mark and the background are taught dynamically (during running system processes)
- All marks in the direction of the mark reflection are detected

Static 1-point teach

- Suitable for the detection of all marks outside of a reference value
- Teach process in which the reference value is taught statically (with system process at a standstill)
- All reflections that differ from the reference value are detected



Fine adjustment of contrast scanners at the press of a button – work intuitively with **"EasyTune"**.

Adapt the switching threshold step by step.

For devices without "EasyTune", it is not possible to correct the switching threshold during running operation. Application adaptation can only be performed by means of a new teach-in. That changes with the unique "EasyTune" from Leuze electronic. With just a single press of a button, the switching threshold can simply be shifted in small steps. Thus application adaptation can be performed in a manner similar to that for a sensor with a potentiometer.

Here, a long – i.e. longer than 200 ms – and, thus, forceful press of the button results in an increase; a short – i.e. shorter than 200 ms – and, thus, automatically lighter press of the button results in a decrease of the value. This process was developed through intensive trials and corresponds to the intuitive operation of such a button. Indicator LEDs illuminate upon reaching the upper and lower adjustment limits. As a result, you never lose your orientation.

To ensure trouble-free detection during the work process, "EasyTune" can be used to simply adapt a taught value to fluctuations caused e.g. by minimal deviations in chromaticity, material properties or scanning range.



You can perform fine adjustment of the contrast scanners literally "with your little finger."



With our contrast scanners, **IO-Link** is on the label because **IO-Link** is really inside.

Connectivity from Leuze electronic offers the better solutions.

IO-Link makes a number of additional functions available in the contrast scanners. In addition to the extended process data, extensive configuration and service functions can also be used. In this way, settings and diagnostics can be performed across all levels of fieldbus technology all the way to such a small sensor.

As one of the initiators and developers of this new industrial standard, we aim to offer our customers only IO-Link sensors that truly deserve this designation and that offer all of the possibilities afforded by this innovative technology.

Advantages that **IO-Link makes possible in the contrast scanners**

- Digital measurement value output, in addition to the switching output, replaces the analog output on the sensor
- Configuration of switching thresholds enables easy recipe management
- Time functions for fault suppression
- Internal mark counters facilitate referencing with the machine cycle rate
- Remote control of all sensor functions enables validated machine designs



Technical data

Color scanners of the CRT family

Optical data	CRT 442	CRT 20B
Scanning range	12,5 mm	12.5/60 mm
Light-spot size	1.5x6.5 mm	4x2 mm / 13x13 mm
Transmitter	RGB	RGB
Timing		
Response time	0.5 ms	85/145 µs
Switching frequency	1.500 Hz	6/3.5 kHz
Adjustments		
Teach-in	X	X
Teach-in level	–	X
EasyTune	–	–
IO-Link	–	–
Potentiometer	–	–
Buttons	–	–
Options		
Functions via pin 2	X	X
Pulse stretching	–	X
Configuration	–	X

Luminescence scanners of the LRT family

Optical data	LRT 8	LRT 440
Scanning range	0–200 mm	0–300 mm
Light spot diameter	3–40 mm	10–25 mm
Transmitter	UV	UV
Timing		
Response time	0.35 ms	0.83 ms
Switching frequency	1.5 kHz	0.6/6 kHz
Adjustments		
Teach-in	–	–
Teach-in level	–	–
EasyTune	–	–
IO-Link	–	–
Potentiometer	X	–
Buttons	–	X
Options		
Functions via pin 2	–	–
Pulse stretching	–	–
Configuration	–	–

Technical data

Contrast scanners of the KRT family

Optical data	KRT 3B	KRT 55	KRT 20	KRT 20B
Scanning range	14.5/60 mm	13 mm	12/20/50 mm	13.5 mm
Light-spot size (laser)	1.5x6.5 mm (0.5x1.0 mm)	1.5x6.5 mm	1.2x4 mm	1.5x6.5 mm
Transmitter	white light, RGB, laser	white light, RGB, laser	RGB	white light, RGB
Signal adaptation	X	X	X	X
Color optimization	X	X	X	X
Timing				
Response time	min. 50 µs	50 µs	16 µs	min. 50 µs
Switching frequency	max. 10 kHz	10 kHz	31.25 kHz	max. 10 kHz
Adjustments				
Teach-in	X	X	X	X
Teach-in level	X	X	X	X
EasyTune	X	X	—	X
IO-Link	X	X	—	X
Analog output	—	—	X	—
Options				
Functions via pin 2	X	X	X	X
Pulse stretching	X	X	X	X
Configuration	X	X	X	X



Optoelectronic Sensors

Cubic Series
Cylindrical Sensors, Mini Sensors, Fiber Optic Amplifiers
Measuring Sensors
Special Sensors
Light Curtains
Forked Sensors
Double Sheet Monitoring, Splice Detection
Inductive Switches
Accessories

Identification Systems

Data Transmission Systems

Distance Measurement

Barcode Readers
RF-IDent-Systems
Modular Interfacing Units
Industrial Image Processing Systems
Optical Data Transmission Systems
Optical Distance Measurement/Positioning
Mobile Code Readers

Safety Sensors

Safety Systems

Safety Services

Safety Laser Scanners
Safety Light Curtains
Transceiver and Multiple Light Beam Safety Devices
Single Light Beam Safety Devices
AS-i-Safety Product Range
Safety Sensor Technology for PROFIBUS DP
Safety Switches, Safety Locking Devices, Safety Command Devices
Safety Relays
Sensor Accessories and Signal Devices
Safety Engineering Software
Machine Safety Services

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