REGISTRATION SENSORS
PRODUCTS AT A GLANCE

Contrast, color, luminescence, fork, array, pattern glare and register sensors

SICK
Sensor Intelligence.

OPTICAL CHALLENGES – RELIABLE SENSOR SOLUTIONS

A WIDE VARIETY

The process control details are often not visible to the human eye. Colors, contrasts, glare, or even entire patterns flash by and the eye cannot detect them.

However, nothing escapes SICK sensors – with a diversified product range, they ensure that the widest range of optical characteristics can be detected safely and reliably. And all of this is possible even when the challenge seems impossible at first.

Detecting glare and glare differences

Detecting luminescence and invisible marks

Detecting objects and managing labels in line with the through-beam principle

Detecting and differentiating colors

Detecting edges, lines, and diameters

Detecting and differentiating contrasts

Detecting patterns

DETECTING AND DIFFERENTIATING CONTRASTS

If you need to differentiate between light and dark, various color levels, gray scale values, and contrasts during your processes, then you will always find yourself faced with the challenge of reliable contrast differentiation. In all of these cases, detecting the finest details and smallest deviations is key.

Examples
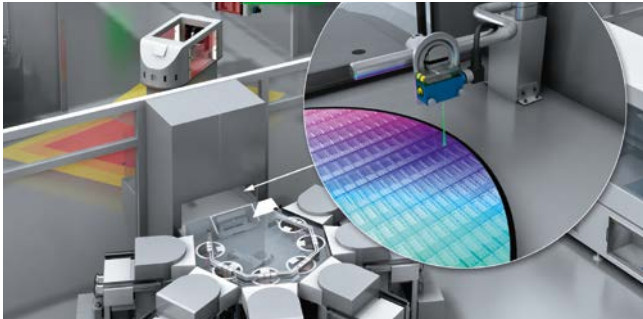
Differentiating surface coatings in wafer production.

Detecting registration marks on printing machines.

Detecting print marks on envelope-stuffing or labeling machines.

Detecting and differentiating contrasts

DETECTING AND DIFFERENTIATING COLORS

Differentiating by color is a complex task and is particularly challenging when the nuances are only slight. Light blue or blue, yellow or orange – something which seems very simplistic to the eye can often cause difficulties in industrial processes. If you have to differentiate or select your process control by color, then you will find yourself faced with the challenge of detecting color.

Examples
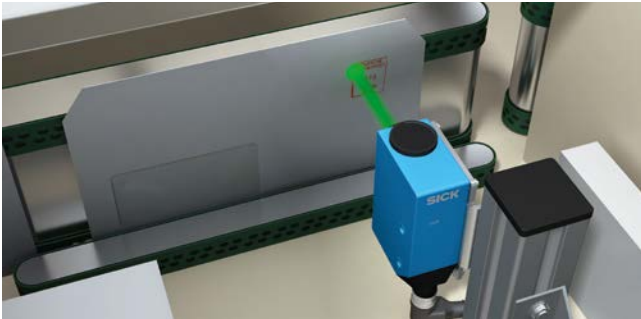
Monitoring stampings.

PSDI control on a packaging machine based on a color element.


Detecting packaging with faulty printing.

Detecting and differentiating colors

DETECTING LUMINESCENCE AND INVISIBLE MARKS

Often the human eye does not see what has to be detected and evaluated. The reason for this is markings which are only visible under UV light. Luminescence sensors are crucial if you want to work with or uniquely allocate marks like this and detect specific content in your processes, or if your processes require differentiation regardless of color, pattern, or surface quality.
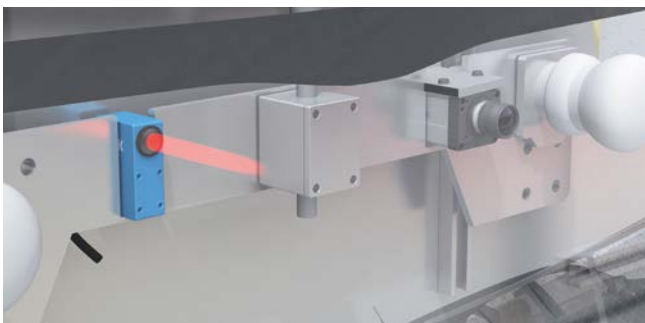
Examples
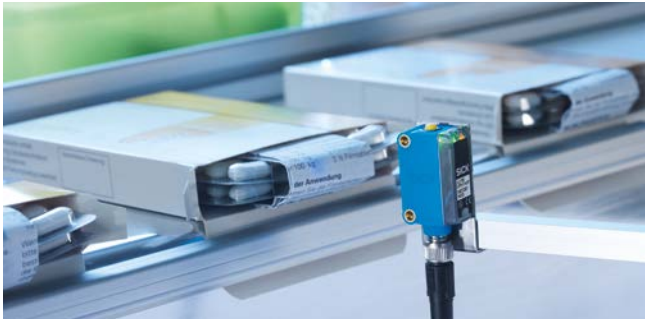
Monitoring the placement of packaging inserts in the pharmaceutical industry.

Quality control for front screen in the automotive industry.

Monitoring glue application in the wood processing industry.

Detecting luminescence and invisible marks

DETECTING GLARE AND GLARE DIFFERENCES

Detecting glossy surfaces and differentiating them from matte areas is particularly challenging as often the differences in the level of glare are only minimal. However, glare offers unexpected possibilities for controlling processes regardless of color, transparency, or pattern. If you would like to record glare differences, detect reflective objects, or detect non-reflective areas, then you will need to detect glare.
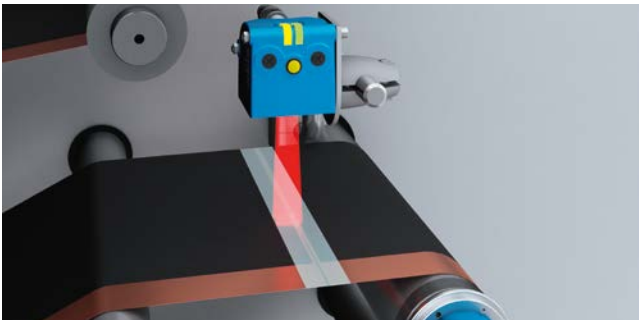
Examples

Detecting protective packaging.

Detecting splice connections in sheets.

Detecting authenticity features.

Detecting glare and glare differences

DETECTING OBJECTS AND MANAGING LABELS IN LINE WITH THE THROUGH-BEAM PRINCIPLE

Hitting the mark without the need for extensive preparation is the very definition of precision. However, fork sensors from SICK do not just boast accuracy but also an outstanding array of equipment: senders and receivers are located in the housing, which saves time during alignment.
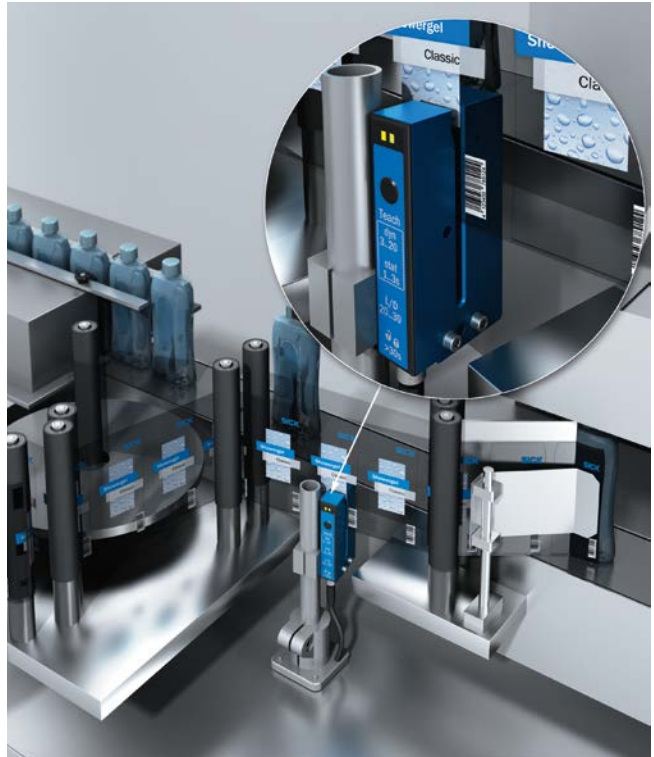
Examples

The fork sensor WFS is ideal for the detection of non-transparent labels. Thanks it its slim fork design, it is ideal for integration into the machine concept.

Safe object detection with fork sensors from SICK. Whether the light source uses red, infrared or laser light, we have the ideal solution for your application with WFM, WFN, and WFL.

The UFnext ultrasonic fork sensor detects both transparent, opaque, and also printed labels, making it the obvious choice for label detection.


Detecting objects and managing labels in line with the through-beam principle

DETECTING EDGES, LINES, AND DIAMETERS

The array sensor from SICK is the ideal solution for accurate web edge and line tracing. Whether you need to position print marks, control web edges, or monitor unchanging diameters, the Ax20 is the ideal solution with its measuring principle of operation.

Examples
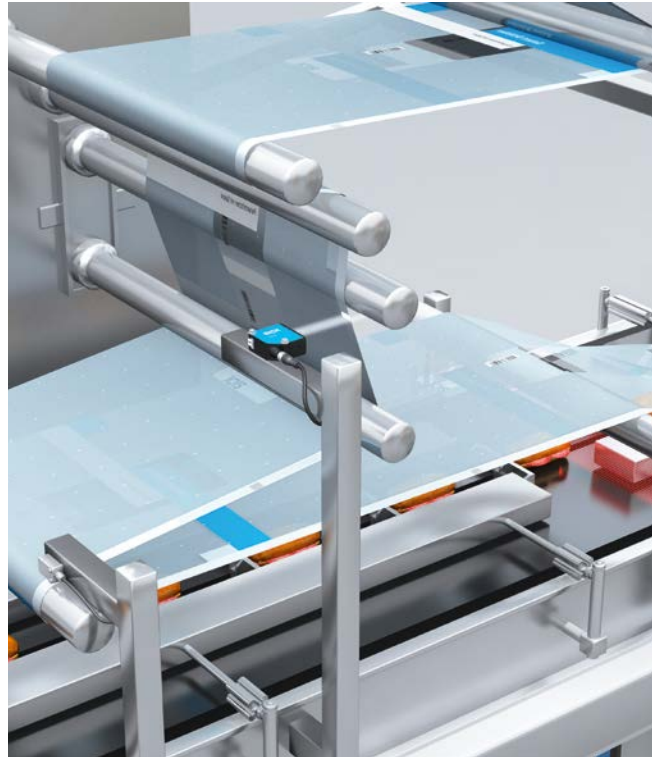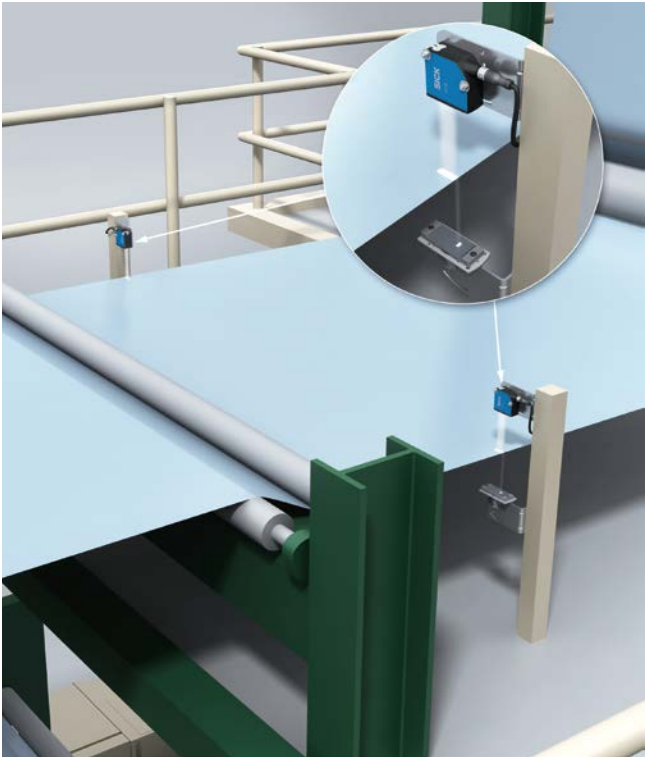
The Ax20 line sensor is the efficient solution for accurate web edge control, width and diameter detection as well as the detection of small parts. Thanks to its scanning principle, it can be flexibly integrated into the machine concept.

Detecting edges, lines, and diameters

DETECTING PATTERNS

Company logos, labels, printed information, and all recurrent optical elements on a product represent optical patterns. Being able to detect the positions of these more and more accurately makes many processes a lot easier, whether these are in packaging, labeling, or internal logistics. Do you also work with labeled or printed objects in your processes? Then you have to detect patterns.

Examples

Tube positioning in the packaging industry.

Detecting cutting positions.

Monitoring labels in the packaging industry.

Detecting patterns

	KTL180	**KTS Core**	**KTS Prime**
	Safe object detection at high machine speeds	Universal contrast detection in modern housing	Innovative TwinEye-Technology for better contrast detection

Technical data overview

	KTL180	**KTS Core**	**KTS Prime**
Dimensions (W x H x D)	10.5 mm x 33.2 mm x 71.9 mm	26 mm x 62 mm x 47,5 mm	26 mm x 62 mm x 47,5 mm
Sensing distance	0 mm ... 1,400 mm	13 mm	13 mm / 25 mm / 40 mm / 70 mm / 150 mm
Type of light	LED, white	LED, RGB LED, white	LED, RGB LED, white
Light spot size	–	1.2 mm x 3.9 mm	0.9 mm ... 12 mm
Switching frequency	31.2 kHz	25 kHz / 12.5 kHz	70 kHz / 50 kHz / 25 kHz / 11,5 kHz / 6,25 kHz / 1,5 kHz
Response time	16 µs	20 µs / 40 µs	3 µs / 10 µs / 20 µs / 42 µs / 80 µs / 320 µs
Output function	PNP, NPN	PNP, NPN, PUSH/PULL	PNP, NPN, PUSH/PULL
Adjustment	–	2-point teach-in teach-in dynamic	n-point, 1-point, 2-point teach-in, teach-in dynamic, auto-mode
Connection type	Male connector M8, 4-pin Cable M12 male connector, 5-pin Cable open end, 4-wire	Male connector M12, 4-pin	Male connector M12, 4-pin Male connector M12, 5-pin
IO-Link	–	–	✔

At a glance

	KTL180	**KTS Core**	**KTS Prime**
	• 31.2 kHz switching frequency at a response time of 16 µs • High dynamic range • Multi-functional 7-segment display • Job save for easy format change • 1-point, 2-point and dynamic teach-in • Master-slave function • A wide range of different fibers	• White LED or RGB LED • High gray line resolution • Very large dynamic range means reliable detection of contrasts on glossy materials • 25 kHz switching frequency • Display for easy sensor adjustment • 2-point and dynamic teach-in • Manual switching threshold adjustment • Light/dark switching	• TwinEye-Technology for increased depth of field and sensing distance tolerance • 50 kHz switching frequency and 5 µs jitter • Large dynamic range means reliable detection of contrasts on glossy materials • 7-segment display • Color mode • Assembly feedback • IO-Link and automation functions

Detailed information	➔ www.sick.com/KTL180	➔ www.sick.com/KTS_Core	➔ www.sick.com/KTS_Prime

	KTX Prime	KTM Core	KTM Prime
	Contrast detection with TwinEye-Technology in tried-and-tested housing	Mini, easy, speedy	Mini, easy, speedy, robust
	30 mm x 53 mm x 78.5 mm	12 mm x 31.5 mm x 21 mm	12 mm x 31,5 mm x 21 mm 15.25 mm x 48.6 mm x 22.2 mm
	13 mm / 25 mm / 40 mm / 70 mm / 150 mm	12.5 mm	11 mm / 12.5 mm
	LED, RGB	LED, white	LED, white LED, RGB
	0.9 mm ... 12 mm	Ø 1 mm / Ø 2 mm	1.5 mm x 6.5 mm Ø 2 mm
	70 kHz / 50 kHz / 25 kHz / 11.5 kHz / 6.25 kHz	10 kHz	15 kHz
	3 µs / 10 µs / 20 µs / 42 µs / 80 µs	50 µs	35 µs
	PNP, NPN, PUSH/PULL	PNP, NPN	PNP, NPN
	n-point, 1-point, 2-point teach-in, teach-in dynamic, auto-mode	Potentiometer	2-point teach-in static/dynamic + proximity to mark
	Male connector M12, 4-pin Male connector M12, 5-pin	Male connector M8, 4-pin Cable with M12 male connector, 4-pin Cable open end, 4-wire	Male connector M8, 4-pin Cable with M12 male connector, 4-pin
	✔	–	✔

KTX Prime	KTM Core	KTM Prime
• TwinEye-Technology for increased depth of field and sensing distance tolerance • 50 kHz switching frequency and 5 µs jitter • Large dynamic range means reliable detection of contrasts on glossy materials • 7-segment display • Color mode • Assembly feedback • IO-Link and automation functions • Flexible sensor setting thanks to various sensor parameters	• Small, tried-and tested housing • High grayscale resolution • Very large dynamic range means reliable detection of contrasts on glossy materials • Switching frequency: 10 kHz • White light	• Small, tried-and-tested housing, also available in stainless steel • High grayscale resolution • Very large dynamic range means reliable detection of contrasts on glossy materials • Static and dynamic teach-in in one variant • Switching frequency: 15 kHz • KTM Prime with IO-LInk functions
➜ www.sick.com/KTX_Prime	➜ www.sick.com/KTM_Core	➜ www.sick.com/KTM_Prime

	KT3L Laser	KT8
	Long sensing distance – precise detection	Laser contrast sensor and CAN communication

Technical data overview		
Dimensions (W x H x D)	12 mm x 40 mm x 22 mm	30.4 mm x 53 mm x 80 mm
Sensing distance	40 mm	10 mm / 20 mm / 60 mm / 150 mm
Type of light	Laser, Red	LED, RGB / Laser, Red
Light spot size	1 mm x 2 mm	0.8 mm x 4 mm 1.5 mm x 5.5 mm Ø 0.3 mm Ø 3 mm
Switching frequency	1.5 kHz	17 kHz / 22.5 kHz
Response time	400 µs	22 µs / 30 µs
Adjustment	Static 2-point teach-in	Static 2-point teach-in, Dynamic teach-in (min/max)
Connection type	Male connector M12, 4-pin	Male connector M12, 5-pin Male connector M12,8-pin
IO-Link	–	–

At a glance		
	• Very small housing • Precise, small laser spot • Sensing distance up to 60 mm • Simple 2-point teach-in • Switching frequency of 1,5 kHz • Reliable operation for jittering materials	• Laser version offers sensing distances of 30 mm to 800 mm • Very small and precise laser light spot (Class II) • Fast switching frequency of 17 kHz • Detection reliability displayed in the bar graph display • CAN interface version for parameter setup, diagnostics and function selection • Very precise light spot

Detailed information	➜ www.sick.com/KT3	➜ www.sick.com/KT8

	CSM	CS8
	Mini, easy, smart	High-performance color sensing

Technical data overview		
Dimensions (W x H x D)	12 mm x 31.5 mm x 21 mm	30.4 mm x 53 mm x 80 mm
Sensing distance	12.5 mm	12.5 mm / 60 mm
Type of light	LED, RGB	LED, RGB
Light spot size	1.5 mm x 6.5 mm	2 mm x 4 mm 13 mm x 13 mm
Switching frequency	1.7 kHz	0.5 kHz / 1 kHz / 3 kHz / 3.5 kHz / 6 kHz
Response time	300 µs	85 µs, 145 µs, 160 µs, 500 µs, 1,000 µs
Output (channel)	1 color / 8 colors via IO-Link	1 color / 4 colors
Adjustment	1-point-teach-in	Static 1-point teach-in
Connection type	Cable with male connector Cable	Male connector
IO-Link	✔	–

| At a glance		
	• Color sensor in a new miniature housing • Static and teach-in method for 1 color using control cable or control panel • Over IO-Link up to 8 colors teachable • Switching frequency: 1.7 kHz • Sensing distance: 12.5 mm • Compatibility with older color sensors thanks to cable with male connector M12	• One (CS8-1) or four (CS8-4) colors can be saved • 12.5 mm or 60 mm sensing distance • Fast response time up to 85 µs • High resolution color • Bar graph display shows the correlation of the colors • Extremely precise light spot and high resolution • Metal housing with two light exits (interchangeable)

Detailed information	➜ www.sick.com/CSM	➜ www.sick.com/CS8

	LUTM	LUT3
	Small, intelligent luminescence sensor	The solution for standard applications

Technical data overview

	LUTM	LUT3
Dimensions (W x H x D)	12 mm x 31.5 mm x 21 mm	30.4 mm x 80 mm x 53 mm
Sensing distance	12.5 mm	10 mm / 20 mm / 50 mm / 90 mm
Type of light	LED, ultraviolet light	LED, ultraviolet light
Light spot size	2 mm x 2.5 mm	2 mm x 6 mm 3 mm x 9 mm 15 mm x 15 mm 12 mm x 12 mm
Light emission	Long side	Long side
Switching frequency	6 kHz	1.5 kHz
Response time	80 µs	350 µs
Output function	Light/darkswitching	Light switching
Analog output Q_A	–	–
Adjustment	2-point teach-in static/dynamic	–
Connection type	Cable with M12 male connector, 4-pin Male connector M8, 4-pin	Male connector M12, 4-pin Male connector M12, 5-pin
IO-Link	✔	–

At a glance

	LUTM	LUT3
	• Luminescence sensor in a miniature housing • Static and dynamic teach-in methods in a single variant • Reliable detection even at a low level luminescence • Switching frequency: 6 kHz • Operating range: 8 ... 20 mm • IO-Link function • Compatibility with older LUT sensors thanks to cable with male connector M12	• Rugged metal housing • Sensing distance: 10, 20, or 50 mm • Sensing ranges can be selected with interchangeable lenses • Sender LED UV (375 nm)

Detailed information	➜ www.sick.com/LUTM	➜ www.sick.com/LUT3

	LUT8	LUT9
	For universal use with easy adjustment	The new standard for high-performance luminescence sensors
	30.4 mm x 53 mm x 80 mm	30.4 mm x 53 mm x 80 mm
	10 mm / 20 mm / 50 mm / 90 mm	10 mm / 20 mm / 50 mm / 90 mm / 150 mm
	LED, ultraviolet light	LED, ultraviolet light
		LED, Blue
	2 mm x 6 mm	2 mm x 6 mm
	3 mm x 9 mm	3 mm x 9 mm
	15 mm x 15 mm	5 mm x 12 mm
	12 mm x 12 mm	5 mm x 15 mm
	Ø 6 mm	12 mm x 12 mm
	Long side	Long side / long and short side, exchangeable
	2.5 kHz	0.5 kHz / 2.5 kHz / 6.5 kHz
	200 µs	1 ms / 75 µs / 200 µs
	Light switching	
	0 mA ... 13 mA	0 mA ... 13 mA
	–	Static 2-point teach-in with manual fine adjustment
	Male connector M12, 5-pin	Male connector M12, 4-pin
		Male connector M12, 5-pin
	–	✔

- Tough metal housing
- Simple sensitivity adjustment in 8 stages
- Bar graph display provides information about the luminescence intensity
- Sensing distances selectable through interchangeable lenses
- Additional optical filters suppress background luminescence
- Fiber-optic cable connection (with 20 mm lens)
- Switching and analog output

- Simple teach-in
- Operating range up to 250 mm
- Version with IO-Link for remote monitoring
- Bar graph display provides information about the luminescence intensity
- High speed (6.5 kHz), standard (2.5 kHz), high resolution (500 Hz) models
- Additional optical filters suppress background luminescence
- Fiber-optic cable connection (with 20 mm lens)
- Switching and analog output

➜ www.sick.com/LUT8

➜ www.sick.com/LUT9

	UFnext	WFS	
	The clear choice for detecting transparent labels	Precise detection for optimum label detection	

Technical data overview

	UFnext	WFS	
Dimensions (W x H x D)	18 mm x 47,5 mm x 92,5 mm	10 mm x 25 mm x 64.3 mm	
Functional principle	Ultrasonic detection principle	Optical detection principle	
Fork width	3 mm	3 mm	
Fork depth	69 mm	42 mm	
MDO	Gap between labels: 2 mm Size of labels: 2 mm	Gap between labels: 2 mm Size of labels: 2 mm	
Light source	–	LED, Infrared light	
Switching frequency	1.5 kHz	10 kHz / 15 kHz	
Response time	250 µs	46 µs / 50 µs	
Output function	Light/darkswitching, selectable via button	Light/darkswitching, selectable via button	
Adjustment	1-point teach-in, 2-point teach-in, dynamic Teach-in	1-point teach-in, 2-point teach-in, dynamic Teach-in	
Connection type	Male connector M8, 4-pin	Male connector M8, 4-pin Cable, 4-wire 2 m	
IO-Link	–	✔	

At a glance

	UFnext	WFS	
	• Detection of transparent, opaque or printed labels • Unaffected by metallic foils and labels • Fast response time of 250 µs • Simple and accurate adjustment via "+"/"−"-buttons or teach-in • Rugged, IP 65 aluminum housing	• Housing with slim forked shape • Simple and precise setting of the switching threshold via IO-Link, teach-in button, or plus/minus buttons • Light/dark switching function • Fast response time: 50 µs • PNP or NPN switching output • Plastic housing with IP 65 enclosure rating • Smart sensor with integrated IO-Link interface	

Detailed information	➜ www.sick.com/UF	➜ www.sick.com/WFS	

	WFnext	WFL	WFM
	The specialist for high-speed applications	The perfect sensor for the detection of very small parts and precise positioning	Plug-and-play fork sensors – connect and get started
	10 mm x 32 mm x 57 mm ... 10 mm x 150 mm x 110 mm	10 mm x 40,5 mm x 47 mm ... 10 mm x 158,5 mm x 110 mm	10 mm x 50 mm x 59,5 mm ... 10 mm x 200 mm x 141,8 mm
	Optical detection principle	Optical detection principle	Optical detection principle
	2 mm ... 225 mm	2 mm ... 120 mm	30 mm ... 180 mm
	42 mm ... 95 mm	42 mm ... 95 mm	42 mm ... 124 mm
	0.2 mm	0.05 mm	0.8 mm 1 mm
	LED, Infrared light	Laser, visible red light	LED, visible red light
	10 kHz / 15 kHz	10 kHz / 11 kHz	4 kHz
	46 µs / 100 µs	60 µs / 100 µs	125 µs
	Light/darkswitching, selectable via button	Light/darkswitching, selectable via button	Light/darkswitching
	–	1-point teach-in, 2-point teach-in, dynamic Teach-in	–
	Male connector M8, 4-pin	Male connector M8, 4-pin	Male connector M8, 3-pin Cable, 3-wire
	✔	✔	–

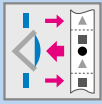| WFnext	WFL	WFM
• Infrared light source • Simple and accurate adjustment via teach-in or manually via "+"/"–" buttons • Fast response time (max. 100 µs) • PNP and NPN switching output • Light/dark switching function • 21 different models with different fork widths and depths • Rugged, IP 65 aluminum housing	• High-precision laser (Class 1) • Simple and precise setting via teach-in • Fast response time (max. 100 µs) • Minimum detectable object size of just 0.05 mm • PNP and NPN output signal switching device • Light/dark switching function • 21 different models with different fork widths and depths • Rugged, IP 65 aluminum housing	• Highly visible red emitted light • No setup, out-of-the-box operation • 360° output indicator • 5 fork sizes: maximum depth 120 mm, maximum width 180 mm • Rugged, IP 67 aluminum housing
➜ www.sick.com/WF	➜ www.sick.com/WFL	➜ www.sick.com/WFM

	AS30	Ax20
	More flexibility and efficient communication	Ax20 array sensors for edge and diameter detection solutions

Technical data overview

Dimensions (W x H x D)	31 mm x 62 mm x 52.2 mm	24.3 mm x 59.8 mm x 54.1 mm
Functional principle	Mid/center, position determination, Edge detection	Edge detection, proximity and reflector Diameter detection, proximity and reflector
Sensing distance	25 mm / 100 mm	25 mm / 100 mm
Light source	LED, white	LED, white
Light spot size	11.1 mm ... 62.5 mm	5 mm ... 50 mm
Switching output	PUSH/PULL	PNP, NPN
Measuring range	20 mm ... 30 mm 90 mm ... 110 mm	20 mm ... 30 mm
Reproducibility	0.03 mm / 0.05 mm / 0.2 mm	0.03 mm / 0.05 mm
Analog output Q_A	4 mA ... 20 mA	4 mA ... 20 mA
Connection type	Male connector M12, 5-pin	Male connector M12, 5-pin
IO-Link	–	–

At a glance

	• Teach-in of selected edges possible • Full color TFT display • Various operating modes for different applications • Core and Prime variant for different fields of application • Large measuring range of up to 50 mm • Sensing distance of 25 mm or 100 mm • Repeatability of up to 30 μm	• Proximity contrast line sensor in a compact housing • Application-specific sensor functions • Detect position of edge of material • Diameter, width and gap detection of different objects • Very high reproducibility of 0.03 mm • Large measurement range: 30 mm • Visible white LED light spot to enable accurate alignment • Simple setup, no teach-in necessary

Detailed information	➜ www.sick.com/AS30	➜ www.sick.com/Ax20

	PSS	PS30
	Print Detector: The easy way to verify the quality of printed images	From pattern detection to rapid position identification

Technical data overview		
Dimensions (W x H x D)	26 mm x 62 mm x 47,5 mm	46 mm x 77 mm x 46 mm
Max. movement speed	4 m/s	10 m/s
Sensing distance	13 mm / 27.5 mm	20 mm
Light source	LED, white	LED, white
Switching output	0.8 mm x 5.5 mm / 0.8 mm x 8 mm	65 mm x 3 mm
Light spot size	PUSH/PULL	PNP
Adjustment	Logic switching output, Pin 2 configuration, Key lock, Delay switching output, Printed image teach-in, Teach-in background, Sensitivity, Input delay trigger, Impuls length Q	Start stop teach Start length teach
Connection type	Male connector M12, 12-pin	Male connector M12, 12-pin
IO-Link	✔	–

At a glance		
	• Simple sensor-based pattern recognition • Print pattern and background teach-in • Flexibly adjustable sensitivity levels • Response time: 10 ms • Trigger required • Print pattern quality shown on sensor display • Configuration via IO-Link	• Rugged housing with rotatable male connector • Scanning speed up to 10 m/s • Reproducibility of up to 0.15 mm (2 Sigma) • Ethernet interface for integration into the machine controller • Integrated, visible object illumination • Operating elements with cleartext display • Software tools for visualized configuration and diagnosis of the sensor • Automatic configuration when changing objects

| Detailed information	➜ www.sick.com/PSS	➜ www.sick.com/PS30

Glare

The authority on gloss

Technical data overview	
Dimensions (W x H x D)	42.5 mm x 44 mm x 43.4 mm
Sensing distance	50 mm
MDO	12 mm x 14 mm
Light source	LED, Red
Light spot size	10 mm x 12 mm
Switching frequency	500 Hz
Response time	1 ms
Adjustment	Static 1-point teach-in / Static 2-point teach-in Dynamic 2-point teach-in /Static 3-point teach-in
Connection type	Male connector M12, 5-pin
IO-Link	✔

At a glance	
	• Object detection and differentiation on the basis of surface gloss level • Configurable in many different operating modes to meet the requirements of any application • Integrated alignment aid • Integrated automation functions • Two digital push-pull outputs and one configurable input • Sensitivity adjusts to object properties • IO-Link provides easy data access from the PLC • Quick and easy configuration

Detailed information	➜ www.sick.com/Glare
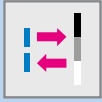
RS10

Adjustable individual thresholds

Technical data overview

Dimensions (W x H x D)	15 mm x 62 m x 60 mm
Sensing distance	13 mm
Light source	LED, White
Light spot size	0.8 mm x 3 mm
Response time	≤ 20 µs
Switching output	PNP/NPN PUSH/PULL
Connection type	Male connector M12, 8-pin
IO-Link	–

At a glance

- The register is controlled with individual thresholds
- Unique housing: one screw mounting
- Tight dual-sensor mounting ability
- Detects 1-18 marks of different colors
- Easy teach-in via button

Detailed information	➜ www.sick.com/RS10

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SICK AT A GLANCE

SICK is a leading manufacturer of intelligent sensors and sensor solutions for industrial applications. With more than 9,700 employees and over 50 subsidiaries and equity investments as well as numerous agencies worldwide, SICK is always close to its customers. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents, and preventing damage to the environment.

SICK has extensive experience in various industries and understands their processes and requirements. With intelligent sensors, SICK delivers exactly what the customers need. In application centers in Europe, Asia, and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes SICK a reliable supplier and development partner.

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