

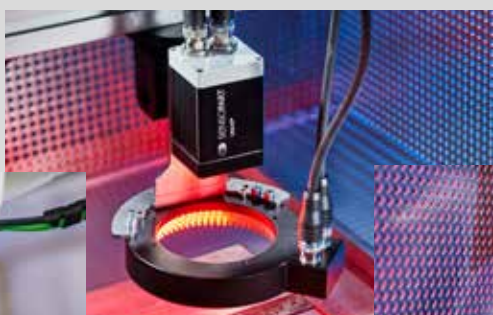
Product innovations: Vision



The expert sensor for robotics applications



Versatile image processors – VISOR® vision sensors



New illumination methods (Multishot) – VISOR® Allround Professional



Reading of barcodes and data matrix codes, as well as OCR

VISOR® New Generation from page 32

Vision sensor for detection, classification and identification of objects

- Integrated evaluation unit with high-performance processor
- High-resolution monochrome or color imaging chip
- Powerful integrated LED lighting
- Motorised focus adjustment



VISOR® Allround from page 42

Object detection and identification in one device

- All the detectors available with VISOR® Object and VISOR® Code Reader united in a single device
- Multishot function reveals minimal height differences and suppresses printed surfaces
- Reading of raised or recessed characters



VISOR® Robotic from page 92

The expert sensor for robotics applications

- Calibration methods for robotics applications
- Different detectors for locating components
- Gripper space check
- Offset of work plane through Z offset function



made in Germany

Product innovations		
	Special features	Page
VISOR® New Generation	Vision sensor for detection, classification and identification of objects	32
VISOR® Allround	Object detection and identification with one device	42
VISOR® Robotic	The expert sensor for robotics applications	92

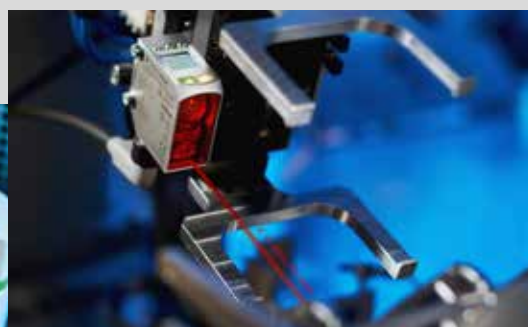
Product innovations: Sensor technology



Detecting double layer of printed circuit boards, or presence and height control of components



Detecting color of packaging elements



FT 55-RLAM – A sensor for countless applications

FT 10-RLA – Our smallest model from page 272

- Minimal weight – ideal for robotics applications
- Suited to the smallest installation spaces thanks to minimal dimensions
- Fit for the future – output of measured values via IO-link
- Measuring range 10 to 70 mm
- Optimum eye safety due to laser class 1



FT 55-CM – Full-spectrum color sensor from page 344

- Stable processes thanks to intelligent color detection regardless of distance
- Economical solutions owing to up to twelve storable colours or jobs.
- Reliable switching through dependable glare suppression (depending on version)
- IO-Link



FT 50 BH – BGS sensor with blue transmission light from page 428

- Precise adjustable background suppression
- Simple scanning range adjustment thanks to indicator scale
- Detection of transparent objects without a reflector
- Reliable detection with shiny surfaces, even at large scanning angles
- Detection of very dark objects



FT 55-RLAM – High-performance precision from page 280

- Allround distance sensor with excellent sensor characteristics
- Operating range up to 1m – precise measurement even at long distances
- Measured value output via analogue output & IO-Link
- Optimum eye safety thanks to laser class 1



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Product news		
	Special features	Page
FT 10-RLA – Miniature distance sensor	Smallest optical distance sensor on the market	270
FT 55-CM – Full-spectrum color sensor	Customised adjustment to applications through digital output of color values using IO-Link	344
FT 50 BH – BGS sensor with blue transmission light	Extremely high detection reliability with objects that are difficult to detect.	428
FT 55-RLAM – Laser distance sensor	Precise measurements even at long distances of up to 1m!	280

Product overview VISOR® vision sensors

	VISOR® Allround		VISOR® Object	
	Presence, completeness, measurement, color, reading of barcodes, 2D codes		Presence, completeness, measurement, color	
	Advanced	Professional	Standard	Advanced
Resolution				
V10 V10C 800 × 600	Monochrome Color	–	Monochrome Color	
Number of images per second V10 V10 C	75 50	– –	75 50	
V20 V20C 1440 × 1080	Monochrome Color		–	Monochrome Color
Number of images per second V20 V20 C	40 20		– –	40 20
Lighting	white, red ¹ , infrared ¹			
Multishot (only at monochrome hardware)	✓		–	
Target laser	✓		–	✓
Lenses				
V10 wide medium narrow c-mount	✓ ✓ ✓ ✓		✓ ✓ ✓ –	✓ ✓ ✓ ✓
V20 wide medium narrow c-mount	✓ ✓ ✓ ✓		– – – –	✓ ✓ ✓ ✓
Interfaces				
Inputs outputs selectable	2 2 6		2 2 4	2 2 6
Encoder input	✓		–	✓
Ethernet EtherNet/IP Profinet SensoWeb	✓ ✓ ✓ ✓		✓ ✓ ✓ ✓	
Service port	✓		–	✓
Job/Detectors				
Number of jobs (max.)	255		8	255
Number of detectors per job (max.)	255		32	255
Calibration				
Calibration (scaling, perspective)	✓		–	✓
Robot calibration	–	✓	–	
Preprocessing				
Preprocessing filter	✓		–	✓
Multiple image capture/Shutter variation	✓		–	✓
Free-form search area	✓		✓	
Position tracking				
Contour comparison (translation, rotation 360°)	✓		✓	
Pattern matching (translation, rotation 360°)	✓		–	✓
Edge detection (translation, rotation)	✓		–	✓
Object detection				
Contour comparison (translation, rotation 360°)	✓		✓	
Multiple contour detection	✓		–	✓
Pattern matching (translation, rotation 360°)	✓		✓	
Grey level Contrast Brightness	✓		✓	
Calliper	✓		–	✓
BLOB	✓		–	✓
Identification				
Datacode	✓		–	
Datacode advanced	✓		–	
Barcode	✓		–	
Barcode advanced	✓		–	
Clear text (OCR)	✓		–	
Robotics functions				
Result offset	–	✓	–	
Checking space around gripper	–	✓	–	
Color detectors ²				
Color field	✓		✓	
Color value	✓		–	✓
Color list	✓		–	✓
Color distance Binarisation	✓		–	✓



	VISOR® Robotic		VISOR® Code Reader		
	Robotics, presence, completeness, measurement, positioning		Reading of barcodes, 2D codes, text		
	Advanced	Professional	Standard	Advanced	Professional
Resolution					
V10 V10C 800 × 600	Monochrome	–	Monochrome		
Number of images per second V10 V10 C	75	– –	75 –		
V20 V20C 1440 × 1080	Monochrome Color		–	Monochrome	
Number of images per second V20 V20 C	40 20		– –	40 –	
Lighting	white, red ¹ , infrared ¹				
Multishot	–		–		
Target laser	✓		–	✓	
Lenses					
V10 wide medium narrow c-mount	✓ ✓ ✓ ✓		✓ ✓ ✓ –	✓ ✓ ✓ ✓	
V20 wide medium narrow c-mount	✓ ✓ ✓ ✓		– – – –	✓ ✓ ✓ ✓	
Interfaces					
Inputs outputs selectable	2 2 6		2 2 4	2 2 6	
Encoder input	✓			✓	
Ethernet EtherNet/IP Profinet SensoWeb	✓ ✓ ✓ ✓			✓ ✓ ✓ ✓	
Service port	✓		–	✓	
Job/Detectors					
Number of jobs (max.)	255		8	255	
Number of detectors per job (max.)	255		2	255	
Calibration					
Calibration (scaling, perspective)	✓		–		
Robot calibration	✓		–		
Preprocessing					
Preprocessing filter	✓		–	–	✓
Multiple image capture/Shutter variation	✓		–	–	✓
Free-form search area	✓		–	–	✓
Position tracking					
Contour comparison (translation, rotation 360°)	✓		–		✓
Pattern matching (translation, rotation 360°)	✓		–		✓
Edge detection (translation, rotation)	✓		–		✓
Object detection					
Contour comparison (translation, rotation 360°)	✓		–		
Multiple contour detection	✓		–		
Pattern matching (translation, rotation 360°)	✓		–		✓
Grey level Contrast Brightness	✓		–		✓
Calliper	✓		–		
BLOB	✓		–		
Identification					
Datacode	–	✓	✓	✓	
Datacode advanced	–	✓	–	✓	
Barcode	–	✓	✓	✓	
Barcode advanced	–	✓	–	✓	
Clear text (OCR)	–	✓	–		✓
Robotics functions					
Result offset	✓		–		
Checking space around gripper	✓		–		
Color detectors ²					
Color field	–		–		
Color value	–		–		
Color list	–		–		
Color distance Binarisation	✓		–		

¹ not with color hardware V10C/V20C

² only color hardware

Product overview – optical sensors

Product family Dimensions (H x W x D)		Distance sensors	Color (C), contrast (K) and luminescence sensors (UV)	Photoelectric diffuse sensors
F 10 21,1 x 14,6 x 8 mm		FT 10-RLA 10–70 mm   		
F 25 34 x 20 x 12 mm		FT 25-RLA 20–100 mm   	FT 25-RL 250 mm K   	FT 25-RL 250 mm   
		FT 25-RA 20–80 mm  	FT 25-W 12 mm K  	FT 25-R 800 mm  
		FT 25-RA 30–200 mm  	FT 25-RGB 12 mm K  	
			FT 25-C 12 mm C  	
F 55 Metal 50 x 50 x 25 mm Plastic 50 x 50 x 23 mm		FT 55-RLAP 5 m   	FT 55-CM 150 mm    	FT 55-RL 1.2 m  
		FR 55-RLAP 70 m   		FT 55-R 2 m 
		FT 55-RLAP2 5 m   		
		FT 55-RLAM 1 m   		
F 20 32 x 20 x 12 mm				
F 50 50 x 50 x 17 mm		FT 50-RLA-20 40–60 mm 	FT 50-C 32 mm C  	
		FT 50-RLA-40 45–85 mm 	FT 50-C-UV 50 mm UV 	
		FT 50-RLA-70 30–100 mm   		
		FT 50-RLA-100 70–170 mm   		
		FT 50-RLA-220 80–300 mm   		
Barrel type Ø 4 mm M 5 M 12 M 18 M 30				FT 04 50 mm 
				FT 05 50 mm 
				FT 12-R 300 mm
				FT 18-2-R 400 mm
				FMS 18-B 400 mm
				FT 18-2-IR 800 mm
				FMS 30-B 1 m
FL 70 84 x 35 x 10 mm		FL 70-RA-xD   Fiber-optic sensors Diffuse 310 mm Through-beam 810 mm		
F 90 95 x 93 x 42 mm		FT 91/92-ILA 6 m    		
		FT 90-ILA 10 m    		
		FR 91/92-ILA 50 m    		
		FR 90-ILA 250 m    		
FG FGL				

Photoelectric diffuse sensors with background suppression (BGS)	Photoelectric retro-reflective sensors	Photoelectric through-beam sensors	Fiber-optic sensors	Page
FT 10-RLH 60 mm    FT 10-B-RLF 15/30 mm  FT 10-RH 70 mm   FT 10-RF 15/30/50 mm FT 10-BF 30/50 mm 	FR 10-RL 2 m   FR 10-R 1.6 m 	FS/FE 10-RL 3 m  		366
FT 25-RLH 120 mm    FT 25-RH 200 mm   FT 25-RHD 400 mm   FT 25-RF 60/80 mm  FT 25-BF 80 mm 	FR 25-RL 13 m    FR 25-R 6 m   FR 25-RF 3 m FR 25-RGO 2 m    FR 25-RLO 4 m   	FS/FE 25-RL 18 m    FS/FE 25-R 13 m   FS/FE 25-RF 4 m FS/FE 55-RL 25 m   FS/FE 55-R 20 m 		
FT 55-RLH 800 mm   FT 55-RLH2 1 m   FT 55-B-RH 800 mm  FT 55-RH 1.2 m  FT 55-BH(2) 1.2 m   FT 55-RLHP2 5 m   	FR 55-RL 12 m   FR 55-R 12 m  FR 55-RLO 20 m   FR 55-RLP 70 m  			
			FL 20-R Diffuse 100 mm  Through-beam 1 m	534
FT 50-RLH 150 mm   FT 50-RLHD 300 mm   FT 50-RH 300 mm  FT 50-BH 300 mm   FT 50-IH 600 mm 	FR 50-RL 20 m   FR 50-R 5.5 m 	FS/FE 50-I 15 m 		286 332 422
FT 12-RH 60 mm  FT 12-RF 24 mm FMH 18 120 mm	FR 12-R 1.5 m FR 18-2-R 3 m FR 18-2-IR 3.6 m	FS/FE 12-RL 5 m  FS/FE 12-R 4 m FS/FE 18-RL 50 m  FS/FE 18-R 20 m FLS/FLE 18-WV 50 m  FSE 18-2-I 10 m	FMS 18-U Diffuse 160 mm Through-beam 700 mm FMS 30-U Diffuse 800 mm Through-beam 4.8 m FAV 30 500 mm	
			FL 70-R Diffuse 310 mm  Through-beam 810 mm FL 70-R-xD Diffuse 310 mm   Through-beam 810 mm	
FT 92-IL  				296 302 314
		FGL-RK /-IK 30–120 mm  FGL 5-IK 5 mm  FGL 5–220 mm  FG 40–120 x 80 mm² 		634
358	358	358	530	

Product overview – ultrasonic and inductive sensors, SmartPlug and

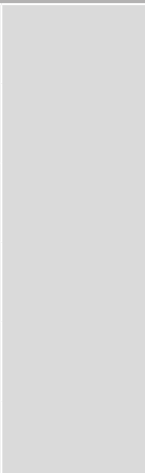
Ultrasonic Sensors

Products		Adjustment	Scanning distances	Special features	Page
UT 20		Teach-in 	140 mm / 150 mm / 240 mm / 700 mm	Ultrasonic sensors with soundpipe, PNP, NPN, analogue output	650
UT 12		Via control input	400 mm	PNP, NPN, analogue output	666
UT/UM 18		Via control input	250 mm / 300 mm / 800 mm	Variants with stainless steel housings, PNP, NPN, analogue output	670
UMT 30		Teach-in or display  	350 mm / 1.3 m / 3.4 m / 6 m	Display, PNP, 2 x PNP or analogue output	680

Inductive Sensors

Products		Design	Switching distance	Special features	Page
IT 8 / 10 / 12 IS 455 / 588		Cubic	0.8 mm / 1.5 mm / 3 mm / 4 mm / 8 mm / 15 mm / 20 mm / 35 mm	Miniature housing, AC/DC variants	702
IS 33		Barrel type Ø 3 mm	0.6 mm	PNP, NPN	708
ISN 44-20 IS 34 IT 4		Barrel type Ø 4 mm	0.8 mm	PNP, NPN, NAMUR, stainless steel housing	709
IMT 5		Barrel type Ø 5 mm	0.8 mm	PNP, NPN, stainless steel housing	712
ISZ 46 IS 46 / 56 IDT 6		Barrel type Ø 6,5 mm	1.5 mm / 2 mm / 3 mm	PNP, NPN	713
IS 48 / 58 IMT 8		Barrel type Ø 8 mm	1.5 mm / 2 mm / 3 mm / 6 mm	PNP, NPN	717
IMT 12 IT 12 IS 512		Barrel type Ø 12 mm	2 mm / 4 mm / 6 mm / 10 mm	PNP, NPN	724
IMT 18 IS 518 IT 18		Barrel type Ø 18 mm	5 mm / 8 mm / 10 mm / 12 mm / 20 mm	PNP, NPN, stainless steel housing	731
IMT 30 IS 530 IT 30		Barrel type Ø 30 mm	10 mm / 15 mm / 20 mm / 22 mm / 40 mm	PNP, NPN, stainless steel housing	737
IS 512 / 518		Barrel type Ø 12 mm / 18 mm analogue	6 mm / 10 mm	Analogue output	729

SmartPlug

Products		Special features	Page
MFI (Inverter)		Inverts NPN to PNP or PNP to NPN devices, N.C./N.O. also adjustable	748
MFC (Counter)		Adjustable counter (pulses or intervals) between 1 ... 65535	750
MFT (Timer)		Adjustable on-delay or drop-out delay between 1 ... 65535 ms	752
MFF (Frequency)		Adjustable frequency monitoring between 15 ... 1000 Hz	754
MFW (Wipe Function)		Adjustable wipe function for falling or rising edges; time range 1 ... 65535 ms	756
MFU (Universal)		All-in-one multifunctional switching device programmable via USB	758

1

Products		Description	Page
Mechanical accessories		Brackets for sensors	A-4
		Mountings for VISOR® and illumination	A-58
Optical accessories		Reflectors and reflective tape	A-18
		Lenses and protective casings	A-28
		Illumination	A-33
Electrical accessories		Cables	A-46
		Converters	A-46
		Cables, SensoIO, power supply units and switching devices, Panel Viewer	A-46