Product news

VISOR® object sensor V20 Advanced

from Page 64

Vision sensors for object detection and classification

- *Highly accurate evaluation via 1.3 megapixel chip*
- *255 inspection tasks available, 255 evaluations can be used for each inspection task*

VISOR® Color

from Page 80

Improved object detection through additional colour information

- *Highly accurate evaluation via 1.3 megapixel colour chip*
- *Powerful colour detection, even with the smallest of colour nuances or self-illuminating components*
- *255 inspection tasks available, 255 evaluations can be used for each inspection task*

Eyesight vision system V20 Advanced

from Page 108

Complete image-processing package with robust and flexible smart camera

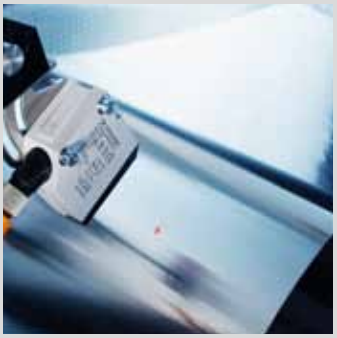
- *Highly accurate evaluation via 1.3 megapixel (colour) chip*
- *No limitation of inspection tasks (40 MB)*

F 10 – sub-miniature sensors as LED variant

from Page 226

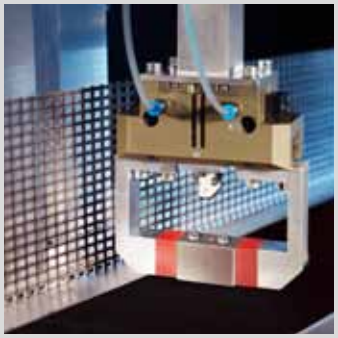
For installation in the smallest of spaces and in moving machine parts

- *High performance – small dimensions*
- *Special variant for detection of dark blue objects*



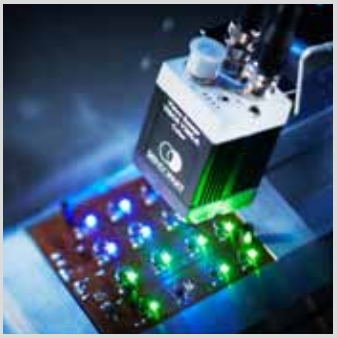
Determing coil thickness – FT 55 Time-of-flight sensors

Correctly positioned? – VISOR® vision sensors



Fits into a robot arm – F 10 sub-miniature sensors

Reliable colour detection in a miniature housing– FT 25-C



All LEDs in the right place? – VISOR® Color

Dancer roll regulation – FT 25-RA

FT 25-RA – sub-mininiature distance sensor

from Page 148

For control tasks such as dancer roll regulation on automatic winding machines thanks to high repeatability

- *Operating range (scanning distance) from 20 mm to 200 mm*
- *Simple integration thanks to small housings*
- *Analogue output 0 … 10 V*

FT 25 C – miniature RGB colour sensor

from Page 190

Smallest RGB colour sensor with a high switching frequency of ≤10 kHz for rapid applications

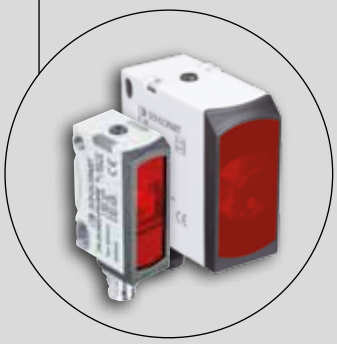
- *Reliable detection of "non-colours", e. g. black, white and grey*
- *Very small and precise light spot for the detection of the smallest of marks*

FR 25/55-RLO – autocollimation photoelectric sensors

from Page 266/300

The specialists for small-part and front-edge detection

- *Detection possible from range zero*
- *High switching accuracy and positioning accuracy on lateral object approach*



F 55 – time-of-flight sensors

from Page 166

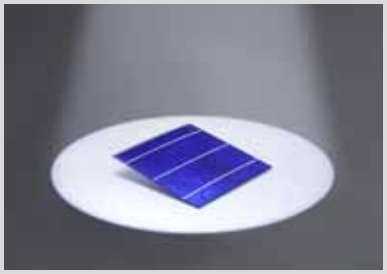
Compact sensors for distance measurement and object detection

- *For measurement, regulatory and detection tasks on all object surfaces at large distances*
- *Reliable object detection even with bright, highly reflective or shiny backgrounds*

made in Germany

Product news		
	Special features	Page
VISOR® Object sensor V20 Advanced	Vision sensor for object detection and classification with 1.3 mega pixel resolution	64
VISOR® Color	Improved object detection through additional colour information	80
Eyesight Vision-System V20 Advanced	Complete image-processing package with robust and flexible Smart Camera	108
F 10 – sub-mininiature distance sensors with LED	For installation in the smallest of places and in moving machine parts	226
FT 25-RA – miniature distance sensor	For control tasks such as dancer roll regulation on automatic winding machines thanks to high repeatability	148
FT 25 C – miniature RGB colour sensor	Smallest RGB colour sensor with a high switching frequency of ≤10 kHz for rapid applications	190
FR 25/55-RLO – autocollimation photoelectric sensors	The specialists for small-part and front-edge detection	266/300
F 55 – time-of-flight sensors	Compact sensors for distance measurement and object detection at long distances	166

Product overview – vision sensors and systems



Features/sensors	VISOR® Object Sensor		VISOR® Color		VISOR® Solar Sensor	
	V10 Standard	V10/V20 Advanced	V10C Standard	V10C/V20C Advanced	V10 Standard	V10 Advanced
Highlights	Object detection and classification		Improved object detection through additional colour information		Positioning and inspecting solar cells	
			Colour area	Colour area	Wafer position and breakouts	Wafer position and breakouts
			–	Colour list	–	Busbar position and number
			–	Colour value		
Functions						
Resolution in pixels V10	736 x 480 Mono	736 x 480 Mono	736 x 480 Colour	736 x 480 Colour	736 x 480 Mono	736 x 480 Mono
Resolution in pixels V20	–	1280 x 1024 Mono	–	1280 x 1024 Colour	–	–
Image rate per second V10 | V20	50 | –	50 | 40	40 | –	40 | 20	50 | –	50 | –
Number of jobs | detectors	2 | 32	max. 255 | max. 255	8 | 32	max. 255 | max. 255	2 | 32	max. 255 | max. 255
Position tracking	–	✓	✓	✓	–	✓
Contour matching (X-, Y-translation, rotation)	✓	✓	✓	✓	–	–
Pattern comparison (X-, Y-translation)	✓	✓	–	✓	–	✓
Grey threshold	✓	✓	–	✓	✓	✓
Contrast	✓	✓	✓	✓	✓	✓
Brightness	✓	✓	–	✓	✓	✓
Freeform tool	Contour only	✓	–	✓	–	✓
Interfaces						
Inputs | outputs	2 | 4	2 | 4	2 | 4	2 | 4	2 | 4	2 | 4
Freely definable switching outputs/inputs, PNP or NPN	2	4	2	4	2	4
Encoder input	–	✓	–	✓	–	✓
I/O expansion	–	✓	–	✓	–	✓
RS 422 | RS 232	– | –	✓ | ✓	– | –	✓ | ✓	– | –	✓ | ✓
Ethernet	✓	✓	✓	✓	✓	✓
EtherNet/IP	✓	✓	✓	✓	✓	✓
Lens						
V10 integrated, 6 mm | 12 mm | 25 mm	✓ | ✓ | –	✓ | ✓ | ✓	✓ | ✓ | –	✓ | ✓ | ✓	✓ | – | –	✓ | ✓ | –
V20 integrated, 12 mm	–	✓	–	✓	–	–
C-mount	–	✓	–	✓	–	✓
More Information from page	62		80		98	

VISOR® Code Reader		
V10 Standard	V10 / V20 Advanced	V20 Professional (OCR)
Code reading		
Data code	Data code	Data code
Bar code	Bar code	Bar code
–	–	Optical character recognition (OCR)
736 x 480 Mono	736 x 480 Mono	–
–	1280 x 1024 Mono	1280 x 1024 Mono
50 | –	50 | 40	– | 40
8 | 1	max. 255 | max. 255	max. 255 | max. 255
–	✓	✓
–	–	–
–	✓	✓
–	✓	✓
–	✓	✓
–	✓	✓
–	✓ (not with data codes and bar codes)	✓ (not with data codes, bar codes and OCR)
2 | 4	2 | 4	2 | 4
2	4	4
–	✓	✓
✓	✓	✓
✓ | ✓	✓ | ✓	✓ | ✓
✓	✓	✓
✓	✓	✓
✓ | ✓ | –	✓ | ✓ | ✓	–
–	✓	✓
–	✓	✓

Features/system	Eyesight Vision System	
	V10 / V20	V10C/V20C (Colour)
Functions		
Resolution in pixels V10	736 x 480 Mono	736 x 480 Colour
Resolution in pixels V20	1280 x 1024 Mono	1280 x 1024 Colour
Image rate per second V10 | V20	50 | 40	40 | 20
Number of inspection programs	max. 40 Mbyte	max. 40 Mbyte
Commands		
Image/camera	Image capture, camera settings	
Colours	Select colour channel, colour inspection, colour filter (V10C / V20C)	
Pre-processing	Calibration and position tracking, correct brightness, remove background, filter functions	
Inputs/outputs	Test input, set output, access INI file, text, data transfer – serial, data transfer – LAN	
Visualisation	Image transfer	
Measurement	Image information, area test, list of points, determine points, determine lines, calculate circle, calculate distance, line distance, calculate cross-section, measure gap width, calipers, calculate angle, determine warpage point	
Program control	Stop watch, control of sequence and loop options, subprogram, access variable, evaluation	
Pattern/contour comparison	Count objects, inspect contour, track contour, correlation	
Scanning	Scan points, circular scanner, edge counter, find edges (projected), search ring for counting	
Access to libraries	Script interpreter	
Interfaces		
Inputs | outputs	2 | 4	2 | 4
Freely definable switching outputs/inputs	4	4
I/O expansion	✓	✓
RS422 | RS232	✓ | ✓	✓ | ✓
Ethernet	✓	✓
Lens		
V10 integrated, 6 mm | 12 mm	✓	✓
V20 integrated, 12 mm	✓ | ✓	✓ | ✓
C-mount	✓	✓

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More information from page 106

Product overview – optical sensors

Product family Dimensions (H x W x D)		Distance sensors (Analogue sensors)	Colour (C), contrast (K) and luminescence sensors (UV)	Proximity switches
F 10 21,1 x 14,6 x 8 mm³				
F 25 34 x 20 x 12 mm³		FT 25-RA | **20 – 80 mm** FT 25-RA | **30 – 200 mm**	FT 25-RL | **250 mm** | **K** FT 25-W | **12 mm** | **K** FT 25-RGB | **12 mm** | **K** FT 25-C | **12 mm** | **C**	FT 25-RL | **250 mm** FT 25-R | **800 mm**
F 55 50 x 50 x 23 mm³		FT 55-RLAP | **5 m**		FT 55-RL2 | **1.200 mm** FT 55-R | **2.000 mm**
	Stainless steel			FT 55-RM | **1.750 mm**
F 20 32 x 20 x 12 mm³		FT 20-RA | **20 – 80 mm**		FT 20-RL | **150 mm** FT 20-R | **300 mm** FT 23-R | **300 mm**
F 50 50 x 50 x 17 mm³		FT 50-RLA-20 | **40 – 60 mm** FT 50-RLA-40 | **45 – 85 mm** FT 50-RLA-70 | **30 – 100 mm** FT 50-RLA-100 | **70 – 170 mm** FT 50-RLA-220 | **80 – 300 mm**	FT 50-C | **32 mm** | **C** FT 50-CUV | **50 mm** | **UV**	
Cylindrical sensors Ø 4/5 mm Ø 12 mm Ø 18 mm Ø 30 mm				FM 04/05 | **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 | **1.000 mm**
FL 70 84 x 35 x 10 mm³				
F 80 83 x 65 x 25 mm³ **F 90** 95 x 93 x 42 mm³		FT 80-RLA-500 | **250 – 750 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				
More information from page		142	184	218

Proximity switches with background suppression	Photoelectric reflex switches	Through-beam photoelectric switches	Fibre-optic sensors	Page
FT 10-RLH | **60 mm**	FR 10-RL | **2 m**	FS/FE 10-RL | **3 m**		226
FT 10-B-RLF | **15/30 mm**	FR 10-R | **1,6 m**			
FT 10-RH | **70 mm**				
FT 10-RF | **15/30/50 mm**				
FT 10-BF | **30 mm (Bluelight)**				
FT 25-RLH | **120 mm**	FR 25-RL | **13 m**	FS/FE 25-RL | **18 m**		148 206 250
FT 25-RH | **200 mm**	FR 25-R | **6 m**	FS/FE 25-R | **13 m**		
FT 25-RHD | **400 mm**	FR 25-RF | **3 m**	FS/FE 25-RF | **4 m**		
FT 25-RF | **60/80 mm**	FR 25-RGO | **2 m**			
	FR 25-RLO | **4 m**			
FT 55-RLH | **800 mm**	FR 55-RL | **12 m**	FS/FE 55-RL | **25 m**		166 250
FT 55-RL2H | **1.000 mm**	FR 55-R | **12 m**	FS/FE 55-R | **20 m**		
FT 55-B-RH | **800 mm**	FR 55-RLO | **20 m**			
FT 55-RH | **1.200 mm**				
FT 55-RLHP | **5 m**				
FT 55-RHM | **550 mm**	FR 55-RM | **11 m**	FS/FE 55-RM | **15 m**		
FT 20-RLH | **60 mm**	FR 20-RL | **3 m**	FS/FE 20-R | **8 m**	FL 20-R | Proximity switch **100 mm** P/E switch **1.000 mm**	150 316 436
FT 20-RLHD | **110 mm**	FR 20-R | **2,5 m**	FS/FE 23-R | **4 m**		
FT 20-RH | **100 mm**	FR 20-RD | **3,5 m**			
FT 23-RF | **60 mm**	FR 23-R | **2,5 m**			
FT 20-IH | **150 mm**	FR 20-RG/RG 1 | **0,5 m**			
	FR 20-RLO | **4 m**			
FT 50-RLH | **150 mm**	FR 50-RL | **20 m**	FS/FE 50-I | **15 m**		154 196 352
FT 50-RLHD | **300 mm**	FR 50 R | **5,5 m**			
FT 50-RH | **300 mm**				
FT 50-IH | **600 mm**				
FT 12-RH | **60 mm**	FR 12-R | **1,5 m**	FS/FE 12-RL | **5 m**		392
FT 12-RF | **24 mm**		FS/FE 12-R | **4 m**		
FMH 18 | **120 mm**		FS/FE 18-RL | **50 m**	FMS 18-U | Proximity switch **160 mm** P/E switch **700 mm**	
	FR 18-2-R | **3 m**	FS/FE 18-R | **20 m**		
	FR 18-2-IR | **3,6 m**	FLS/FLE 18-W | **50 m**	FMS 30-U | Proximity switch **800 mm** P/E switch **4.800 mm**	
		FSE 18-2-I | **10 m**	FAV 30 | **500 mm**	
			FL 70-R | Proximity switch **310 mm** P/E switch **810 mm**	440
			FL 70-R-XD | Proximity switch **310 mm** P/E switch **810 mm**	
FT 92-IL				162 168 170
		FGL-RK | **30 – 120 mm**		534
		FGL-IK | **30 – 120 mm**		
		FGL | **5 – 220 mm**		
		FG | **40 – 120 x 80 mm²**		
218	218	218	430	

Product overview – ultrasonic, inductive and capacitive sensors, Smart

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	548
UT 12		Via control input	400 mm	PNP, NPN, analogue output	564
UT/UM 18		Via control input	250 mm / 300 mm / 800 mm	Variants with stainless steel housings, PNP, NPN, analogue output	568
UMT 30		Teach-in or display	350 mm / 1300 mm / 3400 mm / 6000 mm	Display, PNP, 2 x PNP or analogue output	578

Inductive Sensors

Products		Design	Switching distance	Special features	Page
IT 8 / 10 / 12 / 40 IS 455 / 588		Cubic	0.8 mm / 1.5 mm / 3mm / 4 mm / 8 mm / 15 mm / 20 mm / 35 mm	Miniature housing, AC/DC variants	600
IS 33		Cylindrical Ø 3 mm	0.6 mm	PNP, NPN	608
ISN 44-20 IS 34 IT 4		Cylindrical Ø 4 mm	0.8 mm	PNP, NPN, NAMUR, stainless steel housing	609
IMT 5		Cylindrical Ø 5 mm	0.8 mm	PNP, NPN, stainless steel housing	612
ISZ 46 IS 46 / 56 IDT 6		Cylindrical Ø 6,5 mm	1.5 mm / 2 mm / 3 mm	PNP, NPN	613
IS 48 / 58 IMT 8		Cylindrical Ø 8 mm	1.5 mm / 2 mm / 3 mm / 6 mm	PNP, NPN	617
IMT 12 IT 12 IS 512		Cylindrical Ø 12 mm	2 mm / 4 mm / 6 mm / 10 mm	PNP, NPN	624
IS 514		Cylindrical Ø 14 mm	3 mm	PNP, stainless steel housing	631
IMT 18 IS 518 IT 18		Cylindrical Ø 18 mm	5 mm / 8 mm / 10 mm / 12 mm / 20 mm	PNP, NPN, stainless steel housing	632
IMT 30 IS 530 IT 30		Cylindrical Ø 30 mm	10 mm / 15 mm / 20 mm / 22 mm / 40 mm	PNP, NPN, stainless steel housing	639
IS 512 / 518		Cylindrical Ø 12 mm / 18 mm analogue	6 mm / 10 mm	Analogue output	629

SENSOPART

Capacitive Sensors

Products		Installation	Adjustment	Switching distance	Page
KD / KL 06		Flush / non-flush	Potentiometer	0.1 … 1.5 / 0.1 … 3 mm	654
KD / KL 08		Flush / non-flush	Potentiometer	0.1 … 1.5 / 0.1 … 3 mm	656
KD / KL 12		Flush / non-flush	Potentiometer	1 … 4 / 1 … 8 mm	658
KD / KL 18		Flush / non-flush	Potentiometer	2 … 8 / 2 … 15 mm	660
KD / KL 30		Flush / non-flush	Potentiometer	1 … 20 / 1 … 30 mm	662

SmartPlug

Products		Special features	Page
MFI (Inverter)		Inverts NPN to PNP or PNP to NPN devices, N.C./N.O. also adjustable	668
MFC (Counter)		Adjustable counter (pulses or intervals) between 1 … 65535 ms	670
MFT (Timer)		Adjustable on-delay or drop-out delay between 1 … 65535 ms	672
MFF (Frequency)		Adjustable frequency monitoring between 15 … 1000 Hz	674
MFW (Wipe Function)		Adjustable wipe function for falling or rising edges; time range 1 … 65535 ms	676
MFU (Universal)		All-in multifunctional switching device programmable via USB	678

Accessories

Products		Description	Page
Mechanical accessories		Brackets for sensors	A-4
		Mountings for VISOR® and illumination	A-12
Optical accessories		Reflectors and reflective tape	A-16
		Lenses and protective casings	A-23
		Illumination	A-25
Electrical accessories		Cables	A-32
		Converters	A-36
		Power supply units and switching devices	A-37