

Image processing made simple!

## VISOR® object sensor from Page 52

### V10-OB-S1-W12

- Standard version configurable for two inspection tasks, up to 32 evaluations can be used for each inspection task
- >> Page 56

### V10-OB-A1-W12

- Advanced version configurable for as many inspection tasks as required, with as many evaluation methods per inspection task as desired
- Includes precise position determination
- >> Page 60



## VISOR® Solar sensor from Page 66

### V10-SO-S1-W6

- Standard version for detecting position and breakouts of wafers and cells
- Easy operation without previous knowledge of image processing
- >> Page 68

### V10-SO-A1-W6

- Advanced version for the comprehensive measurement of wafers and cells
- With busbar detection
- >> Page 70



## Eyesight vision system from Page 74

### V10-EYE-A1-C

- Advanced range of commands for complex inspection tasks
- Visualisation of images and results in inspection mode
- >> Page 80

### FA 45-300-CC-EAOCSHS6

- Basic range of commands for simple inspection tasks
- Complex iterative linkage of individual inspections
- >> Page 92



## VISOR® Code Reader from Page 94

### V20-CR-P2-R12

- Professional version with optical character reading (OCR)
- Megapixel resolution
- >> Page 102

### V10-CR-A1-R12

- Advanced version for detection of 1D/2D codes and objects
- Reads several different code types in a single reading pass
- >> Page 112



## FA 45 colour sensor from Page 162

### FA 45-300-WCCC-CO012HS4

- Offers high detection accuracy even with very slight colour nuances
- Detection of "non-colours"
- >> Page 164



made in Germany

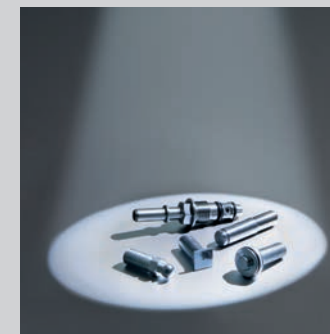
SensoPart covers the entire range of industrial image processing with its portfolio of vision solutions – from VISOR® plug & play solutions for standard applications to the freely configurable Eyesight vision system for particularly complex automation tasks.

### Camera + Software = Vision!

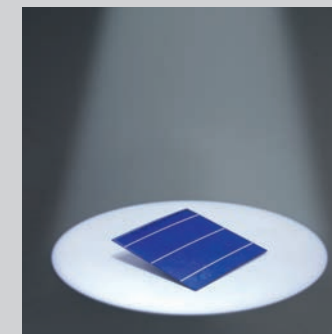
A powerful smart camera in compact tightly sealed sensor housings with uniform dovetail mounting forms the basis of our VISOR® vision sensor and Eyesight vision systems. Among other features, it has integrated signal processing, LED illumination (white, red, infrared), data interfaces and digital I/Os, integrated optics or C-mount, as well as user-friendly configuration software.

Most of the inspection tasks that are required in practice can be solved with one of our VISOR® vision sensors that are ready for use in just a few steps. With up to 50 evaluations per second, our VISOR® vision sensors are also the right choice for rapid processes.

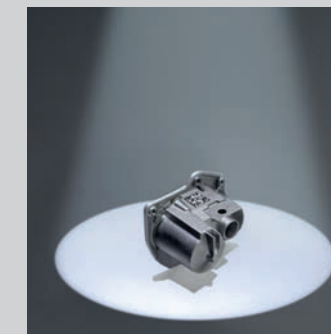
And for particularly complex cases we offer the Eyesight, a flexible vision system with which you can also implement your most sophisticated automation requirements.



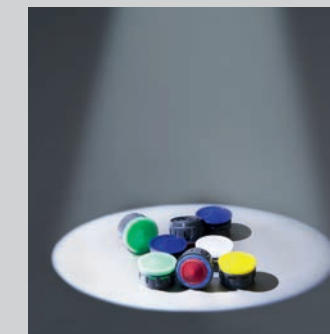
**Object detection and classification:**  
The VISOR® object sensor monitors the sorting of parts and regulates ejection.



**Positioning and inspecting solar cells:**  
The VISOR® Solar sensor detects the position and orientation of wafers and cells, as well as any damage.



**Code reading:**  
The VISOR® Code Reader detects all common printed and directly marked data matrix and bar codes.



**Detection of coloured objects:**  
The FA 45 colour sensor detects not only colours and colour intensities, but also "non-colours", i.e. white, black and grey.



### C-mount variants:

- C-mount for many variants; can be combined with C-mount protective casings
- VISOR® V20 variants with megapixel resolution for high precision



**Unpack, adjust and off you go** – vision sensors have never before been so powerful and so easily and intuitively operated. The VISOR® is ready for operation in only ten minutes with just a few mouse clicks. Thanks to VISOR® technology from SensoPart, there is now also a simple and effective solution for the most difficult automation tasks. Whether objects with complex shapes, data matrix codes, self-illuminating display elements, or edge breakouts on solar cells, our application-specific vision sensors reliably detect all relevant object features.

It's all there.

**Mounting:**  
Simple and flexible mounting thanks to dovetail design

**Interfaces:**  
Integrated communication interfaces (Ethernet, serial interfaces, digital I/O)

**Housing:**  
Integrated evaluation unit with powerful signal processor  
Vibration-proof with an enclosure rating of IP 67

**Illumination:**  
Integrated LED illumination (white, red, infrared)



Figure 1:1

**Lens:**  
Integrated lens or C-mount variants for long operating distances



C-mount variants for long operating distances



The VISOR® vision sensor from SensoPart not only impresses with its excellent performance data, but also with its sophisticated operating concept: even the definition of complex inspection tasks is achieved rapidly and without complication thanks to its comfortable and easily understood user interface – even without detailed image-processing knowledge. You define and test your inspection tasks (jobs) and desired evaluations (detectors) in a few intuitive setup steps.

The effect of every setting is immediately visible in the image. Comprehensive logic functions allow the direct assignment of more complex inspection results to one of six digital result outputs (or even to 32 switching outputs via the I/O expansion module available as an accessory). Time-based control of signal output is also possible via the integrated encoder function. The integrated image recorder, with which you can carry out fault analyses and simulations, is also very helpful.

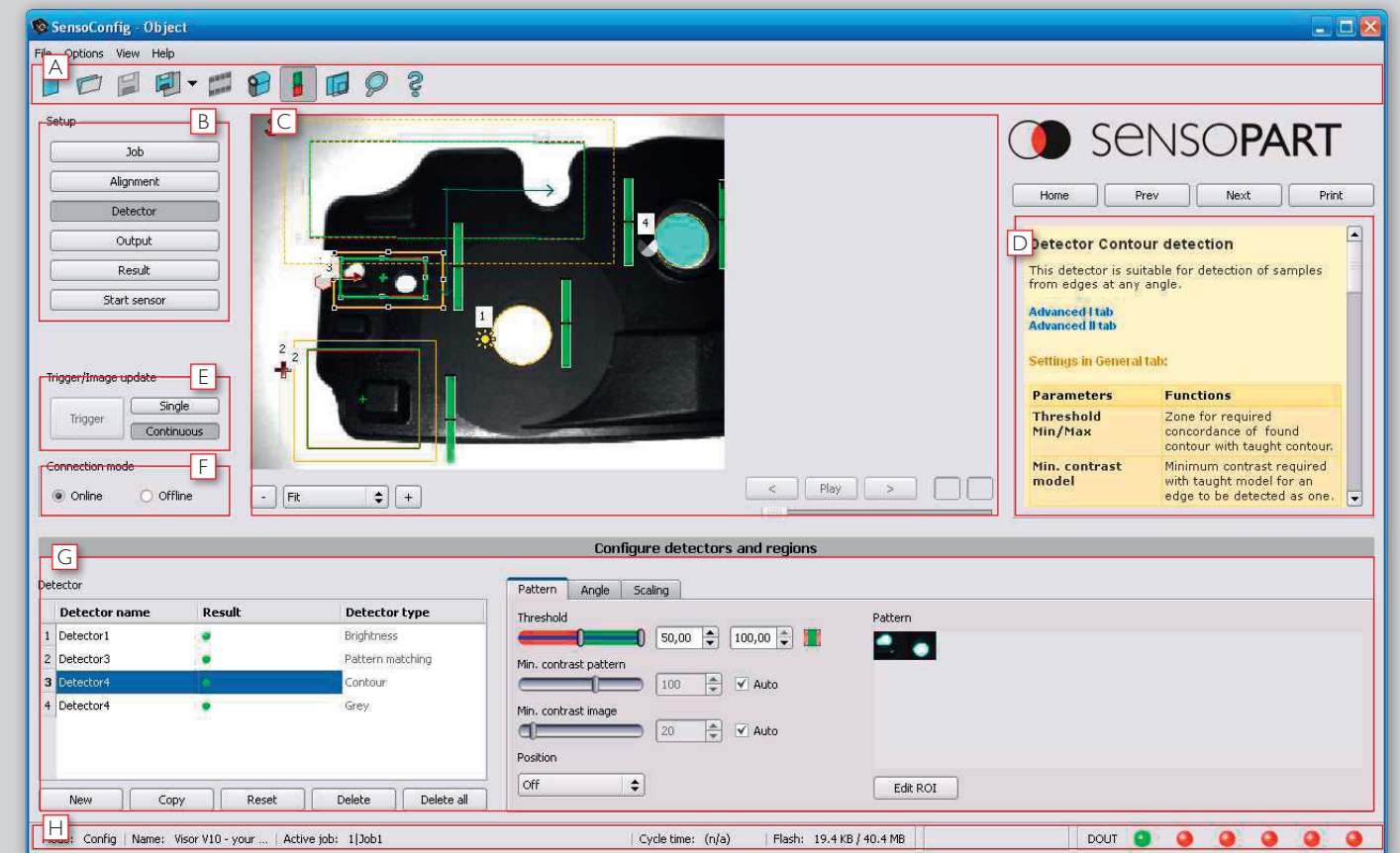
**Everything in view with the Viewer:** after completing configuration, the vision sensor works in your production plant autonomously, i.e. without a PC connection. Of course, data can be called up at any time during running operation: our own Viewer software with hierarchical user rights (reliably preventing unintentional changes to the configuration) is available for this. Professional image processing can be so simple and comfortable!

### Step-by-step to your goal

1. **Job:** select an inspection task or create a new one.
2. **Position tracking:** define a position detector (optional).
3. **Detectors:** define the desired evaluations.
4. **Output:** assign the inspection results to the switching outputs.
5. **Results:** test your configuration.
6. **Start the sensor:** run your job on the sensor.

### Product variants: the VISOR® object sensor

Features/sensors	Standard	Advanced
<b>Functions</b>		
Resolution in pixels	736 x 480	736 x 480
Image rate per second	25	50
Number of jobs   detectors	2   32	n   n
Position tracking	–	✓
Pattern comparison (X-,Y-translation)	✓	✓
Contour matching (X-,Y-translation, orientation)	✓	✓
Grey threshold	✓	✓
Contrast	✓	✓
Brightness	✓	✓
Freeform Tool	Contour only	✓
<b>Interfaces</b>		
Inputs   outputs	2   4	2   4
Freely definable switching outputs/inputs, PNP or NPN	2	4
Encoder input	–	✓
I/O expansion	–	✓
RS422	–	✓
Ethernet/data transmission	✓	✓
EtherNet/IP	✓	✓
PROFIBUS/interface connection	–	✓
<b>Lens</b>		
Integrated 6 mm   12 mm   25 mm	✓   ✓   –	✓   ✓   ✓
C-mount	–	✓
<b>Operation/visualisation</b>		
Viewer software with user guidance	✓	✓
Hierarchical user rights	✓	✓



### Overview of the user interface

- A **Menu bar:** rapid access to the most important functions
- B **Setup navigation:** dependable user guidance through the configuration process
- C **Image window:** live picture of the object with graphic display of inspection area and results
- D **Context-sensitive online Help:** precise information on every work step
- E **Trigger function:** triggered operation or free-running, single picture or serial switching
- F **Online/offline operation:** operating with sensor connected or simulation with stored pictures
- G **Configuration window:** input of parameters for every navigation step
- H **Status line:** current information on active job and on state of outputs

### The tailor-made solution for wafer handling.

The VISOR® Solar sensor can be configured for image processing with a few clicks and without previous knowledge. The user defines the inspection criteria and selects the relevant information, e.g. wafer position and orientation, wafer dimensions, breakout depth, position and orientation of the busbar, or wafer quality.

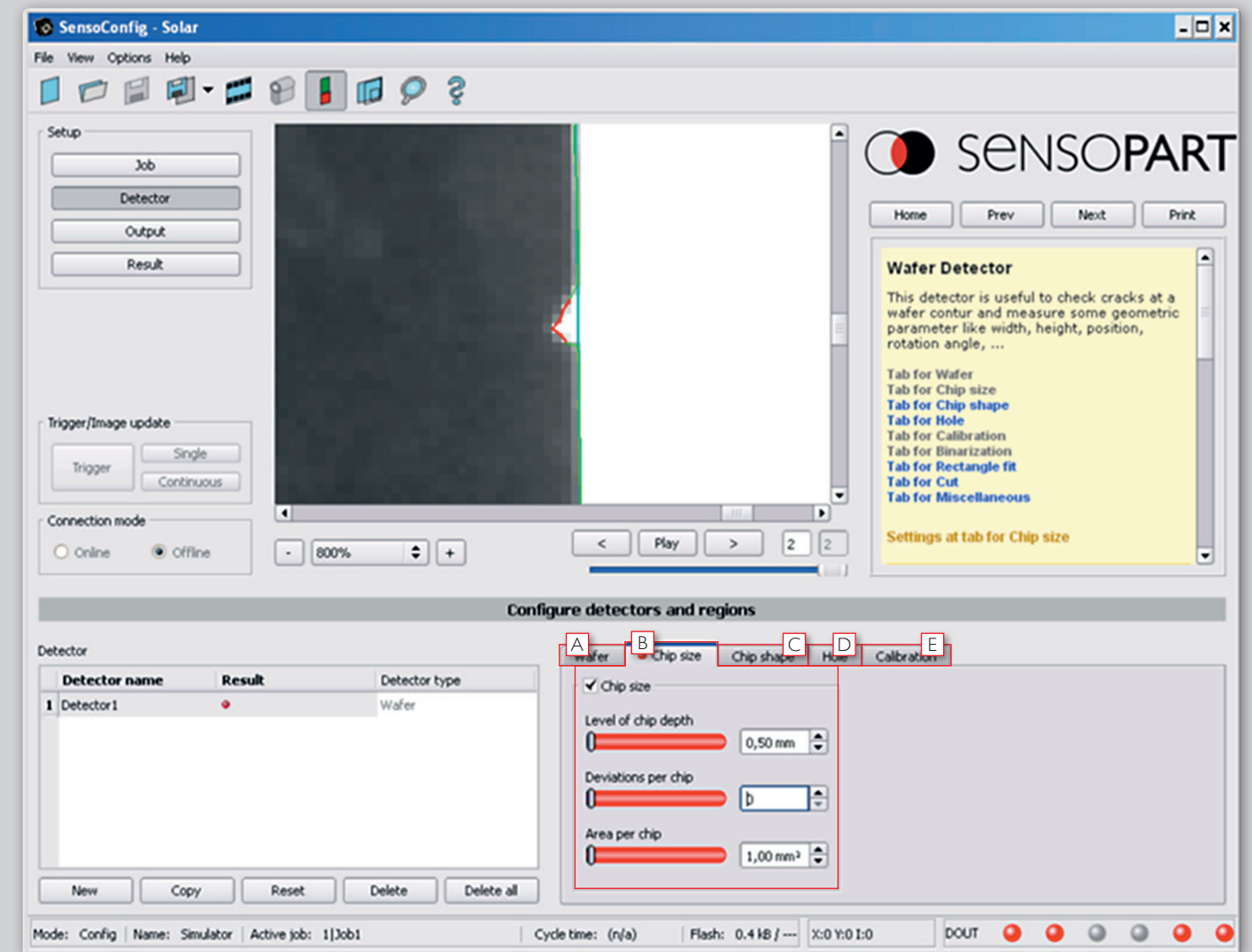
**Plug & play:** using the VISOR® Solar sensor is much easier than a classic image-processing solution. Because the functions relevant for wafer and cell inspections, e.g. the detection of wafer geometry and any defects, are already pre-configured so that the sensor is ready for operation after just a few mouse clicks. This is quick, doesn't cost much and functions wonderfully. Sunny times await you!

### HIGHLIGHTS OF THE VISOR® SOLAR SENSOR

- Simple integration
- Precise position detection to  $\pm 50 \mu\text{m}$
- Finds breakouts from depth of 0.50 mm
- Distinguishes between C-shaped and V-shaped breakouts
- Detection of holes
- Conveyor systems can be cut out
- Short cycle times from 60 ms
- Reliable operation, even in daylight
- No backlight necessary
- Little space required: operating distance from 360 mm

### Product variants: the VISOR® Solar sensor

Features/sensors	Standard	Advanced
<b>Functions</b>		
Resolution in pixels	736 x 480	736 x 480
Image rate per second	50	50
Number of jobs   detectors	2   32	n   n
Position tracking	–	✓
Pattern comparison (X-,Y-translation)	–	✓
Grey threshold	✓	✓
Contrast	✓	✓
Brightness	✓	✓
Wafer position and breakouts	✓	✓
Busbar position and number	–	✓
<b>Interfaces</b>		
Inputs   outputs	2   4	2   4
Freely definable switching outputs/inputs, PNP or NPN	2	4
Encoder input	–	✓
I/O expansion	–	✓
RS422	–	✓
Ethernet/data transmission	✓	✓
EtherNet/IP	✓	✓
PROFIBUS/interface connection	–	✓
<b>Lens</b>		
Integrated 6 mm   12 mm	✓   –	✓   ✓
<b>Operation/visualisation</b>		
Viewer software with user guidance	✓	✓
Hierarchical user rights	✓	✓



### Overview of the user interface

- A Wafer:** select wafer size.
- B Breakout dimensions:** define good / bad criteria according to the size of the breakout.
- C Breakout shape:** differentiate between V- and C-shaped breakouts.
- D Holes:** reject wafers with holes.
- E Calibration:** the camera is calibrated with one click.



Most image-processing applications can be rapidly and easily solved with pre-configured VISOR® vision sensors. However, their range of functions is not always sufficient for particularly demanding or specific tasks – but here, too, SensoPart has the right solution: the freely programmable Eyesight vision system offers comprehensive configuration possibilities so that you can also implement very complex automation applications with the smart camera. Whereby complex is not synonymous with complicated: the graphic programming by means of drag & drop makes it easy for you to “construct” your own applications.

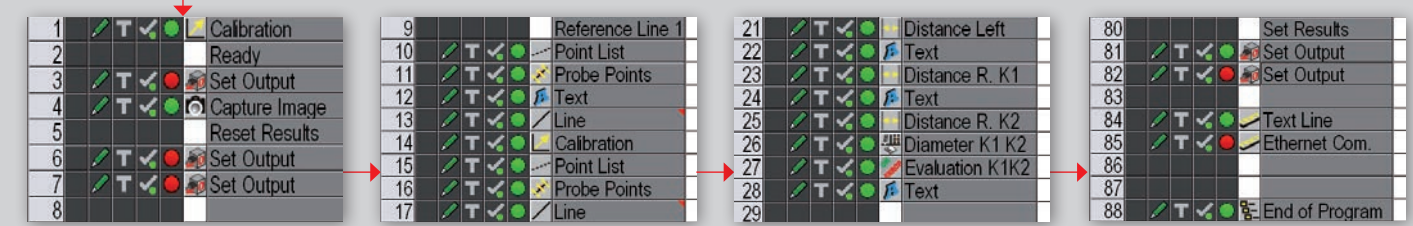
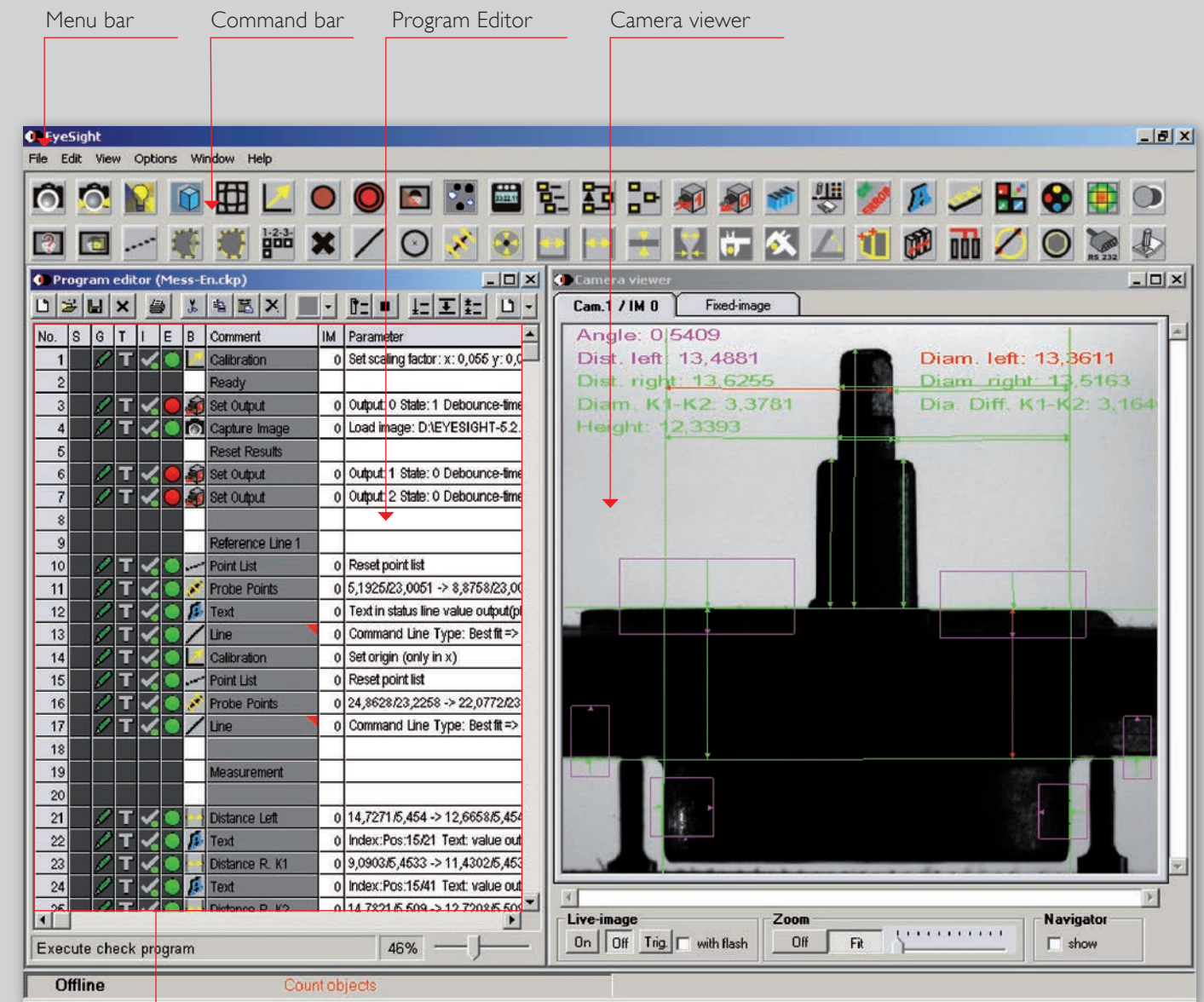
### EYESIGHT HIGHLIGHTS

- Complete image-processing package with robust and flexible smart camera
- Programming via drag & drop of function blocks
- Complex iterative linkage of individual inspections
- Image and result visualisation in inspection mode
- Interpreter for programming your own functions
- Image processing can be simulated on the PC without the camera
- Freely programmable data protocol for Ethernet and serial interface

### Product variants: the Eyesight vision system

Features/sensors	V10 Advanced	FA 45 Basic	FA 45 Advanced
<b>Functions</b>			
Resolution in pixels	736 x 480	640 x 480	640 x 480
Image rate per second	50	25	25
Number of jobs   detectors	No limitation (max. 40 Mb)	No limitation (max. 3 Mb)	No limitation (max. 3 Mb)
Position tracking	✓	✓	✓
Function blocks	See overview of commands >> Page 50	See overview of commands >> Page 50	See overview of commands >> Page 50
<b>Interfaces</b>			
Inputs   outputs	2   4	2   4	2   4
Freely definable switching outputs/inputs	4	–	–
I/O expansion	✓	✓	✓
RS422	✓	✓	✓
Ethernet/data transmission	✓	✓	✓
<b>Lens</b>			
Integrated 6 mm   12 mm	✓   ✓	✓   ✓	✓   ✓
C-mount	✓	✓	✓
<b>Operation/visualisation</b>			
Viewer software	✓	–	✓

### Overview of the user interface



### Step-by-step to your goal

#### Step 1

##### Image capture

- Load image field calibration
- Reset outputs
- Enter triggered image

#### Step 2

##### Referencing

- Object position determination
- Define object reference lines
- Graphic provision of position

#### Step 3

##### Inspection of parts

- Measure distances/diameter
- Calculate difference values
- Define target/actual values
- Graphic provision of measurement values

#### Step 4

##### Output of results

- Set outputs according to results logic
- Transmit data to the master computer via Ethernet
- End program

### Overview of commands: Eyesight vision system

<b>Image/camera</b> Image capture Camera settings	<b>Inputs/outputs</b> Text Data transfer; serial Data transfer; LAN (text line)	<b>Measurement</b> Measure gap width Calipers (hor./vert.) Calipers (free) Calculate angle Determine warpage point	<b>Pattern/contour comparison</b> Correlation Smart Match (optional)
<b>Colours</b> Select colour channel Colour inspection Colour filter	<b>Visualisation</b> Image transfer	<b>Program control</b> Stop watch Control of sequence and loop options Run subprogram Access variable Evaluation	<b>Scanning</b> Scan points Scan points (circular scanner) Edge counter (straight)
<b>Pre-processing</b> Calibration and position tracking Correct brightness Remove background Filter functions	<b>Measurement</b> Image information Area test List of points Determine points Determine lines Calculate circle Calculate distance Line distance Calculate cross-section	<b>Sample/contour comparison</b> Count objects Inspect contour Track contour	<b>Access to libraries</b> Script Interpreter
<b>Inputs/outputs</b> Test input Set output Access INI file			Basic Version Advanced Version



**Circle calculator:**  
Round objects or segments of circles can be measured with this tool for easy detection of deformations. An example of this would be checking for underfilling or overfilling during the plastic process.



**Angle calculation:**  
Components can be tested for dimensional accuracy with the measurement tool. Angles on components, for example, can be determined and evaluated with the angle tool. The thread is also checked for completeness and the dimensions are checked with the help of the distance tool.



**Distance calculation:**  
Any distances in the component can be measured and evaluated with the distance tool. In addition, radii, angles, and drilled holes can also be checked in an inspection program.

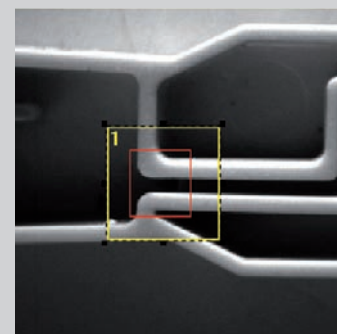
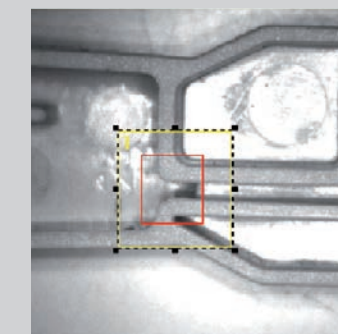
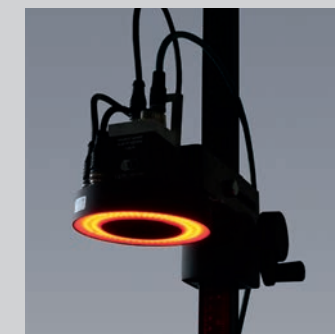
## System description

Good lighting is all-important for image-processing applications – because the best evaluation system cannot compensate for anything that has already been lost during image capture. This is why all our vision systems have powerful integrated illumination that is more than bright enough for most applications. Supplementary illumination may be helpful, however, in critical lighting situations, e.g. with strong ambient light incidence, or highly reflective or strongly contoured objects. SensoPart offers a comprehensive selection of surface, ring and diffuse lighting with which all applications can be properly illuminated.

**Integrated lens or C-mount?** In most cases you will also have no problem with the integrated lens of your vision sensor. If necessary for the application, however, with very long measurement distances for example, a C-mount version with a separate lens is available.

The SensoPart range also covers all eventualities with other accessories, from mounting brackets, through interface cables, to I/O expansion. Because we want to be sure that you are missing nothing!

### A few basics regarding good illumination



**White, red or infrared light?**  
White light can be used everywhere because it includes the whole spectrum of light, so it achieves good contrast with objects of differing surface properties and colours. Red or infrared light is recommended, on the other hand, for the targeted highlighting or suppression of coloured object features or for eliminating ambient light effects.

**Surface or ring lighting?**  
Every structure has its specific virtues. Surface lighting, for example, is often used for backlit applications in which the target object is lit from behind – so that the external contours are strongly highlighted. Very symmetrical incidental illumination can be implemented with ring lighting, and diffuse illumination is recommended for, among other things, strongly reflective surfaces.

**Light or dark field?**  
Targeted features can be amplified, and interfering effects suppressed, by using the right illumination. Light or reflective features are well differentiated when an object is illuminated from the direction of the sensor (light field); if the light is directed towards the sensor at a slight angle (dark field), the structures of the target object are more strongly differentiated.



# VISOR® object sensor for part detection

Detects the right part in the wrong place and vice versa



Objects that sometimes appear in unexpected positions and have complex shapes and details – classic switching sensors would be completely overwhelmed by such detection tasks. Not the VISOR® object sensor from SensoPart: it always maintains its overview, detecting defective parts, parts in the wrong position, wrong orientation, wrong sequence or a combination of them all – in an instant. With its highly precise position and orientation detection, our VISOR® object sensor is one of the best in its class.

## Five detectors plus position detection

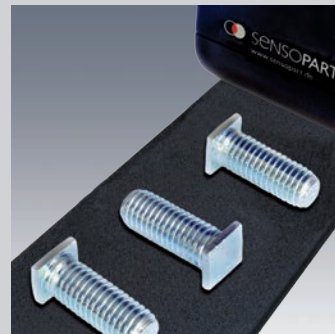
A total of five detectors are available for inspection tasks and evaluations: pattern comparison, contour detection, brightness, grey threshold and contrast detection. The Advanced version of the VISOR® object sensor also offers position tracking, among other things: this permits reliable detection of those features that are not always present in precisely the taught-in position. All evaluations take place relative to the current part position and orientation, without them having to be defined for every possible position of an individual feature. This powerful tool allows you to solve even demanding applications confidently!

## HIGHLIGHTS OF VISOR® OBJECT SENSOR

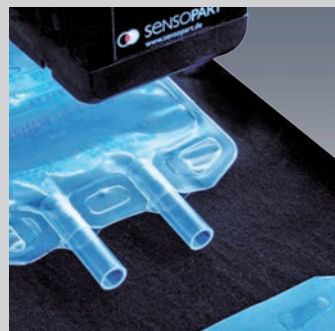
- User-friendly configuration and viewer software with hierarchical user rights and online Help
- Powerful part-finding and tracking
- Precise position determination: x/y-position and orientation
- Comprehensive logic functions for the digital switching outputs
- Flexible definition of output data (header, trailer, net data)
- Support of EtherNet/IP and DHCP
- Comprehensive possibilities for archiving pictures and data



**Glue dot present?**  
Early detection by monitoring presence – in this case caps for the beverages packaging industry – long before quality assurance. Preventing expensive rejections.



**Position and position tolerance measurement:**  
The sensor "learns" the contours and their direction from a picture, and reacts reliably to deviations. The sensor responds correctly even if a nut is the wrong way round.



**Spout present or not?**  
Too much shrinking – or too little? The Vision object sensor's contour detector keeps an eye on all the relevant details during the production of blood bags.

VISOR® Object Sensors – Product Overview				
	Firmware Option	Focal Length	Integrated illumination	Page
<b>VISOR® object sensors</b>				
V10-OB-S1-xxx	Standard	6	White or red LEDs	54
V10-OB-S1-xxx	Standard	12	White or red LEDs	56
V10-OB-A1-xxx	Advanced	6	White, red or infrared LEDs	58
V10-OB-A1-xxx	Advanced	12	White, red or infrared LEDs	60
V10-OB-A1-xxx	Advanced	25	White, red or infrared LEDs	62
V10-OB-A1-xxx	Advanced	C-mount	None	64

# VISOR® V10 object sensor

Standard vision sensor for object detection, 6 mm



## PRODUCT HIGHLIGHTS

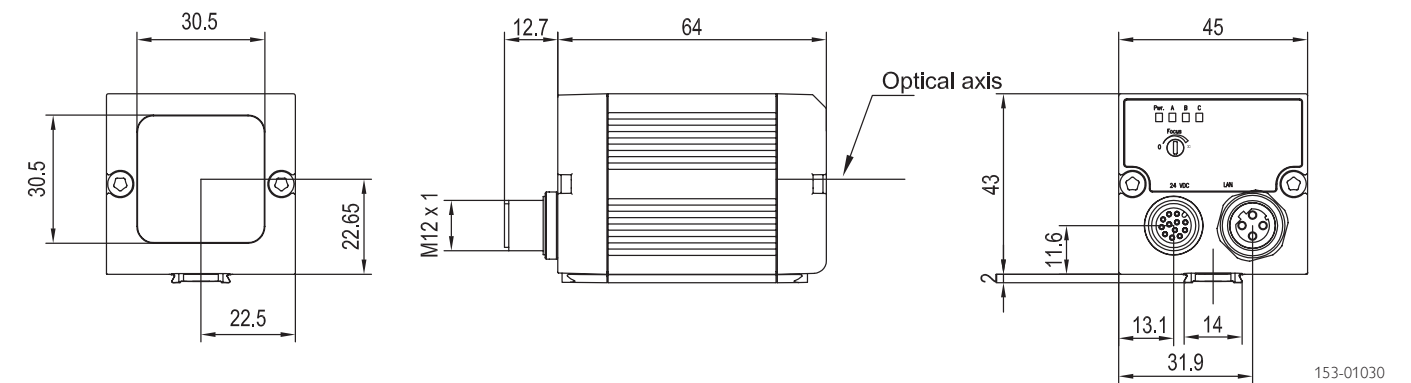
- User-friendly configuration and viewer software with hierarchical user rights
- Detectors for object detection
- Powerful part-finding
- Precise position determination: X/Y-position and orientation
- Comprehensive logic functions for digital switching outputs

Optical data		Functions	
Resolution	736 x 480 pixels	Number of jobs / detectors	2 / 32
CMOS	1/3", monochrome	Detectors	Contour, pattern comparison, contrast, brightness, grey level
Integrated lens, focal length	6 mm, adjustable focal position	Properties	Pattern comparison / contour: teach-in and detection of patterns and contours; grey threshold, brightness: evaluation of brightness; contrast: evaluation of contrast
Adjustment range	6 mm to infinity	Typical cycle times	Typ. 40 ms pattern comparison Typ. 60 ms contour Typ. 4 ms brightness Typ. 4 ms contrast Typ. 4 ms grey threshold
Integrated illumination	White, red LEDs		
Minimum field of view, X x Y	5 x 4 mm <sup>2</sup>		
Electrical data		Mechanical data	
Operating voltage, +U <sub>B</sub>	18 ... 26.4 V DC <sup>1</sup>	Dimensions	65 x 45 x 45 mm <sup>3</sup> (without plug)
Current consumption (without illumination and I/O)	≤ 120 mA	Enclosure rating	IP 67
Current consumption (without I/O)	≤ 200 mA	Material, housing	Aluminium, plastic
Protective circuits	Reverse-polarity protection, U <sub>B</sub> / short-circuit protection of all outputs	Material, front screen	Plastic
Readiness delay	Ca. 13 s after Power on	Ambient temperature: operation	0 ... +50 °C <sup>2</sup>
Outputs	PNP / NPN (switchable)	Ambient temperature: storage	-20 ... +60 °C <sup>2</sup>
Max. output current (per output)	50 mA, 100 mA (pin 12)	Weight	Ca. 160 g
Inputs	PNP/NPN High > U <sub>B</sub> -1 V, Low < 3 V	Plug connections	Supply and I/O M12, 12-pin Ethernet M12, 4-pin
Input resistance	> 20 kOhm	Vibration and impact resistance	EN 60947-5-2
Encoder input	High > 4 V		
Interfaces: VISOR® V10-OB-Standard	Ethernet (LAN), EtherNet/IP		
Inputs/outputs	2 inputs, 4 outputs, 2 selectable inputs/outputs		

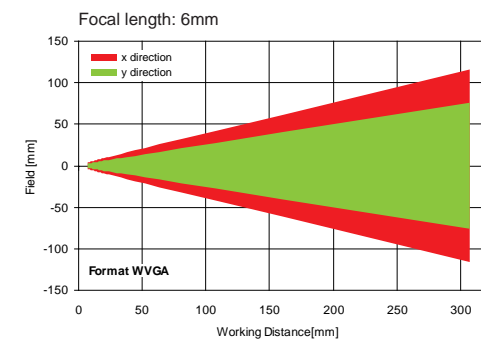
<sup>1</sup> Max. ripple < 5 V<sub>SS</sub>    <sup>2</sup> 80 % air humidity, non-condensing

Illumination	Depth of field	Part number	Article number
White	Normal	V10-OB-S1-W6	535-91008
Red	Normal	V10-OB-S1-R6	535-91010

## VISOR® vision sensor

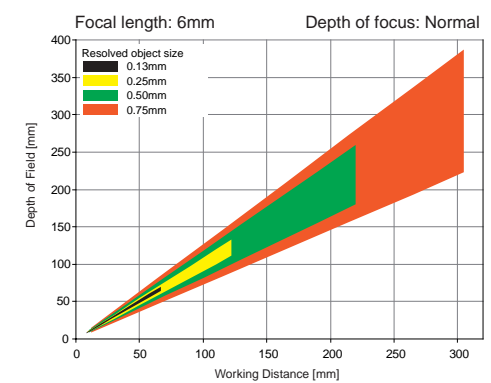


## Field of view



155-01422

## Depth of field: normal



155-01409

## Accessories

Connection cables	From Page 670
Illumination	From Page 663
Brackets	From Page 642
Interface accessories	From Page 674



# VISOR® V10 object sensor

Standard vision sensor for object detection, 12 mm



## PRODUCT HIGHLIGHTS

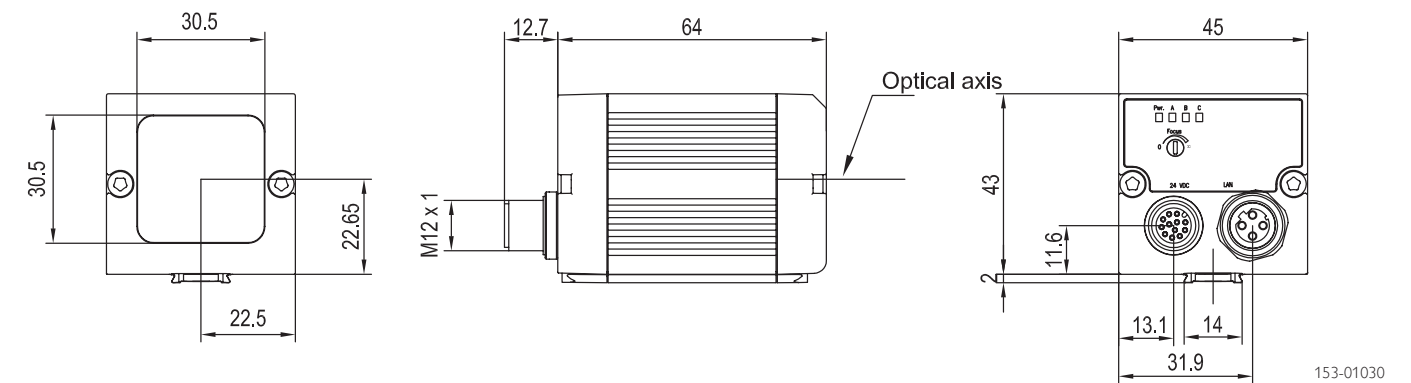
- User-friendly configuration and viewer software with hierarchical user rights
- Detectors for object detection
- Powerful part-finding
- Precise position determination: X/Y-position and orientation
- Comprehensive logic functions for digital switching outputs

Optical data		Functions	
Resolution	736 x 480 pixels	Number of jobs / detectors	2 / 32
CMOS	1/3", monochrome	Detectors	Contour, pattern comparison, contrast, brightness, grey level
Integrated lens, focal length	12 mm, adjustable focal position	Properties	Pattern comparison / contour: teach-in and detection of patterns and contours; grey threshold, brightness: evaluation of brightness; contrast: evaluation of contrast
Adjustment range	30 mm to infinity	Typical cycle times	Typ. 40 ms pattern comparison Typ. 60 ms contour Typ. 4 ms brightness Typ. 4 ms contrast Typ. 4 ms grey threshold
Integrated illumination	White, red LEDs		
Minimum field of view, X x Y	8 x 6 mm <sup>2</sup>		
Electrical data		Mechanical data	
Operating voltage, +U <sub>B</sub>	18 ... 26.4 V DC <sup>1</sup>	Dimensions	65 x 45 x 45 mm <sup>3</sup> (without plug)
Current consumption (without illumination and I/O)	≤ 120 mA	Enclosure rating	IP 67
Current consumption (without I/O)	≤ 200 mA	Material, housing	Aluminium, plastic
Protective circuits	Reverse-polarity protection, U <sub>B</sub> / short-circuit protection of all outputs	Material, front screen	Plastic
Readiness delay	Ca. 13 s after Power on	Ambient temperature: operation	0 ... +50 °C <sup>2</sup>
Outputs	PNP / NPN (switchable)	Ambient temperature: storage	-20 ... +60 °C <sup>2</sup>
Max. output current (per output)	50 mA, 100 mA (pin 12)	Weight	Ca. 160 g
Inputs	PNP/NPN High > U <sub>B</sub> -1 V, Low < 3 V	Plug connections	Supply and I/O M12, 12-pin Ethernet M12, 4-pin
Input resistance	> 20 kOhm	Vibration and impact resistance	EN 60947-5-2
Encoder input	High > 4 V		
Interfaces: VISOR® V10-OB-Standard	Ethernet (LAN), EtherNet/IP		
Inputs/outputs	2 inputs, 4 outputs, 2 selectable inputs/outputs		

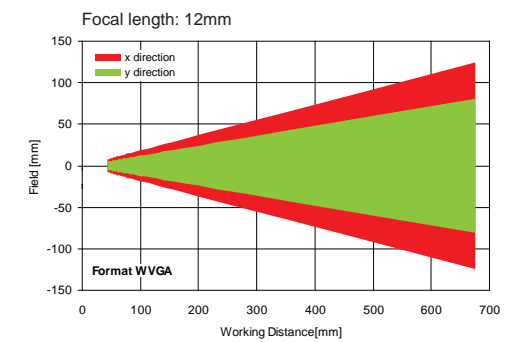
<sup>1</sup> Max. ripple < 5 V<sub>SS</sub>    <sup>2</sup> 80 % air humidity, non-condensing

Illumination	Depth of field	Part number	Article number
White	Normal	V10-OB-S1-W12	535-91009
Red	Normal	V10-OB-S1-R12	535-91011

## VISOR® vision sensor

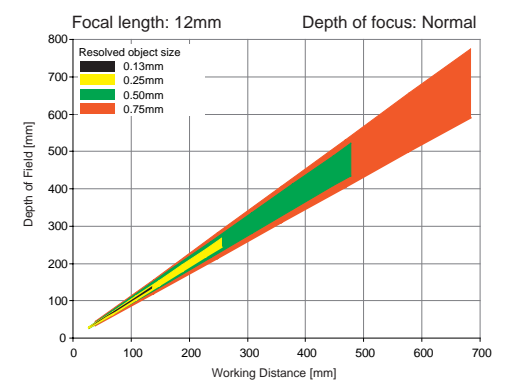


## Field of view



155-01423

## Depth of field: normal



155-01410

## Accessories

Connection cables	From Page 670
Illumination	From Page 663
Brackets	From Page 642
Interface accessories	From Page 674

# VISOR® V10 object sensor

Advanced vision sensor for object detection, 6 mm



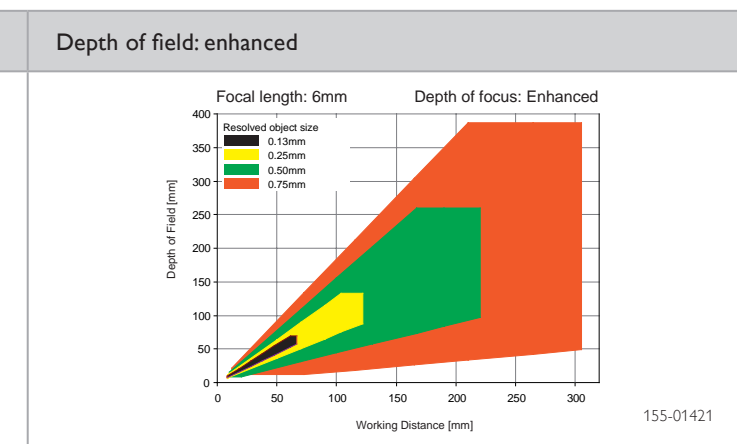
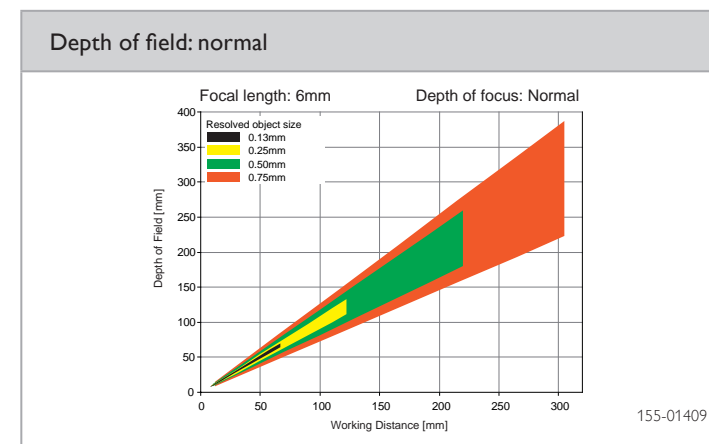
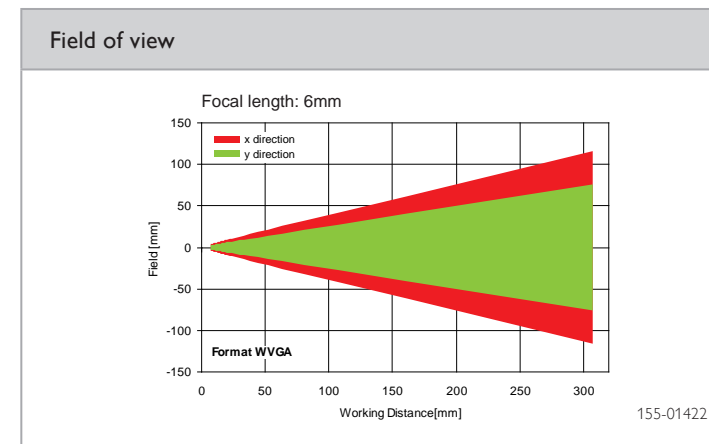
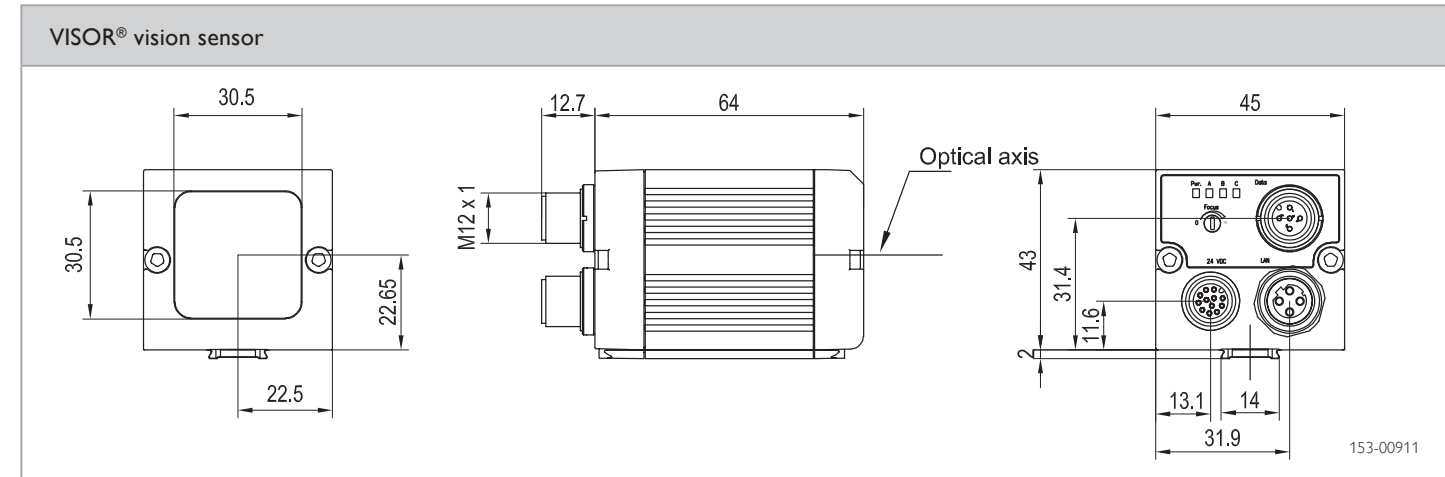
## PRODUCT HIGHLIGHTS

- User-friendly configuration and viewer software with hierarchical user rights
- Detectors for object detection
- Powerful part-finding and tracking
- Precise position determination: X/Y-position and orientation
- Comprehensive logic functions for digital switching outputs
- Encoder input

Optical data		Functions	
Resolution	736 x 480 pixels	Number of jobs / detectors	n / n
CMOS	1/3", monochrome	Detectors	Contour, pattern comparison, contrast, brightness, grey level
Integrated lens, focal length	6 mm, adjustable focal position	Properties	Position tracking: X/Y and orientation; pattern comparison / contour: teach-in and detection of patterns and contours; grey threshold, brightness: evaluation of brightness; contrast: evaluation of contrast
Adjustment range	6 mm to infinity	Typical cycle times	Typ. 20 ms pattern comparison Typ. 30 ms contour Typ. 2 ms brightness Typ. 2 ms contrast Typ. 2 ms grey threshold
Integrated illumination	White, red, infrared LEDs		
Minimum field of view, X x Y	5 x 4 mm <sup>2</sup>		
Electrical data		Mechanical data	
Operating voltage, +U <sub>B</sub>	18 ... 26.4 V DC <sup>1</sup>	Dimensions	65 x 45 x 45 mm <sup>3</sup> (without plug)
Current consumption (without illumination and I/O)	≤ 120 mA	Enclosure rating	IP 67
Current consumption (without I/O)	≤ 200 mA	Material, housing	Aluminium, plastic
Protective circuits	Reverse-polarity protection, U <sub>B</sub> / short-circuit protection of all outputs	Material, front screen	Plastic
Readiness delay	Ca. 13 s after Power on	Ambient temperature: operation	0 ... +50 °C <sup>2</sup>
Outputs	PNP / NPN (switchable)	Ambient temperature: storage	-20 ... +60 °C <sup>2</sup>
Max. output current (per output)	50 mA, 100 mA (pin 12)	Weight	Ca. 160 g
Inputs	PNP/NPN High > U <sub>B</sub> -1 V, Low < 3 V	Plug connections	Supply and I/O M12, 12-pin Ethernet M12, 4-pin Data M12, 5-pin
Input resistance	> 20 kOhm	Vibration and impact resistance	EN 60947-5-2
Encoder input	High > 4 V		
Interfaces: VISOR®	Ethernet (LAN), RS422, EtherNet/IP		
V10-OB-Advanced			
Inputs/outputs	2 inputs, 4 outputs, 4 selectable inputs/outputs		

<sup>1</sup> Max. ripple < 5 V<sub>SS</sub>    <sup>2</sup> 80 % air humidity, non-condensing

Illumination	Depth of field	Part number	Article number
Infrared	Normal	V10-OB-A1-I6	535-91006
Infrared	Enhanced	V10-OB-A1-I6D	535-91019



Illumination	Depth of field	Part number	Article number
White	Normal	V10-OB-A1-W6	535-91001
White	Enhanced	V10-OB-A1-W6D	535-91013
Red	Normal	V10-OB-A1-R6	535-91003
Red	Enhanced	V10-OB-A1-R6D	535-91016

Accessories	
Connection cables	From Page 670
Illumination	From Page 663
Brackets	From Page 642
Interface accessories	From Page 674



# VISOR® V10 object sensor

Advanced vision sensor for object detection, 12 mm



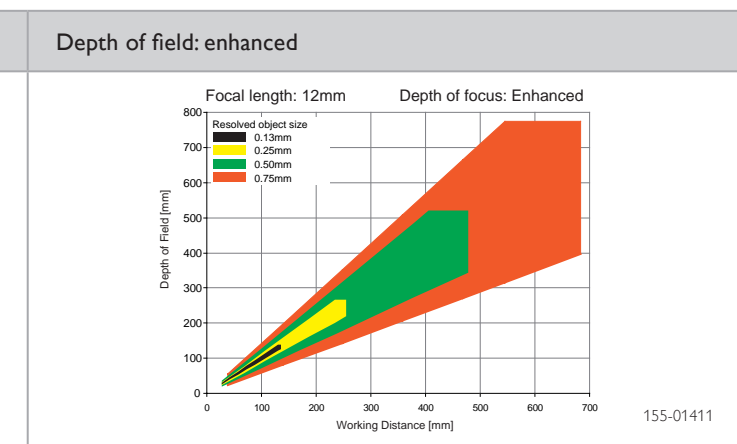
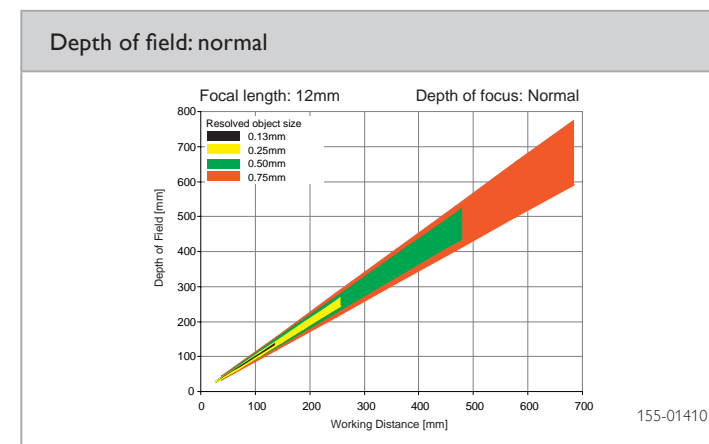
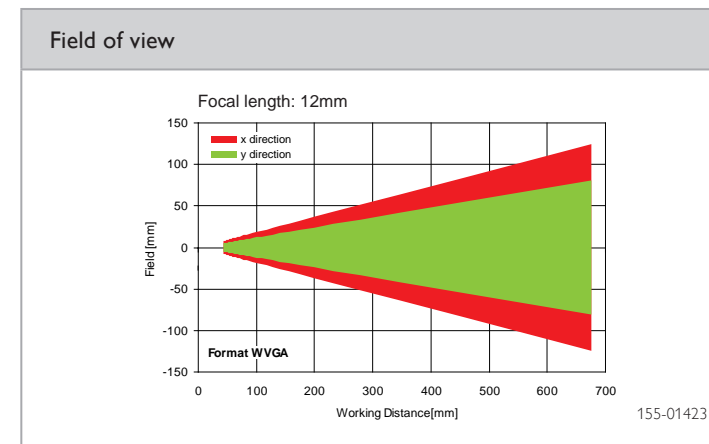
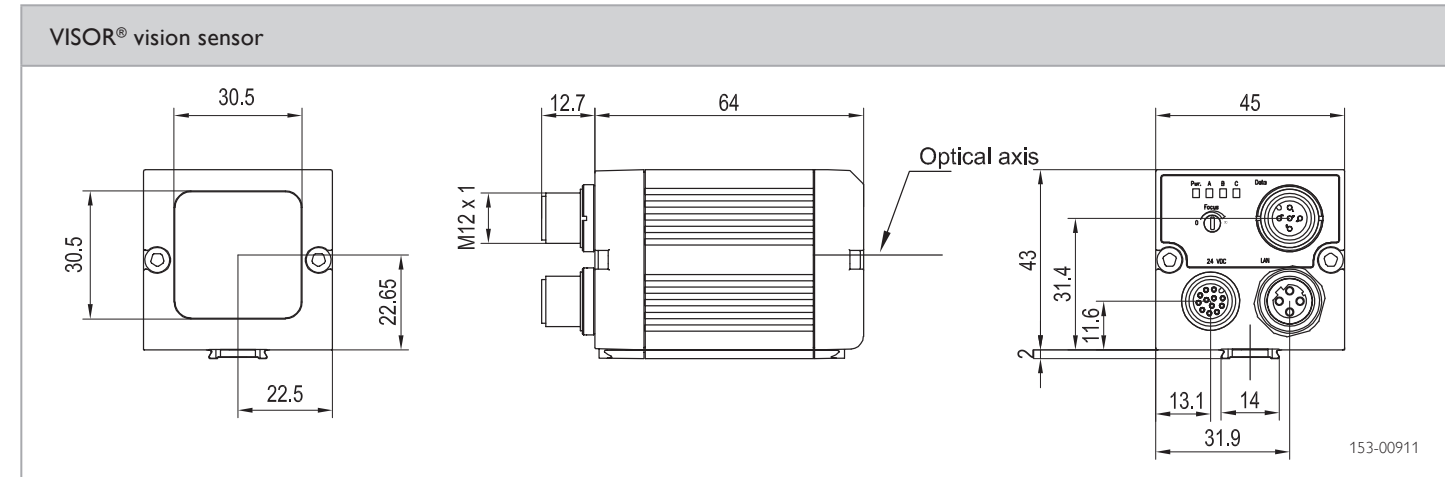
## PRODUCT HIGHLIGHTS

- User-friendly configuration and viewer software with hierarchical user rights
- Detectors for object detection
- Powerful part-finding and tracking
- Precise position determination: X/Y-position and orientation
- Comprehensive logic functions for digital switching outputs
- Encoder input

Optical data		Functions	
Resolution	736 x 480 pixels	Number of jobs / detectors	n / n
CMOS	1/3", monochrome	Detectors	Contour, pattern comparison, contrast, brightness, grey level
Integrated lens, focal length	12 mm, adjustable focal position	Properties	Position tracking: X/Y and orientation; pattern comparison / contour: teach-in and detection of patterns and contours; grey threshold, brightness: evaluation of brightness; contrast: evaluation of contrast
Adjustment range	30 mm to infinity	Typical cycle times	Typ. 20 ms pattern comparison Typ. 30 ms contour Typ. 2 ms brightness Typ. 2 ms contrast Typ. 2 ms grey threshold
Integrated illumination	White, red, infrared LEDs		
Minimum field of view, X x Y	8 x 6 mm <sup>2</sup>		
Electrical data		Mechanical data	
Operating voltage, +U <sub>B</sub>	18 ... 26.4 V DC <sup>1</sup>	Dimensions	65 x 45 x 45 mm <sup>3</sup> (without plug)
Current consumption (without illumination and I/O)	≤ 120 mA	Enclosure rating	IP 67
Current consumption (without I/O)	≤ 200 mA	Material, housing	Aluminium, plastic
Protective circuits	Reverse-polarity protection, U <sub>B</sub> / short-circuit protection of all outputs	Material, front screen	Plastic
Readiness delay	Ca. 13 s after Power on	Ambient temperature: operation	0 ... +50° C <sup>2</sup>
Outputs	PNP / NPN (switchable)	Ambient temperature: storage	-20 ... +60° C <sup>2</sup>
Max. output current (per output)	50 mA, 100 mA (pin 12)	Weight	Ca. 160 g
Inputs	PNP/NPN High > U <sub>B</sub> -1 V, Low < 3 V	Plug connections	Supply and I/O M12, 12-pin Ethernet M12, 4-pin Data M12, 5-pin
Input resistance	> 20 kOhm	Vibration and impact resistance	EN 60947-5-2
Encoder input	High > 4 V		
Interfaces: VISOR®	Ethernet (LAN), RS422, EtherNet/IP		
V10-OB-Advanced			
Inputs/outputs	2 inputs, 4 outputs, 4 selectable inputs/outputs		

<sup>1</sup> Max. ripple < 5V<sub>SS</sub>    <sup>2</sup> 80 % air humidity, non-condensing

Illumination	Depth of field	Part number	Article number
Infrared	Normal	V10-OB-A1-I12	535-91007
Infrared	Enhanced	V10-OB-A1-I12D	535-91020



Illumination	Depth of field	Part number	Article number
White	Normal	V10-OB-A1-W12	535-91002
White	Enhanced	V10-OB-A1-W12D	535-91014
Red	Normal	V10-OB-A1-R12	535-91004
Red	Enhanced	V10-OB-A1-R12D	535-91017

Accessories	
Connection cables	From Page 670
Illumination	From Page 663
Brackets	From Page 642
Interface accessories	From Page 674

# VISOR® V10 object sensor

Advanced vision sensor for object detection, 25 mm



## PRODUCT HIGHLIGHTS

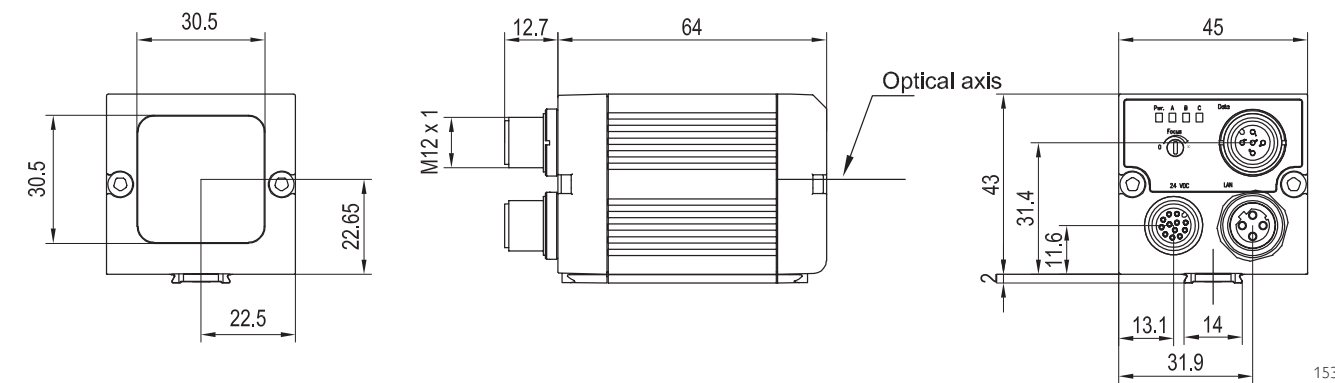
- User-friendly configuration and viewer software with hierarchical user rights
- Detectors for object detection
- Powerful part-finding and tracking
- Precise position determination: X/Y-position and orientation
- Comprehensive logic functions for digital switching outputs
- Encoder input

Optical data		Functions	
Resolution	736 x 480 pixels	Number of jobs / detectors	n / n
CMOS	1/3", monochrome	Detectors	Contour; pattern comparison, contrast, brightness, grey level
Integrated lens, focal length	25 mm, adjustable focal position	Properties	Position tracking: X/Y and orientation; pattern comparison / contour: teach-in and detection of patterns and contours; grey threshold, brightness: evaluation of brightness; contrast: evaluation of contrast
Adjustment range	140 mm to infinity	Typical cycle times	Typ. 20 ms pattern comparison Typ. 30 ms contour Typ. 2 ms brightness Typ. 2 ms contrast Typ. 2 ms grey threshold
Integrated illumination	White, red, infrared LEDs		
Minimum field of view, X x Y	18 x 14 mm <sup>2</sup>		
Electrical data		Mechanical data	
Operating voltage, +U <sub>B</sub>	18 ... 26.4V DC <sup>1</sup>	Dimensions	65 x 45 x 45 mm <sup>3</sup> (without plug)
Current consumption (without illumination and I/O)	≤ 120 mA	Enclosure rating	IP 67
Current consumption (without I/O)	≤ 200 mA	Material, housing	Aluminium, plastic
Protective circuits	Reverse-polarity protection, U <sub>B</sub> / short-circuit protection of all outputs	Material, front screen	Plastic
Readiness delay	Ca. 13 s after Power on	Ambient temperature: operation	0 ... +50 °C <sup>2</sup>
Outputs	PNP / NPN (switchable)	Ambient temperature: storage	-20 ... +60 °C <sup>2</sup>
Max. output current (per output)	50 mA, 100 mA (pin 12)	Weight	Ca. 160 g
Inputs	PNP/NPN High > U <sub>B</sub> -1V, Low < 3V	Plug connections	Supply and I/O M12, 12-pin Ethernet M12, 4-pin Data M12, 5-pin
Input resistance	> 20 kOhm	Vibration and impact resistance	EN 60947-5-2
Encoder input	High > 4V		
Interfaces: VISOR® V10-OB-Advanced	Ethernet (LAN), RS422, EtherNet/IP		
Inputs/outputs	2 inputs, 4 outputs, 4 selectable inputs/outputs		

<sup>1</sup> Max. ripple < 5V<sub>SS</sub>    <sup>2</sup> 80 % air humidity, non-condensing

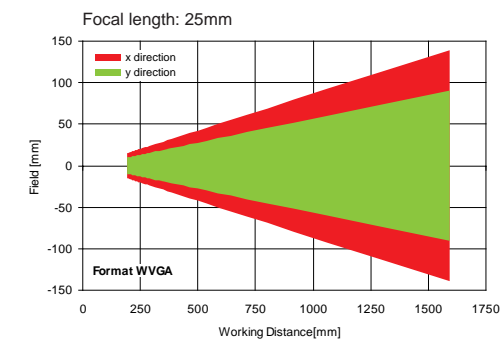
Illumination	Depth of field	Part number	Article number
White	Normal	V10-OB-A1-W25	535-91012
Red	Normal	V10-OB-A1-R25	535-91015
Infrared	Normal	V10-OB-A1-I25	535-91018

## VISOR® vision sensor



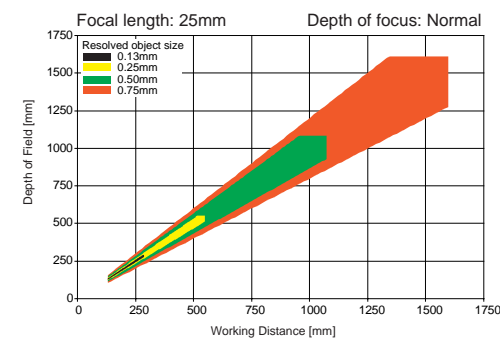
153-00911

## Field of view



155-01424

## Depth of field: normal



155-01412

## Accessories

Connection cables	From Page 670
Illumination	From Page 663
Brackets	From Page 642
Interface accessories	From Page 674



# VISOR® V10 object sensor

Advanced vision sensor for object detection, C-mount



## PRODUCT HIGHLIGHTS

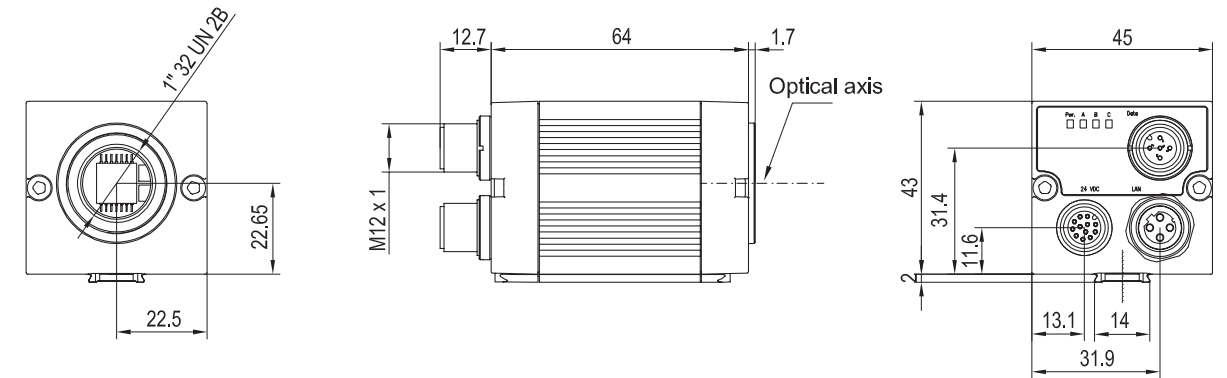
- User-friendly configuration and viewer software with hierarchical user rights
- Detectors for object detection
- Powerful part-finding and tracking
- Precise position determination: X/Y-position and orientation
- Comprehensive logic functions for digital switching outputs
- Encoder input

Optical data		Functions	
Resolution	736 x 480 pixels	Number of jobs / detectors	n / n
CMOS	1/3", monochrome	Detectors	Contour, pattern comparison, contrast, brightness, grey level
Integrated lens, focal length	C-Mount	Properties	Position tracking: X/Y and orientation; pattern comparison / contour: teach-in and detection of patterns and contours; grey threshold, brightness: evaluation of brightness; contrast: evaluation of contrast
Adjustment range	Dependent on lens	Typical cycle times	Typ. 20 ms pattern comparison Typ. 30 ms contour Typ. 2 ms brightness Typ. 2 ms contrast Typ. 2 ms grey threshold
Integrated illumination	None		
Minimum field of view, X x Y	Dependent on lens		
Electrical data		Mechanical data	
Operating voltage, +U <sub>b</sub>	18 ... 26.4 V DC <sup>1</sup>	Dimensions	65 x 45 x 45 mm <sup>3</sup> (without plug)
Current consumption (without illumination and I/O)	≤ 120 mA	Enclosure rating	IP 65 <sup>2</sup>
Current consumption (without I/O)	≤ 200 mA	Material, housing	Aluminium, plastic
Protective circuits	Reverse-polarity protection, U <sub>b</sub> / short-circuit protection of all outputs	Material, front screen	Plastic
Readiness delay	Ca. 13 s after Power on	Ambient temperature: operation	0 ... +50 °C <sup>3</sup>
Outputs	PNP / NPN (switchable)	Ambient temperature: storage	-20 ... +60 °C <sup>3</sup>
Max. output current (per output)	50 mA, 100 mA (pin 12)	Weight	Ca. 160 g
Inputs	PNP/NPN High > U <sub>b</sub> -1 V, Low < 3 V	Plug connections	Supply and I/O M12, 12-pin Ethernet M12, 4-pin Data M12, 5-pin
Input resistance	> 20 kOhm	Vibration and impact resistance	EN 60947-5-2
Encoder input	High > 4 V		
Interfaces: VISOR®	Ethernet (LAN), RS422, EtherNet/IP		
V10-OB-Advanced			
Inputs/outputs	2 inputs, 4 outputs, 4 selectable inputs/outputs		

<sup>1</sup> Max. ripple < 5V<sub>SS</sub>    <sup>2</sup> With LPT45 C-mount protective casing    <sup>3</sup> 80 % air humidity, non-condensing

Part number	Article number
V10-OB-A1-C	535-91005

## VISOR® vision sensor



153-00912

## Lens



	LO C 8	LO C 12	LO C 16	LO C 25	LO C 50
Focal length	8 mm	12 mm	16 mm	25 mm	50 mm
Article number	526-51513	526-51514	526-51515	526-51516	526-51113

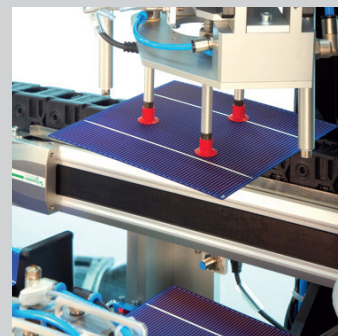
## Accessories

Connection cables	From Page 670
Illumination	From Page 663
Lenses	From Page 661
Brackets	From Page 642
Interface accessories	From Page 674

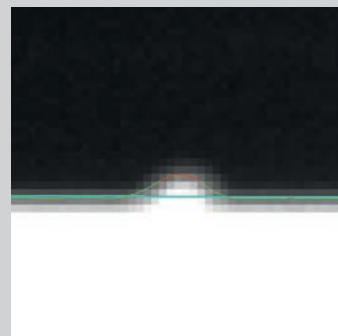


SensoPart has expanded its range of vision sensors with the VISOR® Solar in order to combat rising cost pressure in the production of solar cells. The compact sensor detects the position and any damage to wafers and cells. It allows robots to pick up and lay down wafers accurately. Wafers and solar cells with fine breakouts can be directly rejected during this step, before they can completely break up and damage other material.

These sensors can also be integrated in existing lines – as easily as a light barrier. Before a cell is printed, the sensor checks it for damage that could lead to breakage during the print process, preventing costly machine breakdowns.



The VISOR® Solar sensor operates accurately and reliably even in fast-cycle processes.



The VISOR® Solar sensor measures every wafer or cell and thus detects even minimal edge breakouts.

## HIGHLIGHTS OF VISOR® SOLAR SENSOR

- Simple integration
- Precise position detection down to  $\pm 50 \mu\text{m}$
- Edge defects can be detected up to a depth of 0.50 mm
- Differentiation between C-shaped and V-shaped edge defects
- Detection of holes
- Transport belts can be masked via software
- Short cycle time from 60 ms
- Reliable operation, even in daylight
- No backlight necessary
- Low space requirement: operating distance from 360 mm

Vision Sensors and Systems – Product Overview				
	Firmware Option	Focal length	Integrated illumination	Page
<b>VISOR® Solar sensor</b>				
V10-SO-S1-xxx	Standard	6	White LEDs	68
V10-SO-A1-xxx	Advanced	6	White or infrared LEDs	70
V10-SO-A1-xxx	Advanced	12	White or infrared LEDs	72



Standard vision sensor for wafer and cell inspection, 6 mm



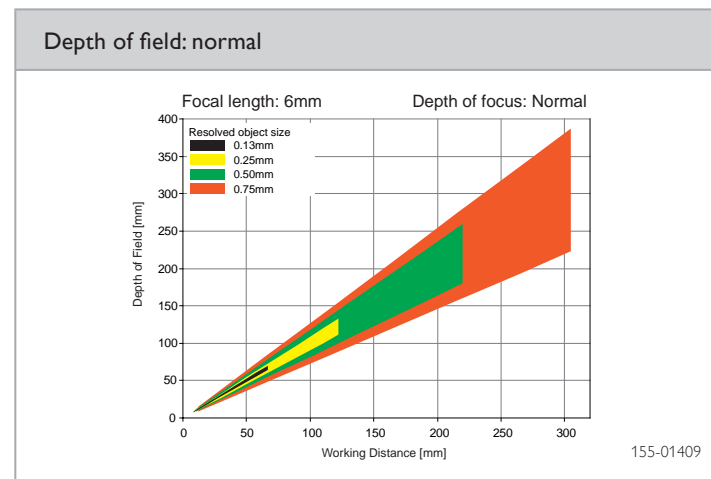
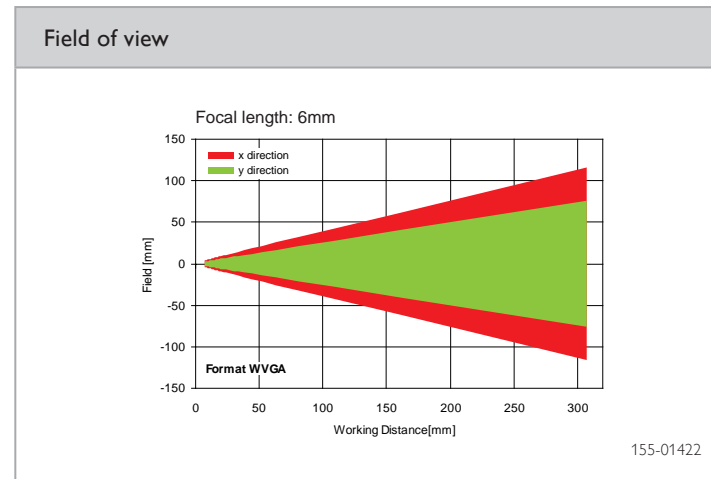
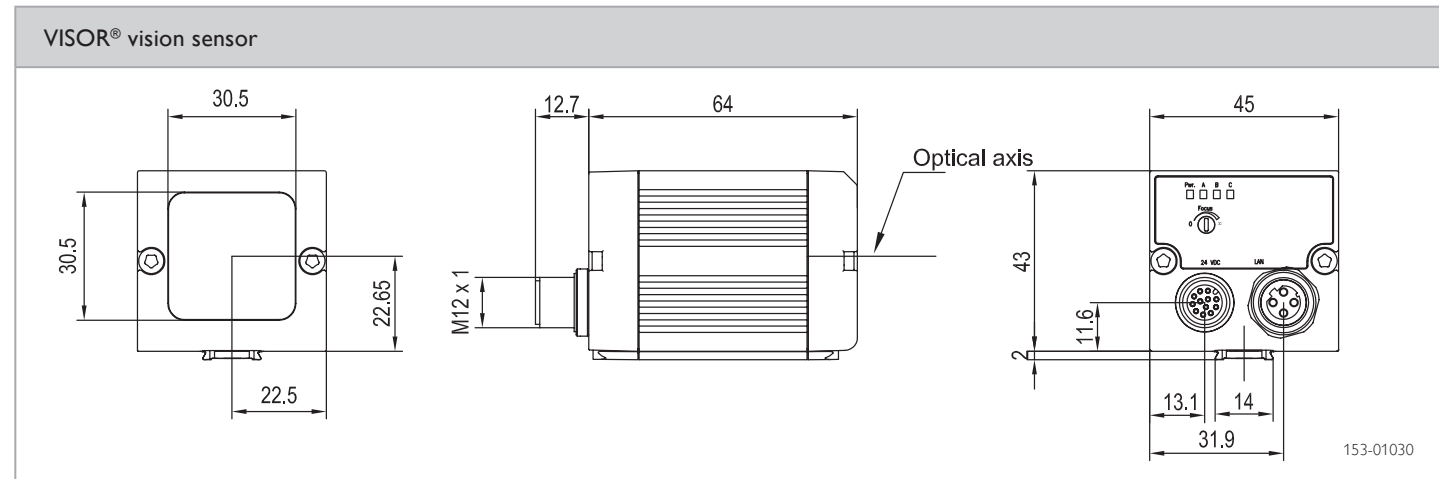
## PRODUCT HIGHLIGHTS

- Automatic detection of wafer and cell geometry
- Suitable for frontlit and backlit applications
- Simple sensor optimisation regarding evaluation speed and test precision (sub-pixel process)
- Detection of holes/cracks and breakouts
- Distortion correction

Optical data		Functions	
Resolution	736 x 480 pixels	Number of jobs / detectors	2 / 32
CMOS	1/3", monochrome	Detectors	Wafers, contrast, brightness, grey level
Integrated lens, focal length	6 mm, adjustable focal position	Properties	Wafers: localisation and examination of wafers Grey threshold, brightness: evaluation of brightness Contrast: evaluation of contrast
Adjustment range	6 mm to infinity	Typical cycle times	Typ. 100 ms wafer Typ. 2 ms brightness Typ. 2 ms contrast Typ. 2 ms grey threshold
Integrated illumination	White LEDs		
Minimum field of view, X x Y	5 x 4 mm <sup>2</sup>		
Electrical data		Mechanical data	
Operating voltage, +U <sub>B</sub>	18 ... 26.4V DC <sup>1</sup>	Dimensions	65 x 45 x 45 mm <sup>3</sup> (without plug)
Current consumption (without illumination and I/O)	≤ 120 mA	Enclosure rating	IP 67
Current consumption (without I/O)	≤ 200 mA	Material, housing	Aluminium, plastic
Protective circuits	Reverse-polarity protection, U <sub>B</sub> / short-circuit protection of all outputs	Material, front screen	Plastic
Readiness delay	Ca. 13 s after Power on	Ambient temperature: operation	0 ... +50 °C <sup>2</sup>
Outputs	PNP / NPN (switchable)	Ambient temperature: storage	-20 ... +60 °C <sup>2</sup>
Max. output current (per output)	50 mA, 100 mA (pin 12)	Weight	Ca. 160 g
Inputs	PNP/NPN High > U <sub>B</sub> -1V, Low < 3V	Plug connections	Supply and I/O M12, 12-pin Ethernet M12, 4-pin
Input resistance	> 20 kOhm	Vibration and impact resistance	EN 60947-5-2
Encoder input	High > 4V		
Interfaces:VISOR® V10-SO-Standard	Ethernet (LAN), EtherNet/IP		
Inputs/outputs	2 inputs, 4 outputs, 2 selectable inputs/outputs		

<sup>1</sup> Max. ripple < 5V<sub>SS</sub>    <sup>2</sup> 80 % air humidity, non-condensing

Illumination	Depth of field	Part number	Article number
White	Normal	V10-SO-S1-W6	535-91049



Accessories	
Connection cables	From Page 670
Illumination	From Page 663
Brackets	From Page 642
Interface accessories	From Page 674

Advanced vision sensor for wafer and cell inspection, 6 mm



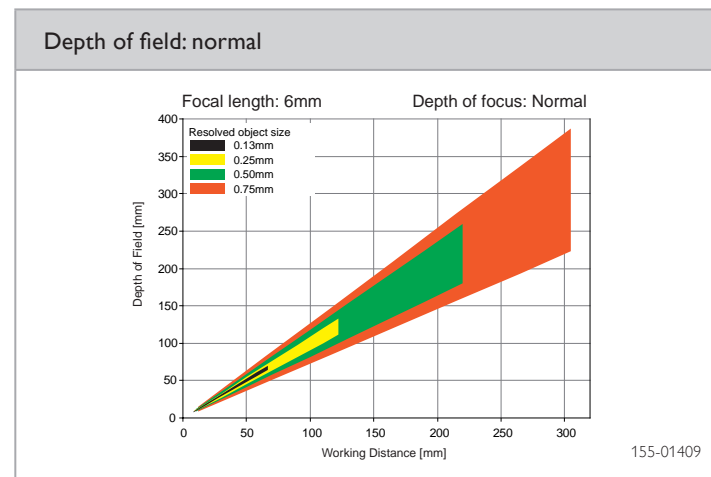
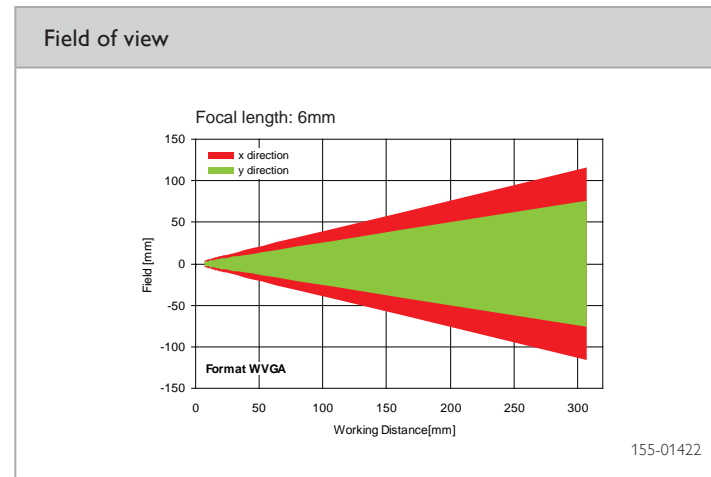
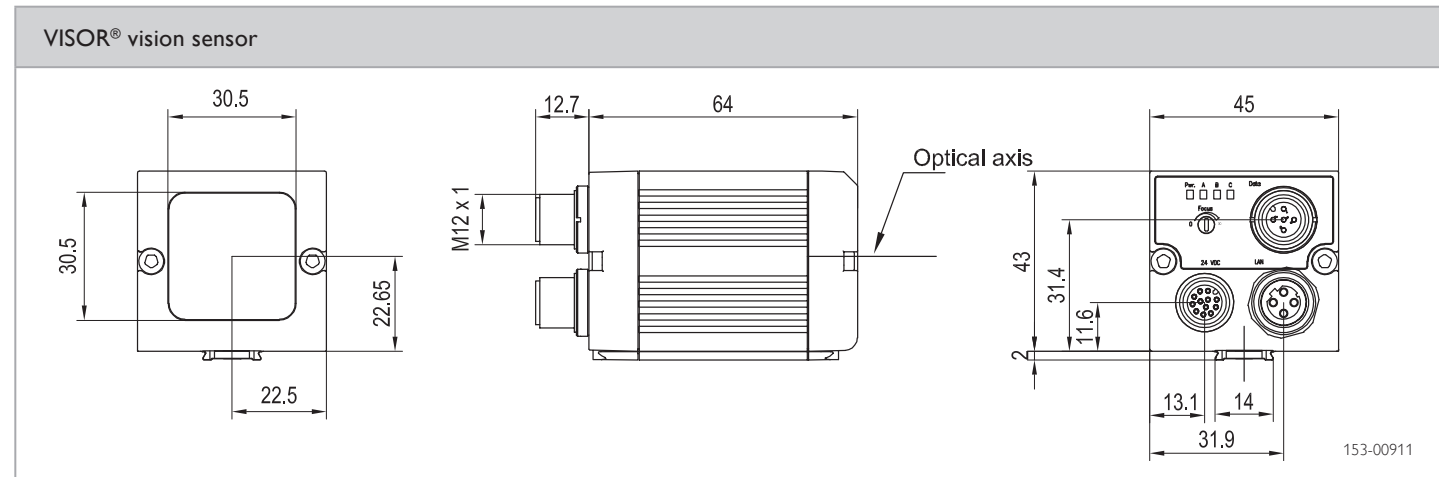
## PRODUCT HIGHLIGHTS

- Automatic detection of wafer and cell geometry
- Suitable for frontlit and backlit applications
- Simple sensor optimisation regarding evaluation speed and test precision (sub-pixel process)
- Detection of holes/cracks and breakouts
- Distortion correction
- Examination and position detection of busbars

Optical data		Functions	
Resolution	736 x 480 pixels	Number of jobs / detectors	n / n
CMOS	1/3", monochrome	Detectors	Wafers, busbars, pattern comparison, contrast, brightness, grey level
Integrated lens, focal length	6 mm, adjustable focal position	Properties	Position tracking Wafers incl. busbars: localisation of wafers or busbars and examination of wafers Pattern comparison: teach-in and detection of patterns Grey threshold, brightness: evaluation of brightness Contrast: evaluation of contrast
Adjustment range	6 mm to infinity	Typical cycle times	Typ. 100 ms wafers Typ. 20 ms pattern comparison Typ. 2 ms brightness Typ. 2 ms contrast Typ. 2 ms grey threshold
Integrated illumination	White, infrared LEDs		
Minimum field of view, X x Y	5 x 4 mm <sup>2</sup>		
Electrical data		Mechanical data	
Operating voltage, +U <sub>B</sub>	18 ... 26.4 V DC <sup>1</sup>	Dimensions	65 x 45 x 45 mm <sup>3</sup> (without plug)
Current consumption (without illumination and I/O)	≤ 120 mA	Enclosure rating	IP 67
Current consumption (without I/O)	≤ 200 mA	Material, housing	Aluminium, plastic
Protective circuits	Reverse-polarity protection, U <sub>B</sub> / short-circuit protection of all outputs	Material, front screen	Plastic
Readiness delay	Ca. 13 s after Power on	Ambient temperature: operation	0 ... +50 °C <sup>2</sup>
Outputs	PNP / NPN (switchable)	Ambient temperature: storage	-20 ... +60 °C <sup>2</sup>
Max. output current (per output)	50 mA, 100 mA (pin 12)	Weight	Ca. 160 g
Inputs	PNP/NPN High > U <sub>B</sub> -1V, Low < 3V	Plug connections	Supply and I/O M12, 12-pin Ethernet M12, 4-pin Data M12, 5-pin
Input resistance	> 20 kOhm	Vibration and impact resistance	EN 60947-5-2
Encoder input	High > 4V		
Interfaces: VISOR® V10-SO-Advanced	Ethernet (LAN), RS422, EtherNet/IP		
Inputs/outputs	2 inputs, 4 outputs, 4 selectable inputs/outputs		

<sup>1</sup> Max. ripple < 5 V<sub>SS</sub>    <sup>2</sup> 80 % air humidity, non-condensing

Illumination	Depth of field	Part number	Article number
White	Normal	V10-SO-A1-W6	535-91051
Infrared	Normal	V10-SO-A1-I6	535-91053



Accessories	
Connection cables	From Page 670
Illumination	From Page 663
Brackets	From Page 642
Interface accessories	From Page 674





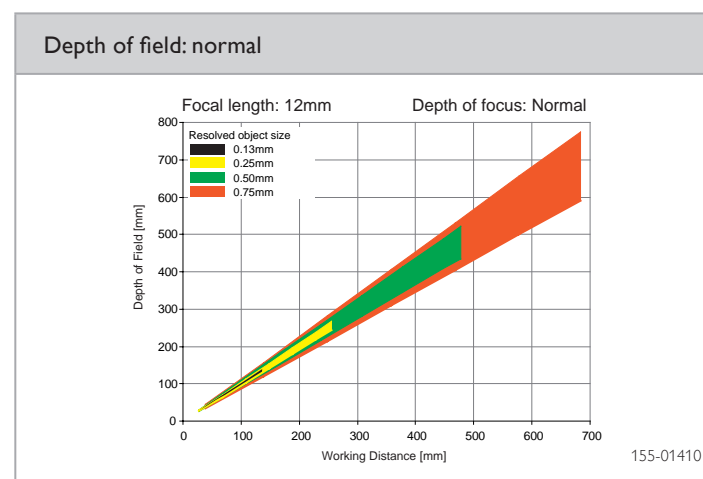
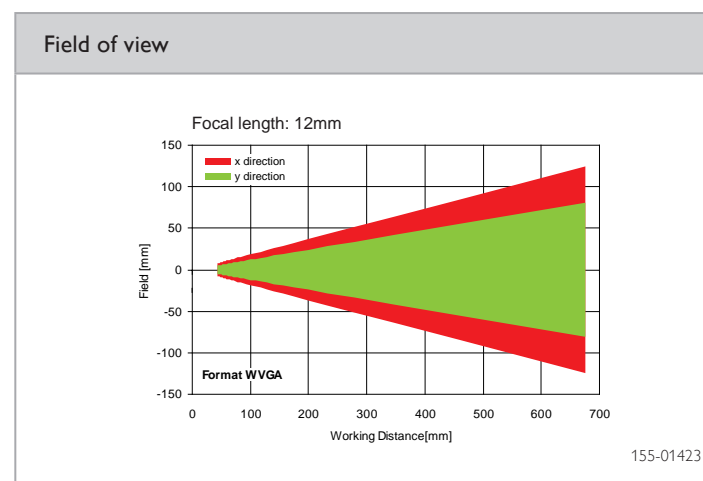
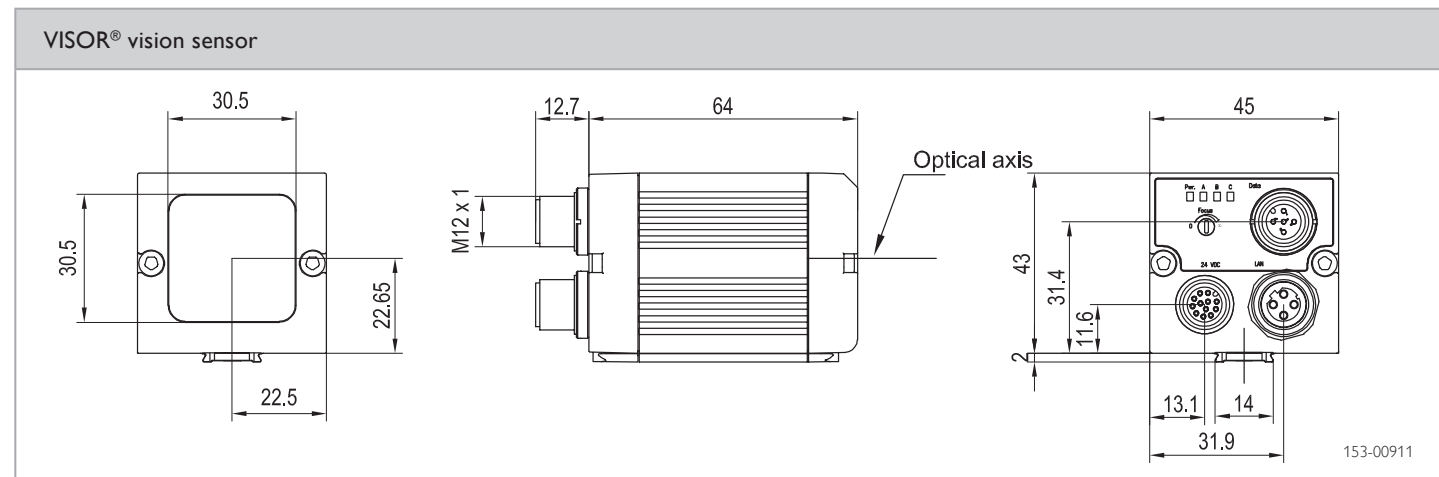
## PRODUCT HIGHLIGHTS

- Automatic detection of wafer and cell geometry
- Suitable for frontlit and backlit applications
- Simple sensor optimisation regarding evaluation speed and test precision (sub-pixel process)
- Detection of holes/cracks and breakouts
- Distortion correction
- Examination and position detection of busbars

Optical data		Functions	
Resolution	736 x 480 pixels	Number of jobs / detectors	n / n
CMOS	1/3", monochrome	Detectors	Wafers, busbars, pattern comparison, contrast, brightness, grey level
Integrated lens, focal length	12 mm, adjustable focal position	Properties	Position tracking Wafers incl. busbars: localisation of wafers or busbars and examination of wafers Pattern comparison: teach-in and detection of patterns Grey threshold, brightness: evaluation of brightness Contrast: evaluation of contrast
Adjustment range	30 mm to infinity	Typical cycle times	Typ. 100 ms wafer Typ. 20 ms pattern comparison Typ. 2 ms brightness Typ. 2 ms contrast Typ. 2 ms grey threshold
Integrated illumination	White, infrared LEDs		
Minimum field of view, X x Y	8 x 6 mm <sup>2</sup>		
Electrical data		Mechanical data	
Operating voltage, +U <sub>B</sub>	18 ... 26.4V DC <sup>1</sup>	Dimensions	65 x 45 x 45 mm <sup>3</sup> (without plug)
Current consumption (without illumination and I/O)	≤ 120 mA	Enclosure rating	IP 67
Current consumption (without I/O)	≤ 200 mA	Material, housing	Aluminium, plastic
Protective circuits	Reverse-polarity protection, U <sub>B</sub> / short-circuit protection of all outputs	Material, front screen	Plastic
Readiness delay	Ca. 13 s after Power on	Ambient temperature: operation	0 ... +50 °C <sup>2</sup>
Outputs	PNP / NPN (switchable)	Ambient temperature: storage	-20 ... +60 °C <sup>2</sup>
Max. output current (per output)	50 mA, 100 mA (pin 12)	Weight	Ca. 160 g
Inputs	PNP/NPN High > U <sub>B</sub> -1V, Low < 3V	Plug connections	Supply and I/O M12, 12-pin Ethernet M12, 4-pin Data M12, 5-pin
Input resistance	> 20 kOhm	Vibration and impact resistance	EN 60947-5-2
Encoder input	High > 4V		
Interfaces: VISOR® V10-SO-Advanced	Ethernet (LAN), RS422, EtherNet/IP		
Inputs/outputs	2 inputs, 4 outputs, 4 selectable inputs/outputs		

<sup>1</sup> Max. ripple < 5V<sub>SS</sub>    <sup>2</sup> 80 % air humidity, non-condensing

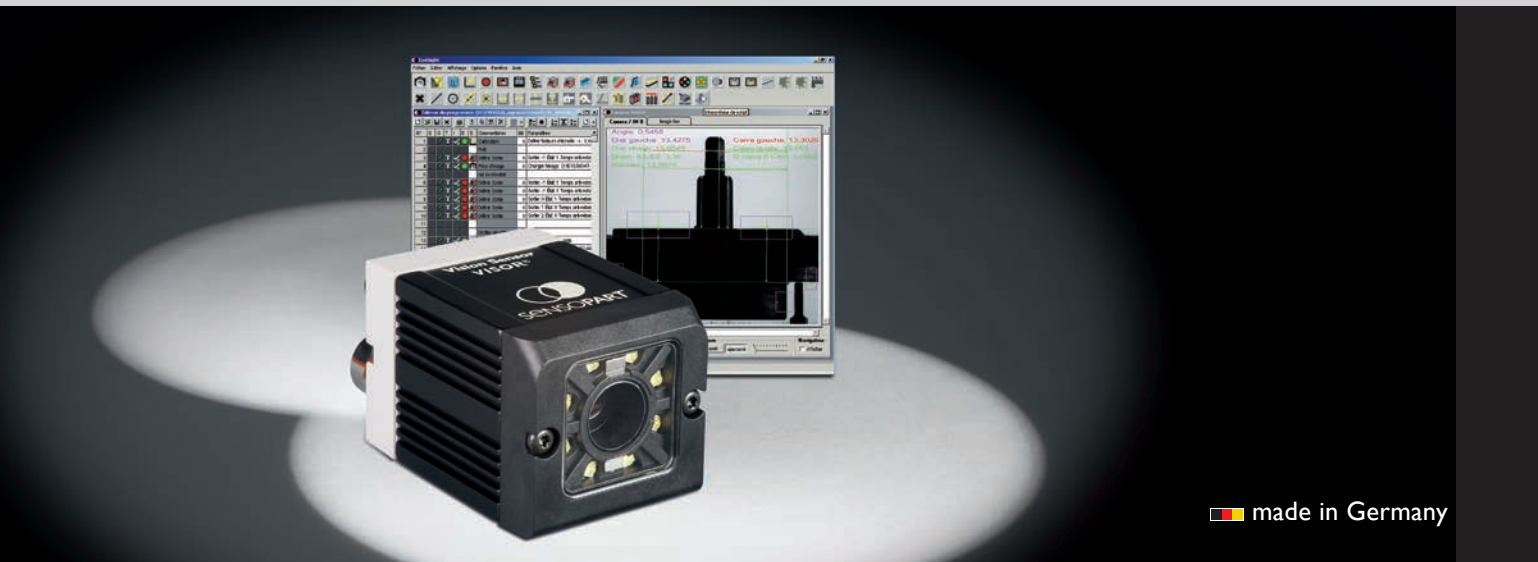
Illumination	Depth of field	Part number	Article number
White	Normal	V10-SO-A1-W12	535-91052
Infrared	Normal	V10-SO-A1-I12	535-91054



Accessories	
Connection cables	From Page 670
Illumination	From Page 663
Brackets	From Page 642
Interface accessories	From Page 674

# Eyesight vision system – everything is possible

At last. You can do what you want!



made in Germany

Most image-processing applications can be rapidly and easily solved with pre-configured VISOR® vision sensors. However, their range of functions is not always sufficient for particularly demanding or specific tasks – but here, too, Sensopart has the right solution: the freely programmable Eyesight vision system offers comprehensive configuration possibilities so that you can also implement very complex automation applications with the smart camera. Whereby complex is not synonymous with complicated: graphic programming by means of drag & drop makes it easy for you to “construct” your own applications.

You can choose between two expansion stages: Eyesight Basic already has all the important routines for object measurement, position determination and tracking, and data communication. Eyesight Advanced offers you additional tools such as warpage point determination, contour inspection/tracking, colour selection/monitoring, brightness correction as well as a variety of filter functions. What can otherwise only be achieved by fully-fledged image-processing systems, you can implement with Eyesight Basic and Eyesight Advanced with considerably less effort – and at a relatively reasonable price.



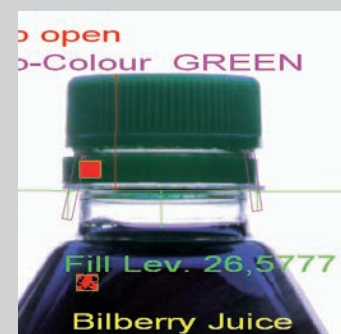
**Taking measures:**  
The dimensional accuracy of an object (e.g. a turned or pressed part) is an important quality feature, and can indirectly provide information on its consistency, stresses or wear, preventing rejects in downstream processes.



**Providing direction:**  
The correct alignment of an object is an important prerequisite for downstream processes, e.g. for positioning and tracking a gripper. Colours, shapes and contours are suitable for monitoring correct orientation

## EYESIGHT HIGHLIGHTS

- Complete image-processing package with robust and flexible smart camera
- Programming via drag & drop of function blocks
- Complex iterative linkage of individual inspections
- Image and result visualisation in inspection mode
- Interpreter for programming one's own functions
- Image processing simulated on PC without camera
- Freely programmable data protocol for Ethernet and serial interface



**Preventing faults:**  
Very different features can be checked at a glance with the Eyesight – here, for example, the position and colour of the cap, filling level and presence of the use-by date. This pays, because each unnoticed fault may be expensive later.

Eyesight Vision Systems – Product Overview				
	Firmware Option	Focal length	Integrated illumination	Page
V10-EYE-A1-xxx	Advanced	6	White, red or infrared LEDs	76
V10-EYE-A1-xxx	Advanced	12	White, red or infrared LEDs	78
V10-EYE-A1-xxx	Advanced	C-mount	None	80
FA 45-300-xxx-EBxxx	Basic	6	White or red LEDs	82
FA 45-300-xxx-EBxxx	Basic	12	White or red LEDs	84
FA 45-300-xxx-EBxxx	Basic	C-mount	None	86
FA 45-300-xxx-EAxxx	Advanced	6	White or red LEDs	88
FA 45-300-xxx-EAxxx	Advanced	12	White or red LEDs	90
FA 45-300-xxx-EAxxx	Advanced	C-mount	None	92





## PRODUCT HIGHLIGHTS

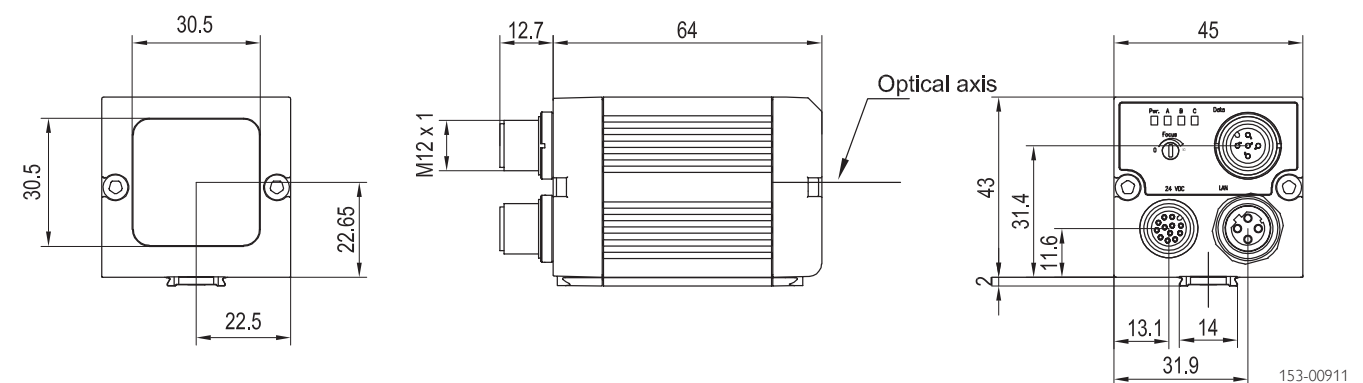
- Complete image-processing package with robust and flexible hardware
- Programming via drag & drop of function blocks
- Complex, iterative linkage of individual inspections
- Image processing can be simulated on the PC without camera
- Image and result visualisation in inspection mode
- Script interpreter for advanced user functions
- Advanced range of commands for complex inspection tasks

Optical data		Functions	
Resolution	736 x 480 pixels	Number of inspection programs	No limitation (max. ca. 40 MB)
CMOS	1/3", monochrome	Functions	All function blocks for object measurement, position determination / tracking, sequence control, data and image transfer, contour inspection, sub-programs, Basic Interpreter:
Integrated lens, focal length	6 mm, adjustable focal position	Properties	See overview of commands
Adjustment range	6 mm to infinity	Typical cycle times	Dependent on inspection program
Integrated illumination	White, red, infrared LEDs		
Minimum field of view, X x Y	5 x 4 mm <sup>2</sup>		
Electrical data		Mechanical data	
Operating voltage, +U <sub>b</sub>	18 ... 26.4 V DC <sup>1</sup>	Dimensions	65 x 45 x 45 mm <sup>3</sup> (without plug)
Current consumption (without illumination and I/O)	≤ 120 mA	Enclosure rating	IP 67
Current consumption (without I/O)	≤ 200 mA	Material, housing	Aluminium, plastic
Protective circuits	Reverse-polarity protection, U <sub>b</sub> / short-circuit protection of all outputs	Material, front screen	Plastic
Readiness delay	Ca. 13 s after Power on	Ambient temperature: operation	0 ... +50 °C <sup>2</sup>
Outputs	PNP	Ambient temperature: storage	-20 ... +60 °C <sup>2</sup>
Max. output current (per output)	50 mA, 100 mA (pin 12)	Weight	Ca. 160 g
Inputs	PNP High > U <sub>b</sub> -1V, Low < 3V	Plug connections	Supply and I/O M12, 12-pin Ethernet M12, 4-pin Data M12, 5-pin
Input resistance	> 20 kΩ	Vibration and impact resistance	EN 60947-5-2
Interfaces: Eyesight vision system, Advanced	Ethernet (LAN), RS422		
Inputs/outputs	2 inputs, 4 outputs, 4 selectable inputs/outputs		

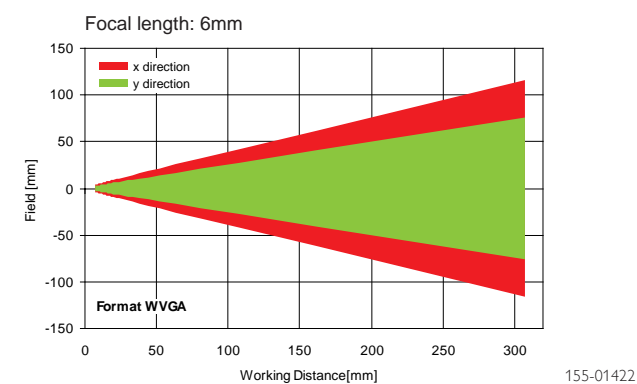
<sup>1</sup> Max. ripple < 5V<sub>SS</sub>    <sup>2</sup> 80 % air humidity, non-condensing

Illumination	Depth of field	Part number	Article number
White	Normal	V10-EYE-A1-W6	537-91000
Red	Normal	V10-EYE-A1-R6	537-91002
Infrared	Normal	V10-EYE-A1-I6	537-91005

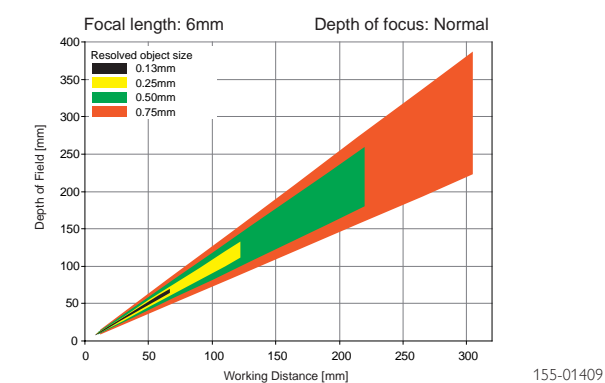
## V10 vision system



## Field of view



## Depth of field: normal



## Accessories

Connection cables	From Page 670
Illumination	From Page 663
Brackets	From Page 642
Interface accessories	From Page 674



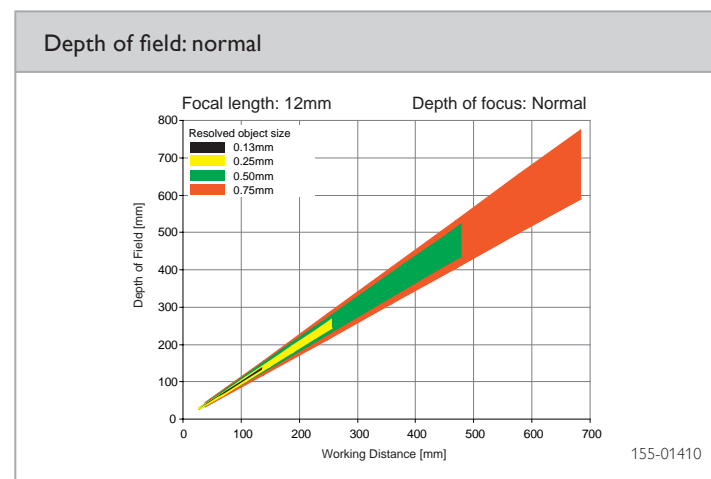
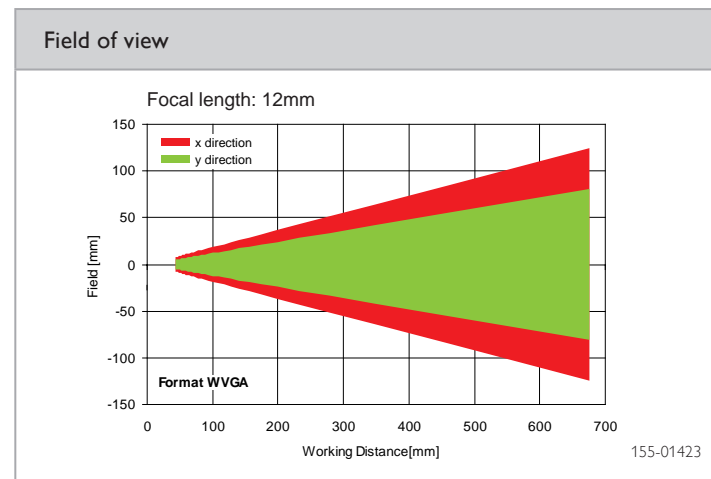
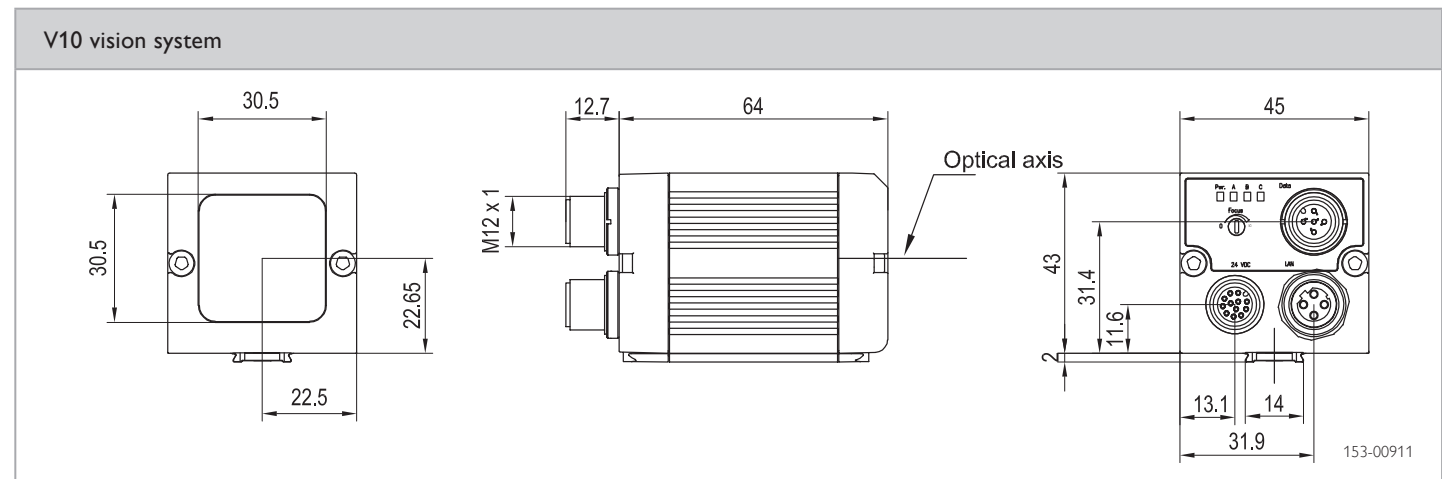
## PRODUCT HIGHLIGHTS

- Complete image-processing package with robust and flexible hardware
- Programming via drag & drop of function blocks
- Complex, iterative linkage of individual inspections
- Image processing can be simulated on the PC without camera
- Image and result visualisation in inspection mode
- Script interpreter for advanced user functions
- Advanced range of commands for complex inspection tasks

Optical data		Functions	
Resolution	736 x 480 pixels	Number of inspection programs	No limitation (max. ca. 40 MB)
CMOS	1/3", monochrome	Functions	All function blocks for object measurement, position determination/tracking, sequence control, data and image transfer; contour inspection, sub-programs, Basic Interpreter:
Integrated lens, focal length	12 mm, adjustable focal position	Properties	See overview of commands
Adjustment range	30 mm to infinity	Typical cycle times	Dependent on inspection program
Integrated illumination	White, red, infrared LEDs		
Minimum field of view, X x Y	8 x 6 mm <sup>2</sup>		
Electrical data		Mechanical data	
Operating voltage, +U <sub>B</sub>	18 ... 26.4 V DC <sup>1</sup>	Dimensions	65 x 45 x 45 mm <sup>3</sup> (without plug)
Current consumption (without illumination and I/O)	≤ 120 mA	Enclosure rating	IP 67
Current consumption (without I/O)	≤ 200 mA	Material, housing	Aluminium, plastic
Protective circuits	Reverse-polarity protection, U <sub>B</sub> / short-circuit protection of all outputs	Material, front screen	Plastic
Readiness delay	Ca. 13 s after Power on	Ambient temperature: operation	0 ... +50 °C <sup>2</sup>
Outputs	PNP	Ambient temperature: storage	-20 ... +60 °C <sup>2</sup>
Max. output current (per output)	50 mA, 100 mA (pin 12)	Weight	Ca. 160 g
Inputs	PNP High > U <sub>B</sub> -1V, Low < 3V	Plug connections	Supply and I/O M12, 12-pin Ethernet M12, 4-pin Data M12, 5-pin
Input resistance	> 20 kΩ	Vibration and impact resistance	EN 60947-5-2
Interfaces: Eyesight vision system, Advanced	Ethernet (LAN), RS422		
Inputs/outputs	2 inputs, 4 outputs, 4 selectable inputs/outputs		

<sup>1</sup> Max. ripple < 5V<sub>SS</sub>    <sup>2</sup> 80 % air humidity, non-condensing

Illumination	Depth of field	Part number	Article number
White	Normal	V10-EYE-A1-W12	537-91001
Red	Normal	V10-EYE-A1-R12	537-91003
Infrared	Normal	V10-EYE-A1-I12	537-91006



Accessories	
Connection cables	From Page 670
Illumination	From Page 663
Brackets	From Page 642
Interface accessories	From Page 674



## PRODUCT HIGHLIGHTS

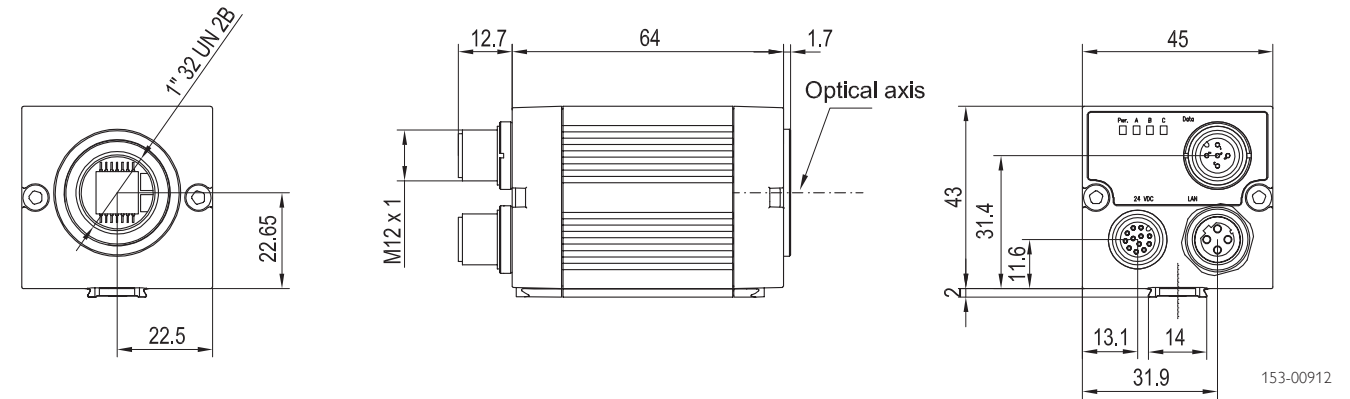
- Complete image-processing package with robust and flexible hardware
- Programming via drag & drop of function blocks
- Complex, iterative linkage of individual inspections
- Image processing can be simulated on the PC without camera
- Image and result visualisation in inspection mode
- Script interpreter for advanced user functions
- Advanced range of commands for complex inspection tasks

Optical data		Functions	
Resolution	736 x 480 pixels	Number of inspection programs	No limitation (max. ca. 40 MB)
CMOS	1/3", monochrome	Functions	All function blocks for object measurement, position determination/tracking, sequence control, data and image transfer, contour inspection, sub-programs, Basic Interpreter:
Integrated lens, focal length	C-mount	Properties	See overview of commands
Adjustment range	Dependent on lens	Typical cycle times	Dependent on inspection program
Integrated illumination	None		
Minimum field of view, X x Y	Dependent on lens		
Electrical data		Mechanical data	
Operating voltage, +U <sub>B</sub>	18 ... 26.4 V DC <sup>1</sup>	Dimensions	65 x 45 x 45 mm <sup>3</sup> (without plug)
Current consumption (without illumination and I/O)	≤ 120 mA	Enclosure rating	IP 65 <sup>2</sup>
Current consumption (without I/O)	≤ 200 mA	Material, housing	Aluminium, plastic
Protective circuits	Reverse-polarity protection, U <sub>B</sub> / short-circuit protection of all outputs	Material, front screen	Plastic
Readiness delay	Ca. 13 s after Power on	Ambient temperature: operation	0 ... +50 °C <sup>3</sup>
Outputs	PNP	Ambient temperature: storage	-20 ... +60 °C <sup>3</sup>
Max. output current (per output)	50 mA, 100 mA (pin 12)	Weight	Ca. 160 g
Inputs	PNP High > U <sub>B</sub> -1V, Low < 3V	Plug connections	Supply and I/O M12, 12-pin Ethernet M12, 4-pin Data M12, 5-pin
Input resistance	> 20 kΩ	Vibration and impact resistance	EN 60947-5-2
Interfaces: Eyesight vision system, Advanced	Ethernet (LAN), RS422		
Inputs/outputs	2 inputs, 4 outputs, 4 selectable inputs/outputs		

<sup>1</sup> Max. ripple < 5V<sub>SS</sub>    <sup>2</sup> With LPT45 C-mount protective casing    <sup>3</sup> 80 % air humidity, non-condensing

Part number	Article number
V10-EYE-A1-C	537-91004

## V10 vision system



## Lens



	LO C 8	LO C 12	LO C 16	LO C 25	LO C 50
Focal length	8 mm	12 mm	16 mm	25 mm	50 mm
Article number	526-51513	526-51514	526-51515	526-51516	526-51113

## Accessories

Connection cables	From Page 670
Illumination	From Page 663
Lenses	From Page 661
Brackets	From Page 642
Interface accessories	From Page 674



Basic vision system for complex image-processing applications, 6 mm



## PRODUCT HIGHLIGHTS

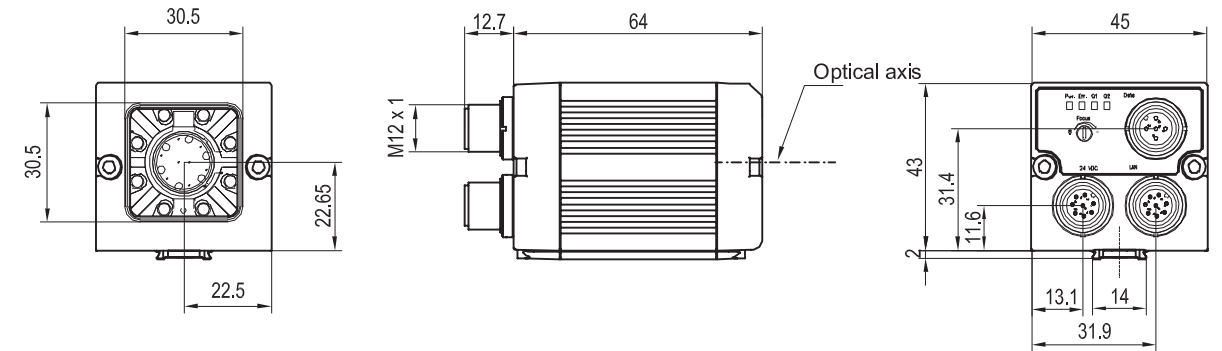
- Complete image-processing package with robust and flexible hardware
- Programming via drag & drop of function blocks
- Complex, iterative linkage of individual inspections
- Image processing can be simulated on the PC without camera
- Basic range of commands for simple inspection tasks

Optical data		Functions	
Resolution	640 x 480 pixels	Number of inspection programs	No limitation (max. ca. 3 MB)
CCD	1/4", monochrome	Functions	All important function blocks for object measurement, position determination/tracking, data transfer and sequence control
Integrated lens, focal length	6 mm, adjustable focal position	Properties	See overview of commands
Adjustment range	20 mm to infinity	Typical cycle times	Dependent on inspection program
Integrated illumination	White, red LEDs		
Minimum field of view, X x Y	18 x 14 mm <sup>2</sup>		
Electrical data		Mechanical data	
Operating voltage, +U <sub>B</sub>	18 ... 30V DC <sup>1</sup>	Dimensions	65 x 45 x 45 mm <sup>3</sup> (without plug)
Current consumption (without I/O)	≤ 200 mA	Enclosure rating	IP 67
Protective circuits	Reverse-polarity protection, U <sub>B</sub> / short-circuit protection of all outputs	Material, housing	Aluminium, plastic
Readiness delay	Ca. 6 s after Power on	Material, front screen	Plastic
Outputs	PNP (N.O.)	Ambient temperature: operation	0 ... +50 °C <sup>2</sup>
Max. output current (per output)	200 mA (max. 9.6 W)	Ambient temperature: storage	-20 ... +50 °C <sup>2</sup>
Inputs	High 10 ... 24V (+10 %), Low 0 ... 3V	Weight	Ca. 170 g
Input resistance	> 20 kOhm	Plug connections	Supply and I/O M12, 8-pin Ethernet M12, 4-pin Data M12, 5-pin
Interfaces:	Ethernet (LAN), RS422	Vibration and impact resistance	EN 60947-5-2
Inputs/outputs	2 inputs, 4 outputs		

<sup>1</sup> Max. ripple < 5V<sub>SS</sub>    <sup>2</sup> 80 % air humidity, non-condensing

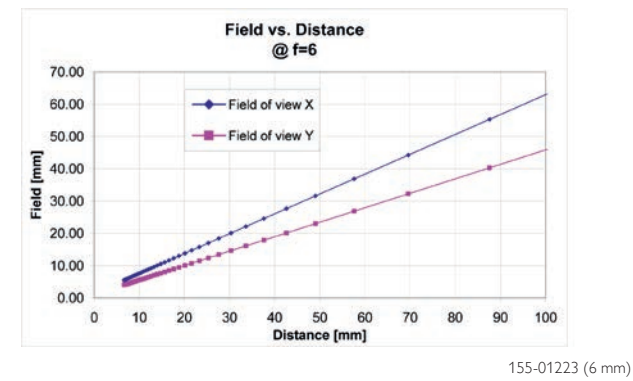
Illumination	CCD	Part number	Article number
White	Monochrome	FA45-300-WCC-EBO6HS6	522-91133
Red	Monochrome	FA45-300-RCC-EBO6HS6	522-91139

## FA 45 vision system



153-00422

## Field of view



155-01223 (6 mm)

## Accessories

Connection cables	From Page 670
Illumination	From Page 663
Brackets	From Page 642
Interface accessories	From Page 674

Basic vision system for complex image-processing applications, 12 mm



## PRODUCT HIGHLIGHTS

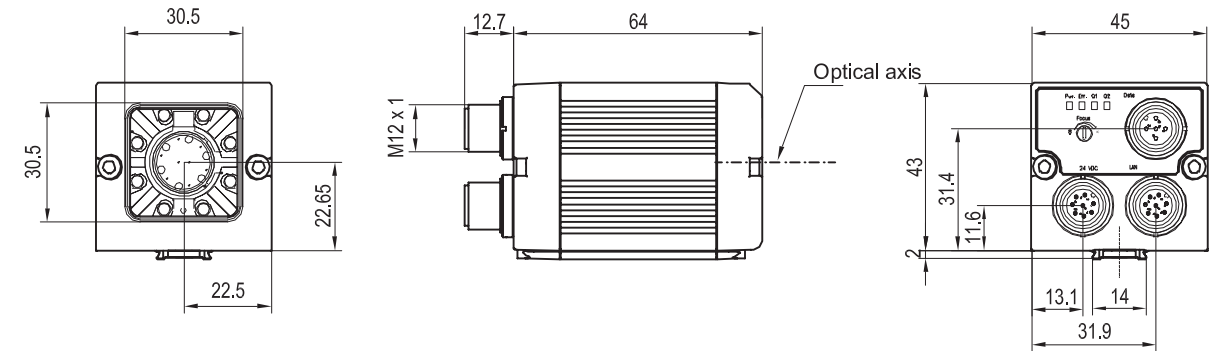
- Complete image-processing package with robust and flexible hardware
- Programming via drag & drop of function blocks
- Complex, iterative linkage of individual inspections
- Image processing can be simulated on the PC without camera
- Basic range of commands for simple inspection tasks

Optical data		Functions	
Resolution	640 x 480 pixels	Number of inspection programs	No limitation (max. ca. 3 MB)
CCD	1/4", monochrome	Functions	All important function blocks for object measurement, position determination/tracking, data transfer and sequence control
Integrated lens, focal length	12 mm, adjustable focal position	Properties	See overview of commands
Adjustment range	20 mm to infinity	Typical cycle times	Dependent on inspection program
Integrated illumination	White, red LEDs		
Minimum field of view, X x Y	8 x 6 mm <sup>2</sup>		
Electrical data		Mechanical data	
Operating voltage, +U <sub>B</sub>	18 ... 30V DC <sup>1</sup>	Dimensions	65 x 45 x 45 mm <sup>3</sup> (without plug)
Current consumption (without I/O)	≤ 200 mA	Enclosure rating	IP 67
Protective circuits	Reverse-polarity protection, U <sub>B</sub> / short-circuit protection of all outputs	Material, housing	Aluminium, plastic
Readiness delay	Ca. 6 s after Power on	Material, front screen	Plastic
Outputs	PNP (N.O.)	Ambient temperature: operation	0 ... +50 °C <sup>2</sup>
Max. output current (per output)	200 mA (max. 9.6 W)	Ambient temperature: storage	-20 ... +50 °C <sup>2</sup>
Inputs	High 10 ... 24V (+10 %), Low 0 ... 3V	Weight	Ca. 170 g
Input resistance	> 20 kOhm	Plug connections	Supply and I/O M12, 8-pin Ethernet M12, 4-pin Data M12, 5-pin
Interfaces:	Ethernet (LAN), RS422	Vibration and impact resistance	EN 60947-5-2
Eyesight vision system, Basic			
Inputs/outputs	2 inputs, 4 outputs		

<sup>1</sup> Max. ripple < 5V<sub>SS</sub>    <sup>2</sup> 80 % air humidity, non-condensing

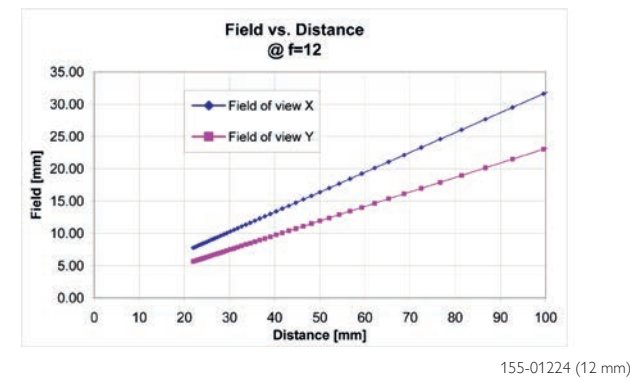
Illumination	CCD	Part number	Article number
White	Monochrome	FA45-300-WCC-EBO12HS6	522-91134
Red	Monochrome	FA45-300-RCC-EBO12HS6	522-91140

## FA 45 vision system



153-00422

## Field of view



155-01224 (12 mm)

## Accessories

Connection cables	From Page 670
Illumination	From Page 663
Brackets	From Page 642
Interface accessories	From Page 674

Basic vision system for complex image-processing applications, C-mount



## PRODUCT HIGHLIGHTS

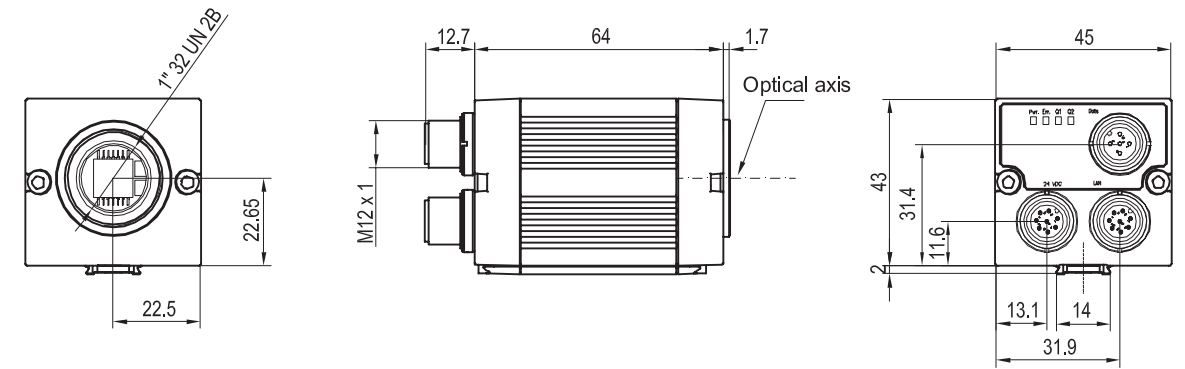
- Complete image-processing package with robust and flexible hardware
- Programming via drag & drop of function blocks
- Complex, iterative linkage of individual inspections
- Image processing can be simulated on the PC without camera
- Basic range of commands for simple inspection tasks

Optical data		Functions	
Resolution	640 x 480 pixels	Number of inspection programs	No limitation (max. ca. 3 MB)
CCD	1/4", monochrome	Functions	All important function blocks for object measurement, position determination/tracking, data transfer and sequence control
Integrated lens, focal length	C-mount	Properties	See overview of commands
Adjustment range	Dependent on lens	Typical cycle times	Dependent on inspection program
Integrated illumination	None		
Minimum field of view, X x Y	Dependent on lens		
Electrical data		Mechanical data	
Operating voltage, +U <sub>B</sub>	18 ... 30V DC <sup>1</sup>	Dimensions	65 x 45 x 45 mm <sup>3</sup> (without plug)
Current consumption (without I/O)	≤ 200 mA	Enclosure rating	IP 65 <sup>2</sup>
Protective circuits	Reverse-polarity protection, U <sub>B</sub> / short-circuit protection of all outputs	Material, housing	Aluminium, plastic
Readiness delay	Ca. 6 s after Power on	Material, front screen	Plastic
Outputs	PNP (N.O.)	Ambient temperature: operation	0 ... +50 °C <sup>3</sup>
Max. output current (per output)	200 mA (max. 9.6 W)	Ambient temperature: storage	-20 ... +50 °C <sup>3</sup>
Inputs	High 10 ... 24V (+10 %), Low 0 ... 3V	Weight	Ca. 170 g
Input resistance	> 20 kOhm	Plug connections	Supply and I/O M12, 8-pin Ethernet M12, 4-pin Data M12, 5-pin
Interfaces:	Ethernet (LAN), RS422	Vibration and impact resistance	EN 60947-5-2
Eyesight vision system, Basic			
Inputs/outputs	2 inputs, 4 outputs		

<sup>1</sup> Max. ripple < 5V<sub>SS</sub>    <sup>2</sup> With LPT45 C-mount protective casing    <sup>3</sup> 80 % air humidity, non-condensing

CCD	Part number	Article number
Monochrome	FA45-300-CC-EBOCSHS6	522-91135

## FA 45 vision system



153-00434

## Lens



	LO C 8	LO C 12	LO C 16	LO C 25	LO C 50
Focal length	8 mm	12 mm	16 mm	25 mm	50 mm
Article number	526-51513	526-51514	526-51515	526-51516	526-51113

## Accessories

Connection cables	From Page 670
Illumination	From Page 663
Lenses	From Page 661
Brackets	From Page 642
Interface accessories	From Page 674



Advanced vision system for complex image-processing applications, 6 mm



## PRODUCT HIGHLIGHTS

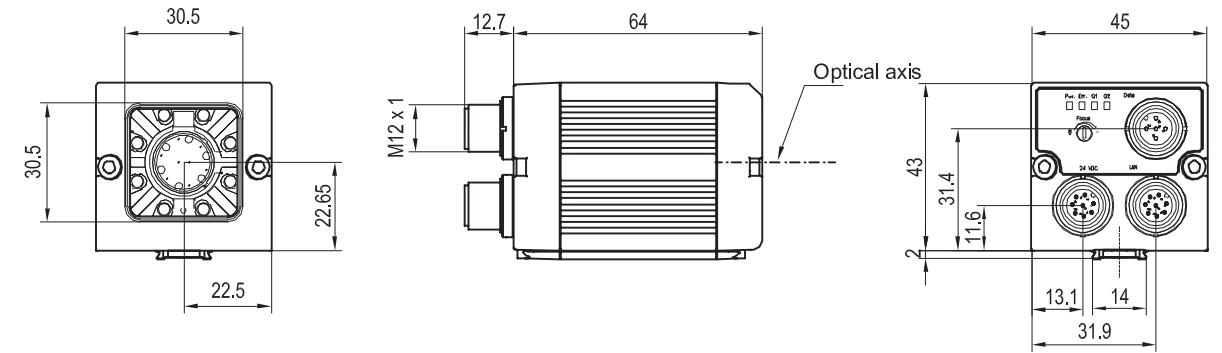
- Complete image-processing package with robust and flexible hardware
- Programming via drag & drop of function blocks
- Complex, iterative linkage of individual inspections
- Image processing can be simulated on the PC without camera
- Image and result visualisation in inspection mode
- Script interpreter for advanced user functions
- Advanced range of commands for complex inspection tasks

Optical data		Functions	
Resolution	640 x 480 pixels	Number of inspection programs	No limitation (max. ca. 3 MB)
CCD	1/4", monochrome or colour	Functions	All function blocks for object measurement, position determination/tracking, sequence control, data and image transfer, contour inspection, sub-programs, Basic Interpreter; with colour CCD, additional function blocks for colour.
Integrated lens, focal length	6 mm, adjustable focal position	Properties	See overview of commands
Adjustment range	20 mm to infinity	Typical cycle times	Dependent on inspection program
Integrated illumination	White, red LEDs		
Minimum field of view, X x Y	18 x 14 mm <sup>2</sup>		
Electrical data		Mechanical data	
Operating voltage, +U <sub>B</sub>	18 ... 30 V DC <sup>1</sup>	Dimensions	65 x 45 x 45 mm <sup>3</sup> (without plug)
Current consumption (without I/O)	≤ 200 mA	Enclosure rating	IP 67
Protective circuits	Reverse-polarity protection, U <sub>B</sub> / short-circuit protection of all outputs	Material, housing	Aluminium, plastic
Readiness delay	Ca. 6 s after Power on	Material, front screen	Plastic
Outputs	PNP (N.O.)	Ambient temperature: operation	0 ... +50 °C <sup>2</sup>
Max. output current (per output)	200 mA (max. 9.6 W)	Ambient temperature: storage	-20 ... +50 °C <sup>2</sup>
Inputs	High 10 ... 24V (+10 %), Low 0 ... 3V	Weight	Ca. 170 g
Input resistance	> 20 kOhm	Plug connections	Supply and I/O M12, 8-pin Ethernet M12, 4-pin Data M12, 5-pin
Interfaces:	Ethernet (LAN), RS422, EtherNet/IP	Vibration and impact resistance	EN 60947-5-2
Eyesight vision system, Advanced			
Inputs/outputs	2 inputs, 4 outputs		

<sup>1</sup> Max. ripple < 5V<sub>SS</sub>    <sup>2</sup> 80 % air humidity, non-condensing

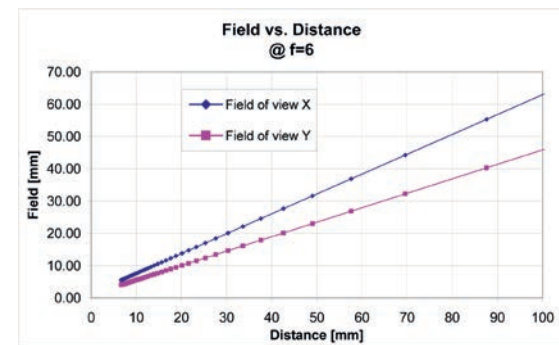
Illumination	CCD	Part number	Article number
White	Monochrome	FA45-300-WCC-EAO6HS6	522-91136
Red	Monochrome	FA45-300-RCC-EAO6HS6	522-91141
White	Colour	FA45-300-WCCC-EAO6HS6	522-91143

## FA 45 vision system



153-00422

## Field of view



155-01223 (6 mm)

## Accessories

Connection cables	From Page 670
Illumination	From Page 663
Brackets	From Page 642
Interface accessories	From Page 674

Advanced vision system for complex image-processing applications, 12 mm



## PRODUCT HIGHLIGHTS

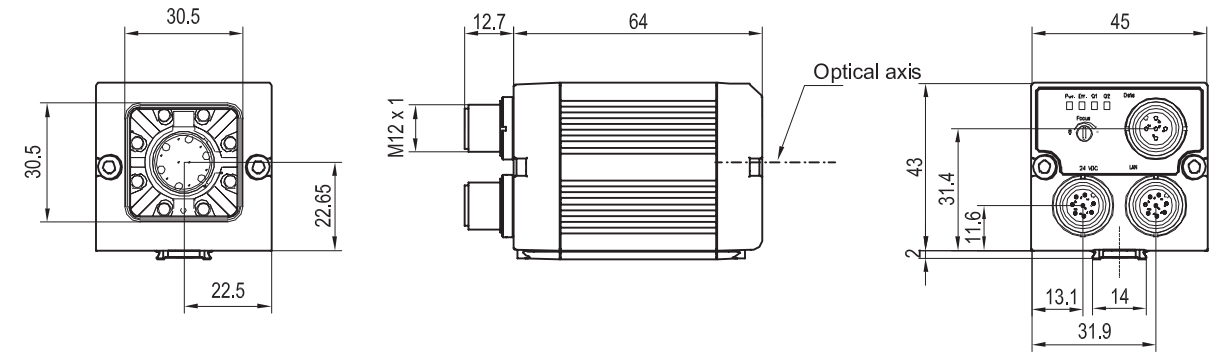
- Complete image-processing package with robust and flexible hardware
- Programming via drag & drop of function blocks
- Complex, iterative linkage of individual inspections
- Image processing can be simulated on the PC without camera
- Image and result visualisation in inspection mode
- Script interpreter for advanced user functions
- Advanced range of commands for complex inspection tasks

Optical data		Functions	
Resolution	640 x 480 pixels	Number of inspection programs	No limitation (max. ca. 3 MB)
CCD	1/4", monochrome or colour	Functions	All function blocks for object measurement, position determination/tracking, sequence control, data and image transfer, contour inspection, sub-programs, Basic Interpreter; with colour CCD, additional function blocks for colour.
Integrated lens, focal length	12 mm, adjustable focal position	Properties	See overview of commands
Adjustment range	20 mm to infinity	Typical cycle times	Dependent on inspection program
Integrated illumination	White, red LEDs		
Minimum field of view, X x Y	8 x 6 mm <sup>2</sup>		
Electrical data		Mechanical data	
Operating voltage, +U <sub>B</sub>	18 ... 30 V DC <sup>1</sup>	Dimensions	65 x 45 x 45 mm <sup>3</sup> (without plug)
Current consumption (without I/O)	≤ 200 mA	Enclosure rating	IP 67
Protective circuits	Reverse-polarity protection, U <sub>B</sub> / short-circuit protection of all outputs	Material, housing	Aluminium, plastic
Readiness delay	Ca. 6 s after Power on	Material, front screen	Plastic
Outputs	PNP (N.O.)	Ambient temperature: operation	0 ... +50 °C <sup>2</sup>
Max. output current (per output)	200 mA (max. 9.6 W)	Ambient temperature: storage	-20 ... +50 °C <sup>2</sup>
Inputs	High 10 ... 24V (+10 %), Low 0 ... 3V	Weight	Ca. 170 g
Input resistance	> 20 kOhm	Plug connections	Supply and I/O M12, 8-pin Ethernet M12, 4-pin Data M12, 5-pin
Interfaces:	Ethernet (LAN), RS422, EtherNet/IP	Vibration and impact resistance	EN 60947-5-2
Eyesight vision system, Advanced			
Inputs/outputs	2 inputs, 4 outputs		

<sup>1</sup> Max. ripple < 5V<sub>SS</sub>    <sup>2</sup> 80 % air humidity, non-condensing

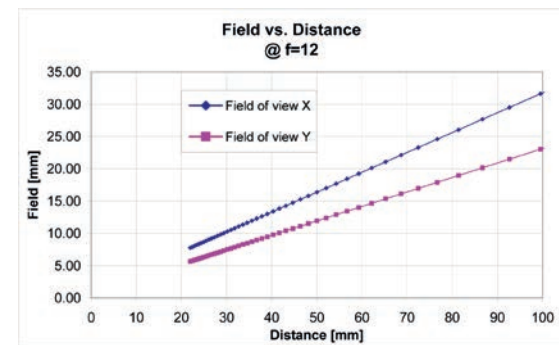
Illumination	CCD	Part number	Article number
White	Monochrome	FA45-300-WCC-EAO12HS6	522-91137
Red	Monochrome	FA45-300-RCC-EAO12HS6	522-91142
White	Colour	FA45-300-WCCC-EAO12HS6	522-91144

## FA 45 vision system



153-00422

## Field of view



155-01224 (12 mm)

## Accessories

Connection cables	From Page 670
Illumination	From Page 663
Brackets	From Page 642
Interface accessories	From Page 674

Advanced vision system for complex image-processing applications, C-mount



## PRODUCT HIGHLIGHTS

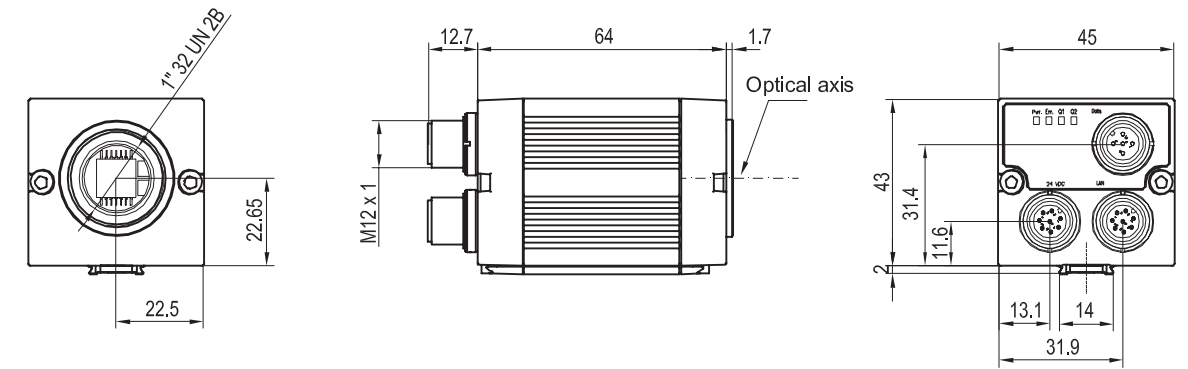
- Complete image-processing package with robust and flexible hardware
- Programming via drag & drop of function blocks
- Complex, iterative linkage of individual inspections
- Image processing can be simulated on the PC without camera
- Image and result visualisation in inspection mode
- Script interpreter for advanced user functions
- Advanced range of commands for complex inspection tasks

Optical data		Functions	
Resolution	640 x 480 pixels	Number of inspection programs	No limitation (max. ca. 3 MB)
CCD	1/4", monochrome or colour	Functions	All function blocks for object measurement, position determination/tracking, sequence control, data and image transfer, contour inspection, sub-programs, Basic Interpreter; with colour CCD, additional function blocks for colour.
Integrated lens, focal length	C-mount	Properties	See overview of commands
Adjustment range	Dependent on lens	Typical cycle times	Dependent on inspection program
Integrated illumination	None		
Minimum field of view, X x Y	Dependent on lens		
Electrical data		Mechanical data	
Operating voltage, +U <sub>B</sub>	18 ... 30 V DC <sup>1</sup>	Dimensions	65 x 45 x 45 mm <sup>3</sup> (without plug)
Current consumption (without I/O)	≤ 200 mA	Enclosure rating	IP 65 <sup>2</sup>
Protective circuits	Reverse-polarity protection, U <sub>B</sub> / short-circuit protection of all outputs	Material, housing	Aluminium, plastic
Readiness delay	Ca. 6 s after Power on	Material, front screen	Plastic
Outputs	PNP (N.O.)	Ambient temperature: operation	0 ... +50 °C <sup>3</sup>
Max. output current (per output)	200 mA (max. 9.6 W)	Ambient temperature: storage	-20 ... +50 °C <sup>3</sup>
Inputs	High 10 ... 24V (+10 %), Low 0 ... 3V	Weight	Ca. 170 g
Input resistance	> 20 kOhm	Plug connections	Supply and I/O M12, 8-pin Ethernet M12, 4-pin Data M12, 5-pin
Interfaces:	Ethernet (LAN), RS422, EtherNet/IP	Vibration and impact resistance	EN 60947-5-2
Eyesight vision system, Advanced			
Inputs/outputs	2 inputs, 4 outputs		

<sup>1</sup> Max. ripple < 5V<sub>SS</sub>    <sup>2</sup> With LPT45 C-mount protective casing    <sup>3</sup> 80 % air humidity, non-condensing

CCD	Part number	Article number
Monochrome	FA45-300-CC-EAOCSHS6	522-91138
Colour	FA45-300-CCC-EAOCSHS6	522-91145

## FA 45 vision system



153-00434

## Lens



	LO C 8	LO C 12	LO C 16	LO C 25	LO C 50
Focal length	8 mm	12 mm	16 mm	25 mm	50 mm
Article number	526-51513	526-51514	526-51515	526-51516	526-51113

## Accessories

Connection cables	From Page 670
Illumination	From Page 663
Lenses	From Page 661
Brackets	From Page 642
Interface accessories	From Page 674