

VISOR[®] Product Overview

VISOR[®] vision sensors for factory automation

**New
Generation**



Calibration of vision sensors

Metric world and robot coordinates at a mouse click.



Increased efficiency when setting up vision sensors:

Vision sensor intelligence has risen continuously over recent years and can be trusted with more and more complex tasks. The calibration function offered by the VISOR® series is a prime example: it saves considerable time when setting up pick and place applications, as there is no need for programming in the robot control system or PLC. This represents a significant boost in efficiency both for users and integrators.

Contents

SensoPart: innovative, flexible, practical	Page 4
Compact image processing systems in a sensor	Page 22
Overview of vision sensors	Page 12
VISOR®: detectors, tools and interfaces	Page 16
VISOR®: versions and system descriptions	Page 20
Technical data	Page 36
Accessories	Page 38

Vision with foresight

At SensoPart we already anticipate the future of automation.



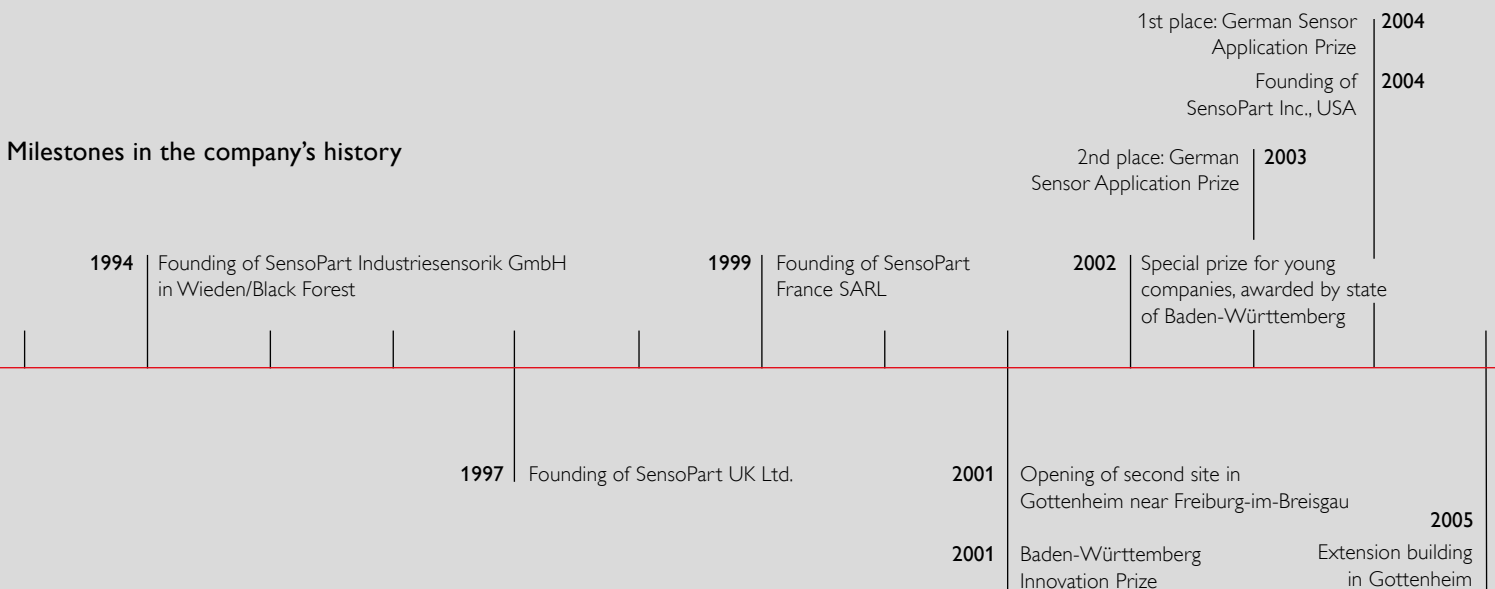
“Our standard is not what is possible today, but the vision of what will be achievable in future” – this has been our credo since the founding of SensoPart in 1994. Our aim is to remain one step ahead and to be able to offer our customers the most innovative products on the market.

When we have identified a path as correct we follow it consistently. As a **family-run company** we can act independently and as we see fit – a major prerequisite for the extremely successful

development that SensoPart has achieved since its start.

Successful products, now considered indispensable for modern factory automation, have been created from the many future-oriented ideas of earlier days. But we do not simply rest on our laurels – because we still have many ideas for the future. Here the future concepts of **Industry 4.0** are playing an important role for us. Some of them have already been implemented with our products.

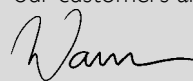
Milestones in the company's history



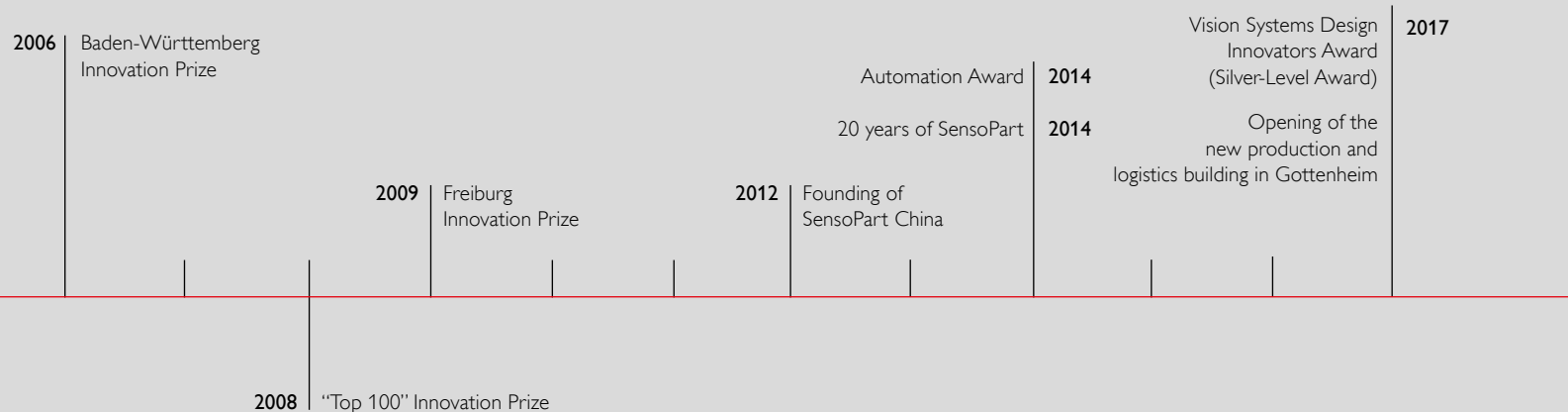


“Dependability, responsibility and trust”

SensoPart is a family-run German company and this also influences our attitude towards work: we believe that dependability is important, we take responsibility for our activities, and we value close and trusting relations within the company as well as with our customers and business partners.



Dr. Theodor Wanner,
Founder and Managing Director of SensoPart



Thoroughly equipped

Sophisticated design and extensive features



- Integrated processing unit with high-performance processor
- Robust and vibration-resistant metal housing, IP 65 / IP 67
- Compact dimensions: 71 x 45 x 45 mm

- Status LEDs



- Simple and flexible installation using dovetail mount
- Extensive range of mounting accessories and holders

Power supply and I/O, M12, 12-pin

- Power supply
- I/Os
- Encoder
- External lighting

Configuration and data output, Ethernet, M12, 4-pin

- Ethernet
- EtherNet/IP
- PROFINET
- sFTP/SMB archiving
- SensoWeb

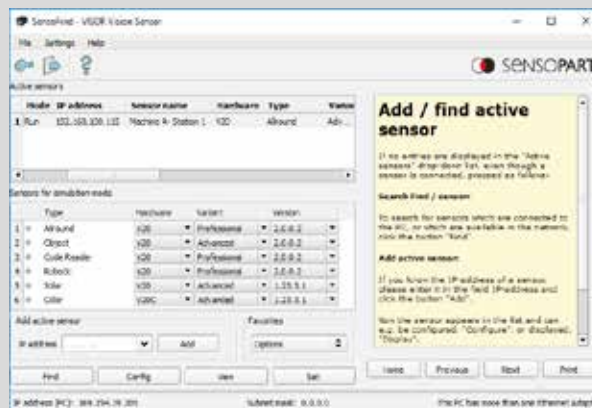
Unpack, set up – it's ready to run! Vision sensors have never been as easy and intuitive to use despite unprecedented levels of performance. The VISOR® is ready in just a few mouse clicks. Thanks to VISOR® technology from SensoPart, there is now a simple and effective solution for even the most challenging vision tasks. Whether these involve complex object shapes, color detection, data matrix codes, fluorescent display elements – our application-specific vision sensors reliably detect all relevant object characteristics.

Setup requires just a few simple steps

Complex tasks made easy - with VISOR® software packages

SensoFind

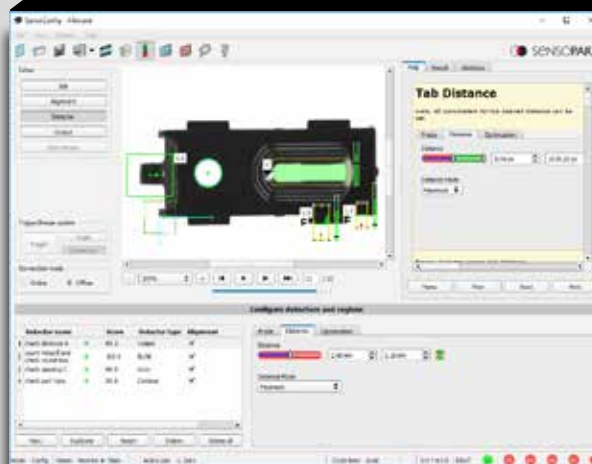
Lists all the VISOR® vision sensors available in the network. Configuration or Viewer mode can be accessed directly from here and offline simulation can also be started.



SensoConfig

VISOR® configuration software.

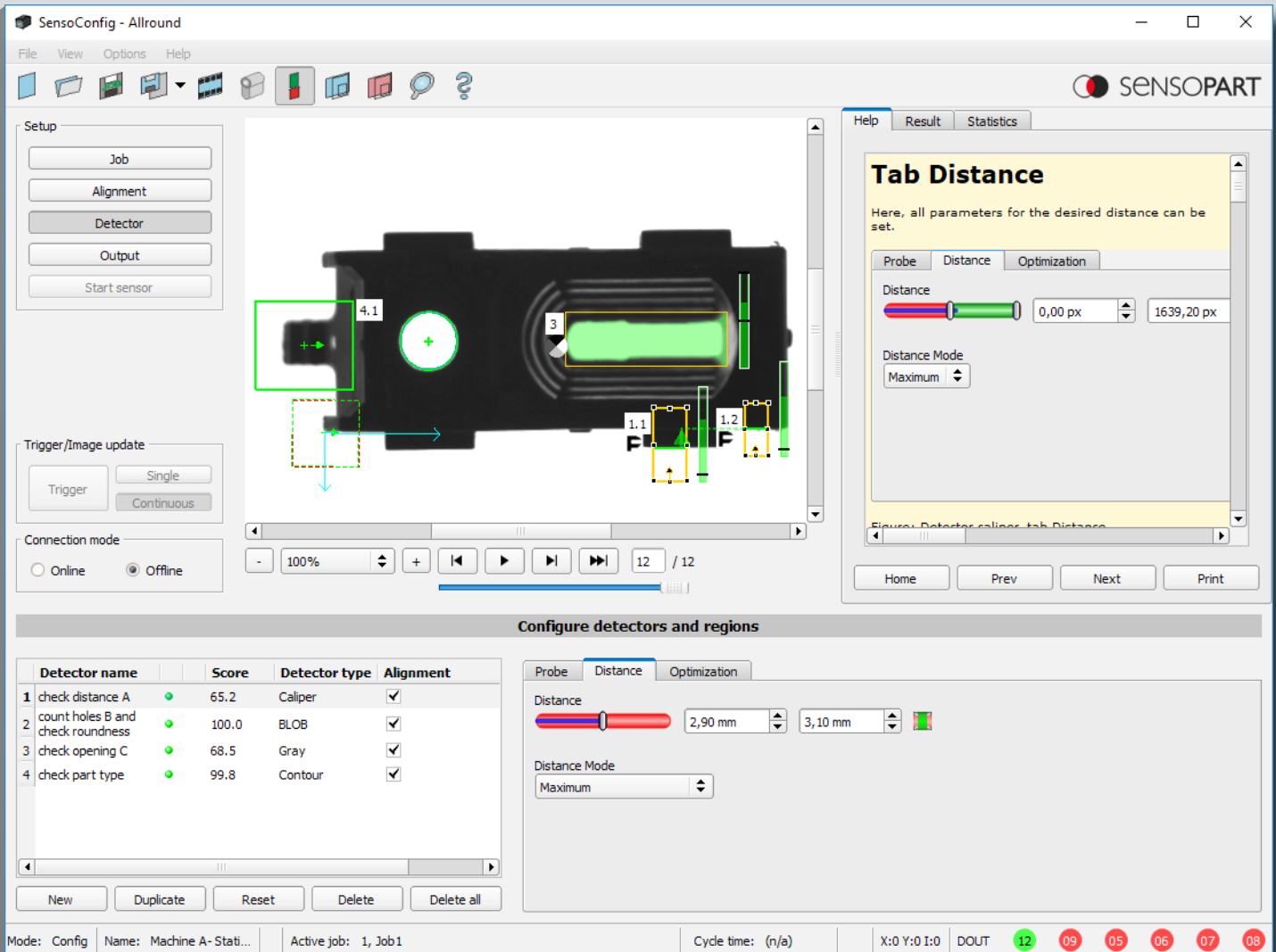
Complex inspection tasks can be easily set up in a step by step process. The effect of each setting is immediately visible on the screen. Comprehensive logic functions enable the direct assignment of complex inspection results to one of six digital result outputs. The integrated image recorder, which enables error analysis and simulations, is also very useful.



SensoView & SensoWeb

Once configuration has been completed, the vision sensor operates as a free-standing unit- i.e. without a PC connection. Data can of course be called up at any time while the sensor is running; a unique viewer software 'SensoView' with restricted user rights is available for this purpose – inadvertent changes to configuration settings are thus reliably avoided. 'SensoWeb' enables easy connection to system visualisation by web browser. Professional image processing is that simple!





Step by step guide

1. Set up job and image
2. Set up image tracking and detectors
3. Result output/communication

A convincing portfolio

An impressive range of outstanding sensors

Advantages of VISOR® vision sensors

- Universal interface for all VISOR® devices, which means universal PLC modules
- Versions with increased depth of field, motorised focus adjustment
- PROFINET (Conformance Class B) with update rate of 4 ms, incl. image transmission via Ethernet
- Easily configurable image processing tools and preprocessing filters for reliable evaluation
- Image resolution can be scaled in software for high-speed analysis
- Standardised electrical and mechanical design
- ONE VISOR® software for ALL versions – this minimises the need for training



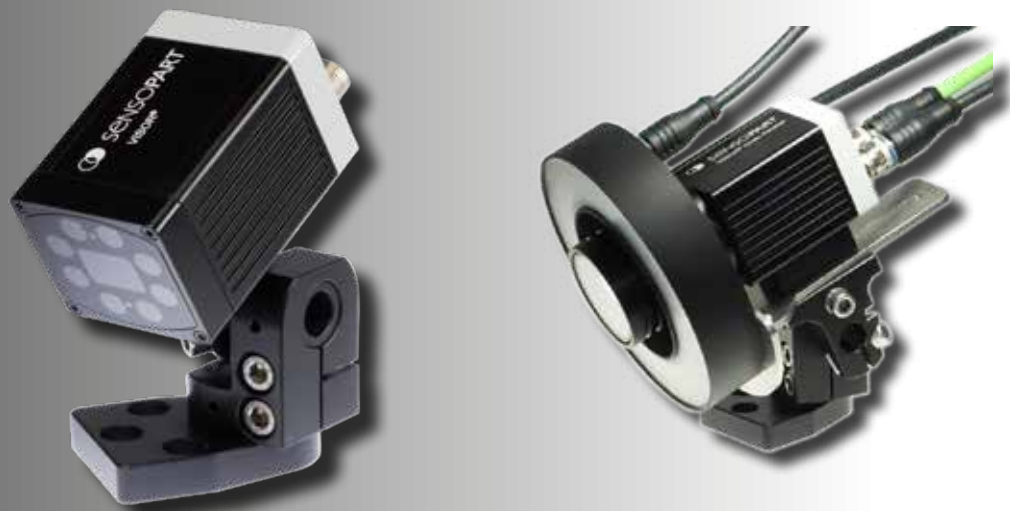
VISOR® red
VISOR® white
VISOR® infrared



VISOR® C-mount

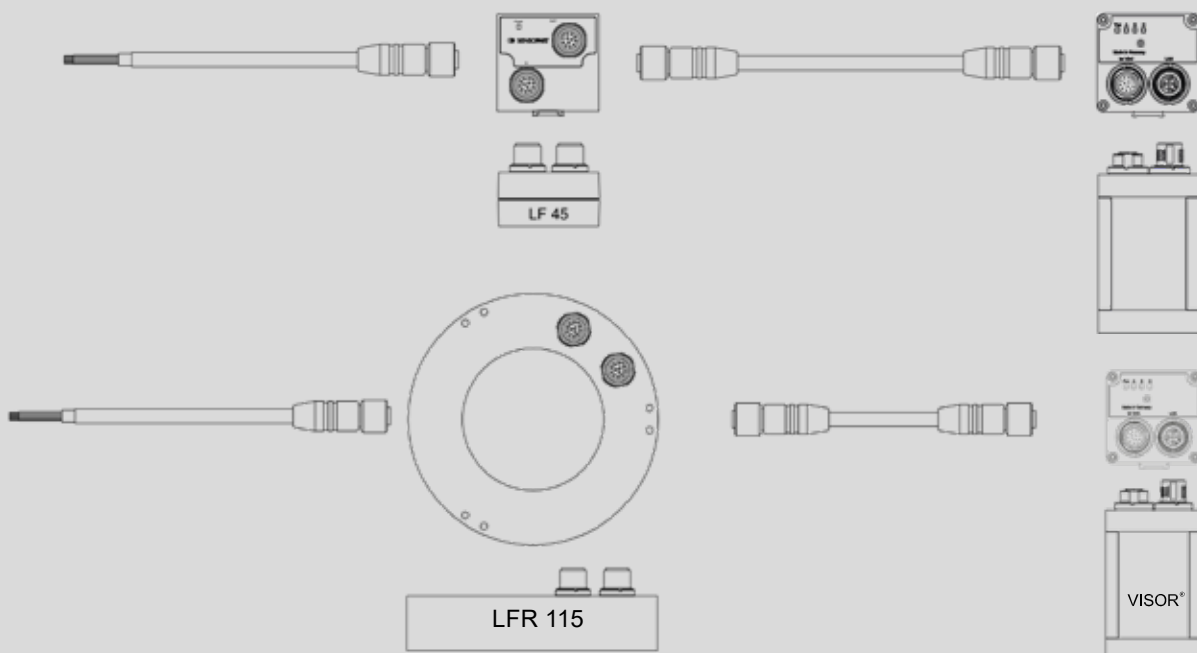
Easily extendible

Innovative and user-friendly accessory and mounting concept



The MG 3A mounting bracket can be combined with mechanical accessories and external lighting.

External lighting can be controlled via VISOR®.



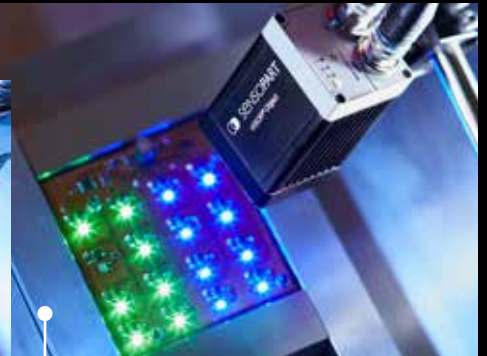
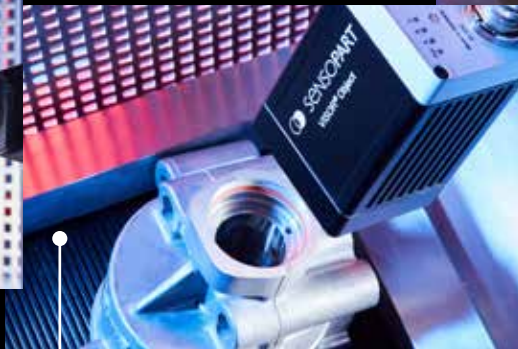
External lighting (panel light LF 45, ring light LFR 115) can be connected directly between the vision sensor and power supply.

VISOR® vision sensors

Image processing can be so easy.

VISOR® Allround

VISOR® Object



VISOR® Allround

Object detection and identification in one device

- All evaluations ("Detectors") of VISOR® Object and VISOR® Code Reader united in one device
- Highly accurate evaluation via 1.5 megapixel chip
- Powerful color detection of version with color chip
- Ethernet, Profinet and EtherNet/IP are available for data communication

VISOR® Object

Reliable detection and classification of objects

- Detectors for presence and completeness checks as well as for simple measurement tasks
- Precise determination of X/Y position, orientation and tracking
- High evaluation accuracy through 1.5 megapixel chip
- Comprehensive logic functions for the digital switching outputs
- Flexible definition of output data (header, trailer, net data)
- Correction of warps and distortions, conversion into millimetres thanks to easy calibration

VISOR® Object Color

Improved object detection through supplementary color information

- Powerful color detection, even with small color nuances or fluorescent components
- Powerful part-finding and tracking
- High evaluation accuracy through 1.5 megapixel color chip
- Up to 8 digital switching outputs

VISOR® Robotic

VISOR® Code Reader



VISOR® Robotic

The expert for robotics applications

- Different detectors for locating up to components
- Check of space available around gripper
- Offset in VISOR® software for simple adjustment of gripper point
- Two calibration methods for robotics applications
- Offset of work plane through Z-offset function

VISOR® Code Reader standard

Reading of barcodes and data matrix codes

- Flexible definition of output data (header; trailer; net data)
- String comparison with signalling via the digital switching output

VISOR® Code Reader Adv. / Prof.

Reading of barcodes and data matrix codes, as well as detection of optical characters (OCR)

- Reads bar codes as well as printed and directly marked data matrix codes reliably; can also read several codes simultaneously and combinations of 1D/2D codes
- Evaluation of quality parameters according to ISO/IEC 15415 and AIM DPM 2006
- Supplementary object detection for features outside the code with "Professional" version

Camera + software = vision!

With its portfolio of vision solutions, SensoPart covers the entire spectrum of industrial image processing. Our VISOR® vision sensors are based on a powerful smart camera in a compact sealed sensor housing with a standardised dovetail mount. They also feature integrated signal processing, LED lighting (white, red, infrared), data interfaces and digital I/Os, integrated lens or C-mount as well as user-friendly configuration software.

Product overview VISOR® vision sensors

	VISOR® Allround		VISOR® Object	
	Presence, completeness, measurement, color, reading of barcodes, 2D codes		Presence, completeness, measurement, color	
	Advanced	Professional	Standard	Advanced
Resolution				
V10 V10C 800 × 600	Monochrome Color	–	Monochrome Color	
Number of images per second V10 V10 C	75 50	– –	75 50	
V20 V20C 1440 × 1080	Monochrome Color		–	Monochrome Color
Number of images per second V20 V20 C	40 20		– –	40 20
Lighting	white, red ¹ , infrared ¹			
Multishot	✓		–	
Target laser	✓		–	✓
Lenses				
V10 wide medium narrow c-mount	✓ ✓ ✓ ✓		✓ ✓ ✓ –	✓ ✓ ✓ ✓
V20 wide medium narrow c-mount	✓ ✓ ✓ ✓		– – – –	✓ ✓ ✓ ✓
Interfaces				
Inputs outputs selectable	2 2 6		2 2 4	2 2 6
Encoder input	✓		–	✓
Ethernet EtherNet/IP Profinet SensoWeb	✓ ✓ ✓ ✓		✓ ✓ ✓ ✓	
Service port	✓		–	✓
Job/Detectors				
Number of jobs (max.)	255		8	255
Number of detectors per job (max.)	255		32	255
Calibration				
Calibration (scaling, perspective)	✓		–	✓
Robot calibration	–	✓	–	
Preprocessing				
Preprocessing filter	✓		–	✓
Multiple image capture/Shutter variation	✓		–	✓
Free-form search area	✓		✓	
Position tracking				
Contour comparison (translation, rotation 360°)	✓		✓	
Pattern matching (translation, rotation 360°)	✓		–	✓
Edge detection (translation, rotation)	✓		–	✓
Object detection				
Contour comparison (translation, rotation 360°)	✓		✓	
Multiple contour detection	✓		–	✓
Pattern matching (translation, rotation 360°)	✓		✓	
Grey level Contrast Brightness	✓		✓	
Calliper	✓		–	✓
BLOB	✓		–	✓
Identification				
Datacode	–		–	
Datacode advanced	✓		–	
Barcode	–		–	
Barcode advanced	✓		–	
Clear text (OCR)	✓		–	
Robotics functions				
Result offset	–	✓	–	
Checking space around gripper	–	✓	–	
Color detectors²				
Color field	✓		✓	
Color value	✓		–	✓
Color list	✓		–	✓
Color distance Binarisation	✓		–	✓










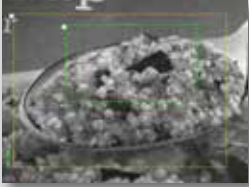










	VISOR® Robotic		VISOR® Code Reader		
	Robotics, presence, completeness, measurement, positioning		Reading of barcodes, 2D codes, text		
	Advanced	Professional	Standard	Advanced	Professional
Resolution					
V10 V10C 800 x 600	Monochrome	–	Monochrome		
Number of images per second V10 V10 C	75	– –	75 –		
V20 V20C 1440 x 1080	Monochrome Color		–	Monochrome	
Number of images per second V20 V20 C	40 20		– –	40 –	
Lighting	white, red ¹ , infrared ¹				
Multishot	–		–		
Target laser	✓		–	✓	
Lenses					
V10 wide medium narrow c-mount	✓ ✓ ✓ ✓		✓ ✓ ✓ –	✓ ✓ ✓ ✓	
V20 wide medium narrow c-mount	✓ ✓ ✓ ✓		– – – –	✓ ✓ ✓ ✓	
Interfaces					
Inputs outputs selectable	2 2 6		2 2 4		2 2 6
Encoder input	✓		✓		
Ethernet EtherNet/IP Profinet SensoWeb	✓ ✓ ✓ ✓		✓ ✓ ✓ ✓		
Service port	✓		–	✓	
Job/Detectors					
Number of jobs (max.)	255		8		255
Number of detectors per job (max.)	255		2		255
Calibration					
Calibration (scaling, perspective)	✓		–		
Robot calibration	✓		–		
Preprocessing					
Preprocessing filter	✓		–	–	✓
Multiple image capture/Shutter variation	✓		–	–	✓
Free-form search area	✓		–	–	✓
Position tracking					
Contour comparison (translation, rotation 360°)	✓		–	–	✓
Pattern matching (translation, rotation 360°)	✓		–	–	✓
Edge detection (translation, rotation)	✓		–	–	✓
Object detection					
Contour comparison (translation, rotation 360°)	✓		–	–	–
Multiple contour detection	✓		–	–	–
Pattern matching (translation, rotation 360°)	✓		–	–	✓
Grey level Contrast Brightness	✓		–	–	✓
Calliper	✓		–	–	–
BLOB	✓		–	–	–
Identification					
Datacode	–	✓	✓	–	✓
Datacode advanced	–	✓	–	–	✓
Barcode	–	✓	✓	–	✓
Barcode advanced	–	✓	–	–	✓
Clear text (OCR)	–	✓	–	–	✓
Robotics functions					
Result offset	✓		–	–	–
Checking space around gripper	✓		–	–	–
Color detectors²					
Color field	–		–	–	–
Color value	–		–	–	–
Color list	–		–	–	–
Color distance Binarisation	✓		–	–	–

¹ not with color hardware V10C/V20C

² only color hardware

VISOR® vision sensor










Detectors and application examples

Identification			
 Barcode	Reading and quality assessment of most barcode types, such as EAN, UPC, RSS, 2/5 Interleaved, 2/5 Industrial, Code 32, Code 39, Code 93, Code 128, GS1, Pharmacode, Codabar.		-
 Data code	Reading and quality assessment of 2D codes, such as ECC200, QR code, ECC200 (GS1), QR code (GS1), PDF 417. High-performance decoder algorithm for directly marked, low-contrast and damaged codes.		-
 OCR	Optical character reading of printed, laser-etched or dot-peened characters. High reading rate with difficult characters or fluctuating marking quality through use of neural networks. Easy to use. Fast segmentation mode for high reading rates.		-
Object detection		✓ ok	✗ not ok
 Pattern matching	Object search based on pattern matching: once a pattern has been taught, consecutive images are then scanned for the same pattern. The degree of similarity can be defined by switching thresholds. Free form function for teaching random shapes with random orientation.		
 Contour	Object search based on contour comparison: once a contour has been taught, images are then scanned for the same contour. The degree of similarity can be defined by switching thresholds. Function for teaching random shapes. Orientation and scaling variations are configurable.		
 Contrast	Contrast analysis in search zone. Definition of result output via switching threshold.		
 Brightness	Brightness analysis in search zone. Definition of result output via switching threshold.		

Object detection (continued)		✓ ok	✗ not ok
 Grey threshold	Analysis of grey threshold in search zone. Definition of result output via switching threshold.		
 Calliper	Measurement of the distance between edges. Diverse detection options. Measurement of minimum, maximum or averaged distance values. Innovative visualisation of detected edges. Definition of measurement sensitivity by dividing the measurement field into search beams.		
 BLOB	Counting and evaluation of objects: Analysis and sorting of objects based on user-defined criteria (area, height, width, circumference, position face up/face down and more).		
Color detection		✓ ok	✗ not ok
 Color value	Output of color values via interfaces, setting options for color space: RGB, HSV, LAB.		-
 Color list	Color evaluation via list: find a color from a list of taught colors, evaluation of colors according to color deviation (delta e) in the color spaces RGB, HSV and LAB.		
 Color area	Color evaluation via area: evaluation of interrelated color area according to size and color. Innovative configuration via histogram for color spaces RGB, HSV and LAB.		

VISOR® vision sensor

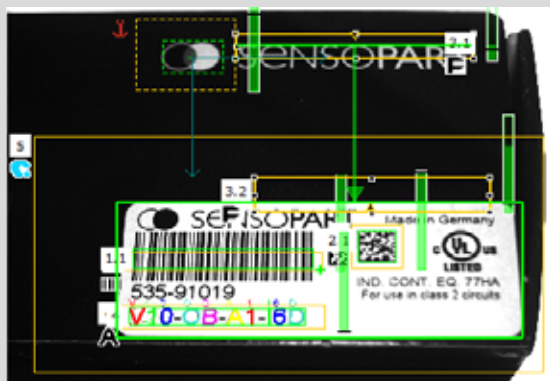
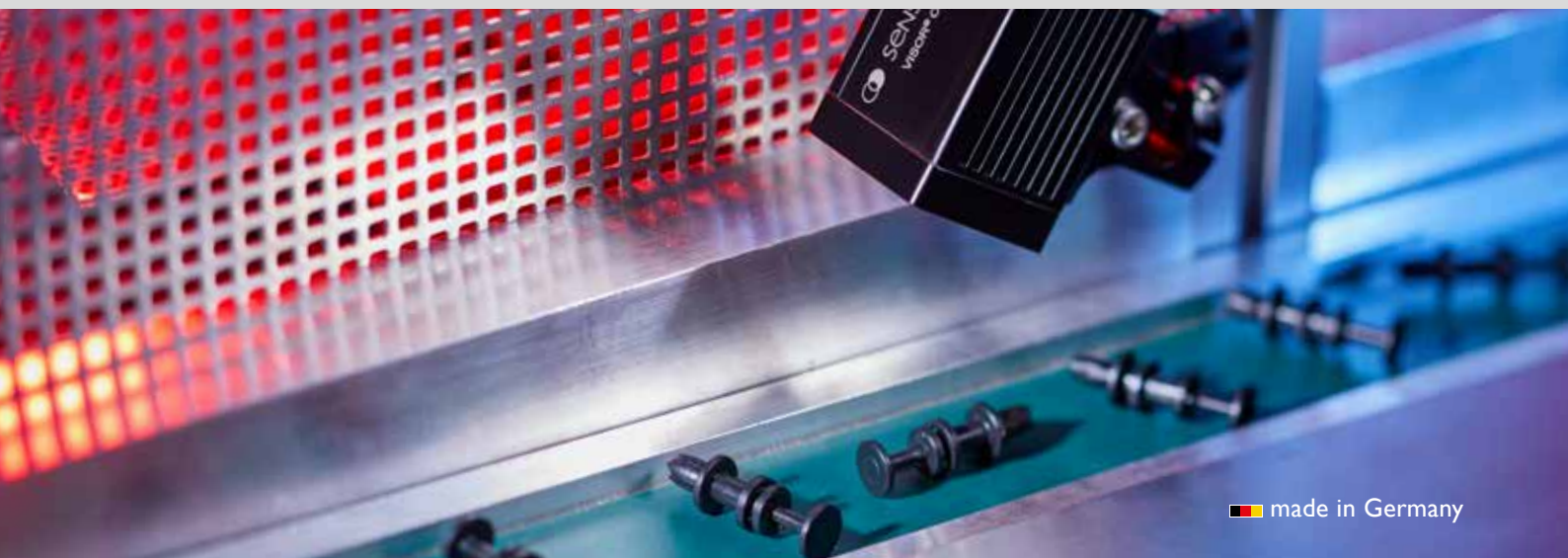
Detectors and application examples

Position tracking		✓ ok	✗ not ok
 Edge detection	<p>High-performance edge finder for position tracking. Combination of different search strategies possible. Innovative visualisation of edges found. Definition of measurement sensitivity by dividing the measurement field into search beams.</p>		
 Pattern matching	<p>Object search based on pattern matching: once a pattern has been taught, consecutive images are then scanned for the same pattern. The degree of similarity can be defined by switching thresholds. Free form function for teaching random shapes. Detection of rotated patterns.</p>		
 Contour	<p>Object search based on contour comparison: once a contour has been taught, images are scanned for the same contour. The degree of similarity can be defined by switching thresholds. Free form function for teaching random shapes. Orientation and scaling variations are configurable.</p>		
Functions & preprocessing filters			
Pattern matching	<p>Object search based on pattern matching: once a pattern has been taught, consecutive images are then scanned for the same pattern. The degree of similarity can be defined by switching thresholds. Free form function for teaching random shapes.</p>		
Filter	<p>Large number of preprocessing filters to improve the picture before actual image processing.</p>		
Color filters	<p>Definition of any color as software color filter to enable OCR on multi-colored backgrounds or the highlighting of edges during object detection tasks (e.g. for parts on colored conveyor belts)</p>		

Interfaces	
 <p>SensoWeb</p>	<p>Visualisation of images and results. Easy connection to system visualisation by web browser.</p>
	<p>Industrial Ethernet in compliance with PROFINET standard (Conformance Class B) through integrated Ethernet interface. VISOR® control options via PROFINET commands.</p>
	<p>Industrial Ethernet in compliance with EtherNet/IP standard through integrated Ethernet interface. VISOR® control options via EtherNet/IP commands.</p>
<p>Ethernet TCP/IP</p>	<p>Ethernet interface with user-configurable protocol. VISOR® control options via TCP/IP commands.</p>
Calibration	
<p>Calibration (scaling/ perspective)</p>	<p>Output of results in customised units (mm, cm, inch). Effects of perspective corrected according to the calibration method.</p>
<p>Robotic calibration</p> 	<p>Output of results in customised units (mm, cm, m, inch) in a world coordinates system. A number of different methods are available for high flexibility.</p>

VISOR® Allround

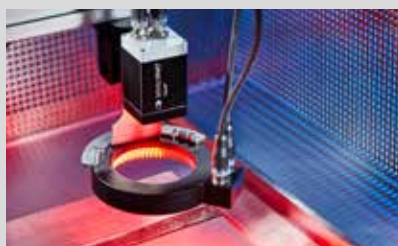
Advanced allround vision sensor for complex inspection tasks.



VISOR® Allround – Object detection in color plus identification united in one device.
The VISOR® Allround is a real multi-talent among vision sensors. In the allround version, the device combines the functions of the object sensor (i.a. calibration, pattern matching, contour, calliper, BLOB) with the powerful tools of the code reader (barcode, datamatrix and optical character recognition).

HIGHLIGHTS OF VISOR® ALLROUND

- All evaluations (“Detectors”) of object sensor and code reader combined in one device
- Precise determination of X/Y position, orientation and tracking
- Can be used for all common 2D-Codes (ECC 200-Data-matrix) and common 1D-barcodes
- User-friendly configuration and viewer software with graded user rights and online help



Raised or recessed object details – such as embossed digits and characters on a credit card – are difficult to detect with standard image processing methods. A remedy for this problem was found in the new Multishot function of VISOR® vision sensor range of SensoPart.

VISOR® Allround – Object detection plus identification.

The VISOR® Allround combines object detection functions with powerful code reading tools. When feeding parts in correct alignment or positioning components, additional data matrix codes for example can also be read. With a resolution of up to 1.5 megapixel even the smallest details are reliably detected and evaluated.

In addition to the monochrome version, the VISOR® Allround is also available as a color version with up to 1.5 megapixel.

Thus additional “Detectors” are available for color evaluation. Even the subtlest nuances in shade can be reliably detected. The relevant object colors, for example, can be taught-in quite simply at the push of a button or - thanks to the intuitive color histogram - set graphically for each channel in the color space. The authorised color tolerances can be defined by the user.

VISOR® Allround – product overview				
	Product variants	Resolution	Field of view	Integrated lighting
V20x-ALL-A3-xxx	Advanced	1440 x 1080 mono/color	wide	White, red* or infrared* LEDs
V20x-ALL-A3-xxx	Advanced	1440 x 1080 mono/color	medium	White, red* or infrared* LEDs
V20x-ALL-A3-xxx	Advanced	1440 x 1080 mono/color	narrow	White, red* or infrared* LEDs
V20x-ALL-A3-C-2	Advanced	1440 x 1080 mono/color	C-mount	None
V20x-ALL-P3-xxx	Professional	1440 x 1080 mono/color	wide	White, red* or infrared* LEDs
V20x-ALL-P3-xxx	Professional	1440 x 1080 mono/color	medium	White, red* or infrared* LEDs
V20x-ALL-P3-xxx	Professional	1440 x 1080 mono/color	narrow	White, red* or infrared* LEDs
V20x-ALL-P3-C-2	Professional	1440 x 1080 mono/color	C-mount	None
V10x-ALL-A3-xxx	Advanced	800 x 600 mono/color	wide	White, red* or infrared* LEDs
V10x-ALL-A3-xxx	Advanced	800 x 600 mono/color	medium	White, red* or infrared* LEDs
V10x-ALL-A3-xxx	Advanced	800 x 600 mono/color	narrow	White, red* or infrared* LEDs
V10x-ALL-A3-C-2	Advanced	800 x 600 mono/color	C-mount	None

*only with monochrome version

VISOR® Allround

System description

VISOR® Allround – Object detection in color plus identification combined in one device

The VISOR® Allround leaves nothing to be desired.

The VISOR® Allround combines the functions of the object sensor (i.a. calibration, pattern matching, contour, calliper, BLOB) with the powerful tools of the code reader (barcode, datamatrix and optical character recognition). When feeding parts in correct alignment or positioning components, additional data matrix codes for example can now also be read. With a resolution of up to 1.5 megapixel even the smallest details are reliably detected and evaluated.

Special image filters for image pre-processing can be used, e.g. to highlight edges or to suppress distracting details.

Communication interfaces

In addition to EtherNet/IP and TCP/IP, the VISOR® vision sensors also support the fieldbus standard Profinet IO and thus "understand" the most common communication standards of Industrial Ethernet. Thanks to freely available PLC function blocks for Siemens S7, Codesys and Allen Bradley, the VISOR® can also be easily and flexibly connected to PLC environments. The new VISOR® Allround is thus one of the most powerful vision sensors in the market.

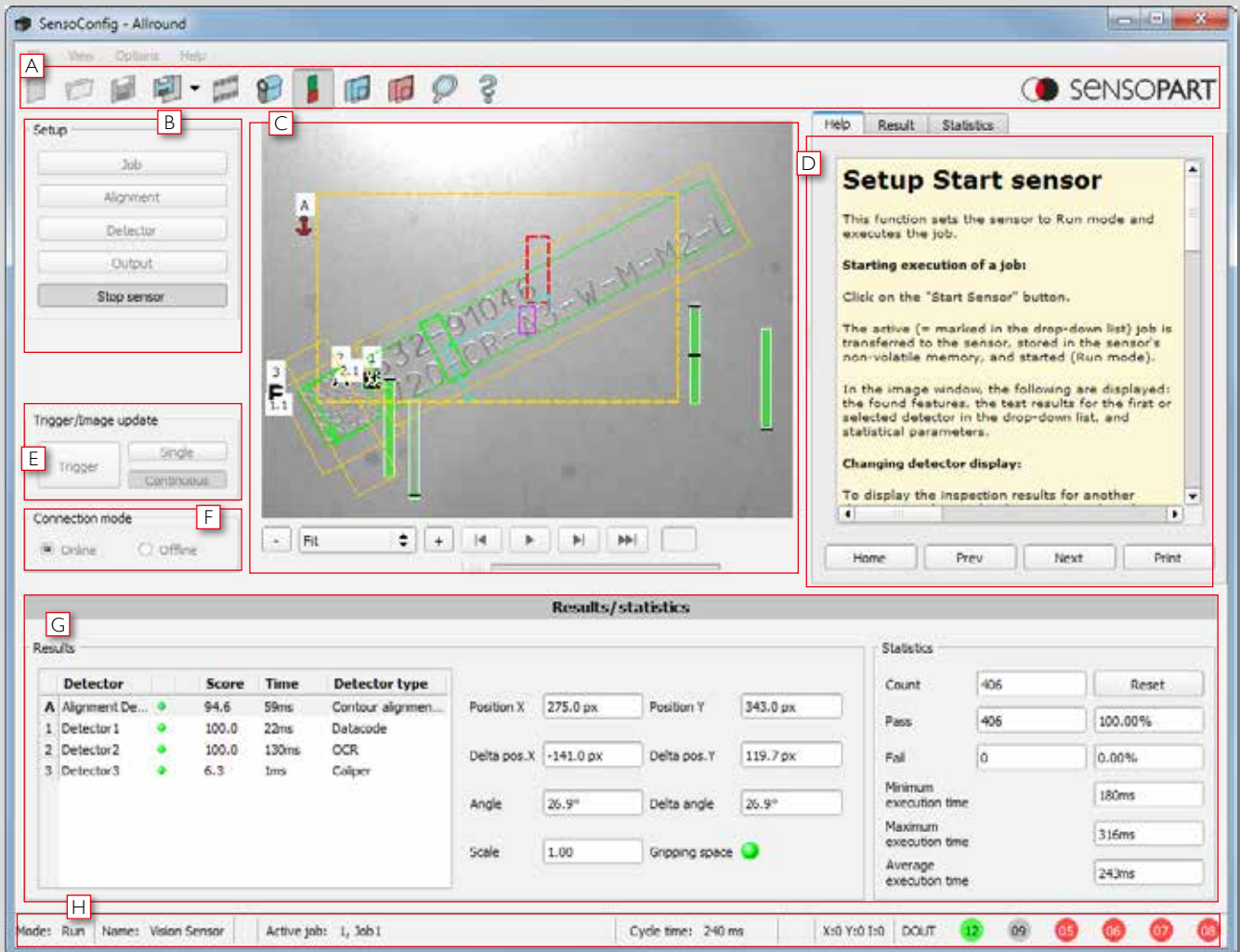
Raised or recessed object details – such as embossed digits and characters on a credit card – are difficult to detect with standard image processing methods. Even use of lateral lighting generally results in poorly identifiable contours due to overexposure and shadows. The solution comes in the shape of SensoPart's VISOR® vision sensor series with the new Multishot function. Contours now stand out clearly so that raised or recessed letters and digits can be easily read, e.g. using the vision sensor's OCR function. Other application examples for VISOR® Multishot include the reading of data matrix codes moulded directly into plastic surfaces, detection of damage such as dents or scratches, or the recognition of raised adhesive beads on the same colored background.

Product variants VISOR® Allround

	VISOR® Allround	
	Presence, completeness, measurement, color, reading of barcodes, 2D codes	
	Advanced	Professional
Resolution	Monochrome, Color	
V10 V10C 800 × 600	75 50	– –
Number of images per second V10 V10 C	Monochrome Color	
V20 V20C 1440 × 1080	40 20	
Number of images per second V20 V20 C	white, red ¹ , infrared ¹	
Lighting		
Multishot	✓	
Target laser	✓	
Lenses		
V10 wide medium narrow c-mount	✓ ✓ ✓ ✓	
V20 wide medium narrow c-mount	✓ ✓ ✓ ✓	
Interfaces		
Inputs outputs selectable	2 2 6	
Encoder input	✓	
Ethernet EtherNet/IP Profinet SensoWeb	✓ ✓ ✓ ✓	
Service port	✓	
Job/Detectors		
Number of jobs (max.)	255	
Number of detectors per job (max.)	255	
Calibration		
Calibration (scaling, perspective)	✓	
Robot calibration	–	✓
Preprocessing		
Preprocessing filter	✓	
Multiple image capture/Shutter variation	✓	
Free-form search area	✓	
Position tracking		
Contour comparison (translation, rotation 360°)	✓	
Pattern matching (translation, rotation 360°)	✓	
Edge detection (translation, rotation)	✓	
Object detection		
Contour comparison (translation, rotation 360°)	✓	
Multiple contour detection	✓	
Pattern matching (translation, rotation 360°)	✓	
Grey level Contrast Brightness	✓	
Calliper	✓	
BLOB	✓	
Identification		
Datacode	✓	
Datacode advanced	✓	
Barcode	✓	
Barcode advanced	✓	
Clear text (OCR)	✓	
Robotics functions		
Result offset	–	✓
Checking space around gripper	–	✓
Color detectors²		
Color field	✓	
Color value	✓	
Color list	✓	
Color distance Binarisation	✓	

¹ not with color hardware V10C/V20C

² only color hardware



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 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 Result window:** Overview of all results.
- H Status line:** current information on active job and on state of outputs.

VISOR® Object

Detects the right part in the wrong place and vice versa.



HIGHLIGHTS OF VISOR® OBJECT

- Detectors for presence and completeness checks as well as for simple measurement tasks
- Precise position determination: x/y-position and orientation
- Improved object detection through additional color information
- Comprehensive logic functions for the digital switching outputs
- Flexible definition of output data
- Support of EtherNet/IP and PROFINET
- Comprehensive for archiving images and data
- Correction of warps and distortions, conversion into millimetres thanks to easy calibration



The one with a BLOB: With the BLOB detector (Binary Large Object), the VISOR® detects even small differences between objects, counts parts or detects whether a part is face up or face down.



The same or not the same?
The VISOR® detects even the smallest of color nuances more reliably than the human eye. This allows, for example, the detection of color deviations or the sorting of parts by color.

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 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. The comprehensive calibration functions range from a simple scaling factor to the correction of image and lens distortions at a mouse click. With its highly precise position and orientation detection, our VISOR® Object is one of the best in its class.

Seven detectors plus position detection

An expansive range of detectors is available for inspection tasks and evaluations: pattern matching, contour detection, calliper, BLOB, brightness, grey threshold and contrast detection. Position tracking offers reliable detection of those features that do not repeatedly appear in the original position taught. 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. The color version features detectors for color detection, enabling VISOR® to also distinguish between the finest nuances in shade. This powerful tool allows you to solve even demanding applications confidently!

VISOR® Object – product overview				
	Product variants	Resolution	Field of view	Integrated lighting
V20x-OB-A3-xxx	Advanced	1440 x 1080 mono/color	wide	White, red* or infrared* LEDs
V20x-OB-A3-xxx	Advanced	1440 x 1080 mono/color	medium	White, red* or infrared* LEDs
V20x-OB-A3-xxx	Advanced	1440 x 1080 mono/color	narrow	White, red* or infrared* LEDs
V20x-OB-A3-C-2	Advanced	1440 x 1080 mono/color	C-mount	None
V10x-OB-S3-xxx	Standard	800 x 600 mono/color	wide	White, red* or infrared* LEDs
V10x-OB-S3-xxx	Standard	800 x 600 mono/color	medium	White, red* or infrared* LEDs
V10x-OB-S3-xxx	Standard	800 x 600 mono/color	narrow	White, red* or infrared* LEDs
V10x-OB-A3-xxx	Advanced	800 x 600 mono/color	wide	White, red* or infrared* LEDs
V10x-OB-A3-xxx	Advanced	800 x 600 mono/color	medium	White, red* or infrared* LEDs
V10x-OB-A3-xxx	Advanced	800 x 600 mono/color	narrow	White, red* or infrared* LEDs
V10x-OB-A3-C-2	Advanced	800 x 600 mono/color	C-mount	None

*only with monochrome version

VISOR® Object

System description

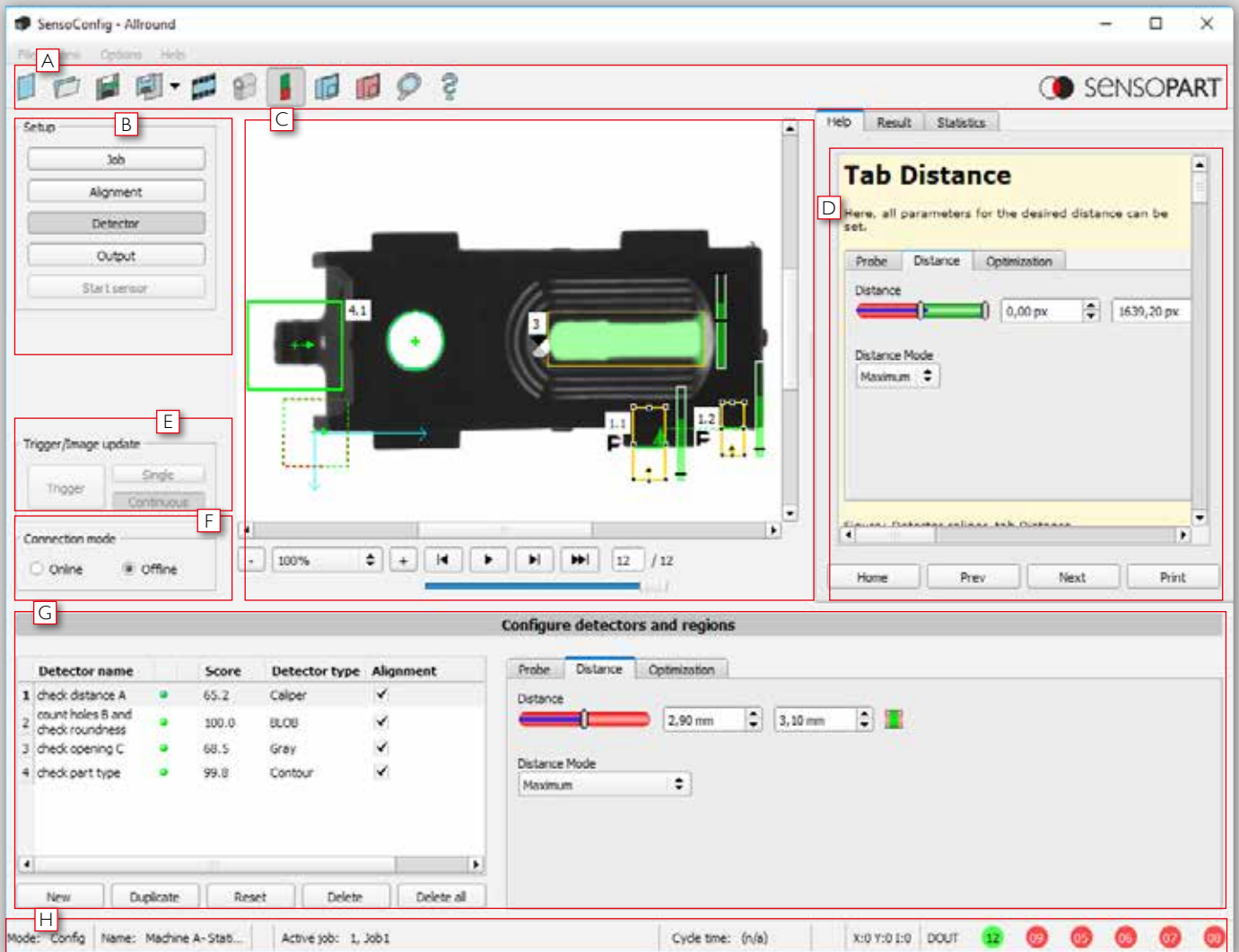
The VISOR® Object from SensoPart not only impresses with its excellent performance data, but also with its sophisticated operating concept: even the definition of complex inspection tasks is achieved rapidly and without complication thanks to its comfortable and easily understood user interface – even without detailed image-processing knowledge. You define and test your inspection tasks (“job”) 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. 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 “SensoView” with hierarchical user rights (reliably preventing unintentional changes to the configuration) is available for this. “SensoWeb” enables a simple integration into the plant visualisation via web browser. Professional image processing can be this simple and comfortable!

Product variants VISOR® Object

	VISOR® Object	
	Presence, completeness, measurement, color	
	Standard	Advanced
Resolution		
V10 V10C 800 × 600	Monochrome Color	
Number of images per second V10 V10 C	75 50	
V20 V20C 1440 × 1080	–	Monochrome Color
Number of images per second V20 V20 C	– –	40 20
Lighting	white, red ¹ , infrared ¹	
Multishot	–	
Target laser	–	✓
Lenses		
V10 wide medium narrow c-mount	✓ ✓ ✓ –	✓ ✓ ✓ ✓
V20 wide medium narrow c-mount	– – – –	✓ ✓ ✓ ✓
Interfaces		
Inputs outputs selectable	2 2 4	2 2 6
Encoder input	–	✓
Ethernet EtherNet/IP Profinet SensoWeb	✓ ✓ ✓ ✓	
Service port	–	✓
Job/Detectors		
Number of jobs (max.)	8	255
Number of detectors per job (max.)	32	255
Calibration		
Calibration (scaling, perspective)	–	✓
Robot calibration	–	
Preprocessing		
Preprocessing filter	–	✓
Multiple image capture/Shutter variation	–	✓
Free-form search area	✓	
Position tracking		
Contour comparison (translation, rotation 360°)	✓	
Pattern matching (translation, rotation 360°)	–	✓
Edge detection (translation, rotation)	–	✓
Object detection		
Contour comparison (translation, rotation 360°)	✓	
Multiple contour detection	–	✓
Pattern matching (translation, rotation 360°)	✓	
Grey level Contrast Brightness	✓	
Calliper	–	✓
BLOB	–	✓
Identification		
Datacode	–	
Datacode advanced	–	
Barcode	–	
Barcode advanced	–	
Clear text (OCR)	–	
Robotics functions		
Result offset	–	
Checking space around gripper	–	
Color detectors²		
Color field	✓	
Color value	–	✓
Color list	–	✓
Color distance Binarisation	–	✓



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 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.

VISOR® Robotic

An eye on everything – the vision sensor for robotics applications



The VISOR® Robotic detects the component's position in a universal tray. It can then be reliably removed. Up to 255 configurations enable utmost production flexibility.



The VISOR® Robotic determines the exact position of the sensor housing. Offset data is used to correct the robot's trajectory.

HIGHLIGHTS OF VISOR® ROBOTIC

- The right version for every application
 - Different resolutions
 - Diverse fields of view
 - Monochrome and color version (e.g. to suppress, different colored conveyor belts)
- Motor-operated focus and a target laser (laser class 1) for easy alignment of VISOR® Robotic
- Integrated and standardised interfaces (PROFINET, EtherNet/IP, TCP/IP)
- Flexible output protocol
- Gripping space check – check for available space around gripper
- Offset of work plane through Z-offset function
- Result offset correction in VISOR® software for simple adjustment of gripper point
- Different detectors for locating components

Picking up components

Feeding systems in a production line are becoming increasingly versatile – in addition to universal trays, components can be supplied with utmost flexibility using hopper feeders. Thanks to the VISOR® Robotic, components can be reliably located and gripped with both feed options. When loose components are supplied, the sensor not only checks their position but also inspects the free space around the gripper. The VISOR® determines both sets of information and sends them to the robot controller via one of the integrated and standardised process interfaces. The process is managed on the basis of this information – the object is gripped or the feeder is triggered.

The application can also be flexibly adapted to individual goods carriers without the need for a costly centring device. The VISOR® detects the position and the fill level of the tray and transmits this information to the robot. If the camera is mounted in a stationary manner, this is cycle time-neutral.

Placing parts

What happens after components have been reliably collected by the gripper? The VISOR® Robotic also supplies important information for the next work steps, and demonstrates its skills in robot-controlled applications, such as the placing of screws, the mounting of clips or the application of glue. The detection of component positions is carried out effortlessly; this allows the correction of any offset and increases the quality of production. Knowledge of the exact position of a component ensures, for example, the precise insertion of a windscreen. Mechanical effort is reduced, and the production line becomes even more flexible. The VISOR® Robotic concept enables direct communication between the VISOR® and the robot, an additional instance is no longer necessary for many applications.

VISOR® Robotic – product overview				
	Product variants	Resolution	Field of view	Integrated lighting
V20x-RO-A3-xxx	Advanced	1440 × 1080 mono/color	wide	White, red* or infrared* LEDs
V20x-RO-A3-xxx	Advanced	1440 × 1080 mono/color	medium	White, red* or infrared* LEDs
V20x-RO-A3-xxx	Advanced	1440 × 1080 mono/color	narrow	White, red* or infrared* LEDs
V20x-RO-A3-C-2	Advanced	1440 × 1080 mono/color	C-mount	None
V20x-RO-P3-xxx	Professional	1440 × 1080 mono/color	wide	White, red* or infrared* LEDs
V20x-RO-P3-xxx	Professional	1440 × 1080 mono/color	medium	White, red* or infrared* LEDs
V20x-RO-P3-xxx	Professional	1440 × 1080 mono/color	narrow	White, red* or infrared* LEDs
V20x-RO-P3-C-2	Professional	1440 × 1080 mono/color	C-mount	None
V10-RO-A3-xxx	Advanced	800 × 600 mono	wide	White, red or infrared LEDs
V10-RO-A3-xxx	Advanced	800 × 600 mono	medium	White, red or infrared LEDs
V10-RO-A3-xxx	Advanced	800 × 600 mono	narrow	White, red or infrared LEDs
V10-RO-A3-C-2	Advanced	800 × 600 mono	C-mount	None

*only with monochrome version

VISOR® Robotic

System description

A diverse specialist

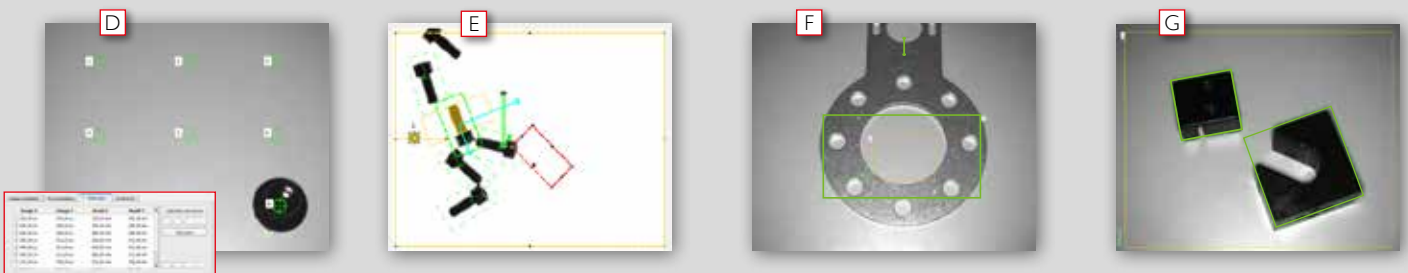
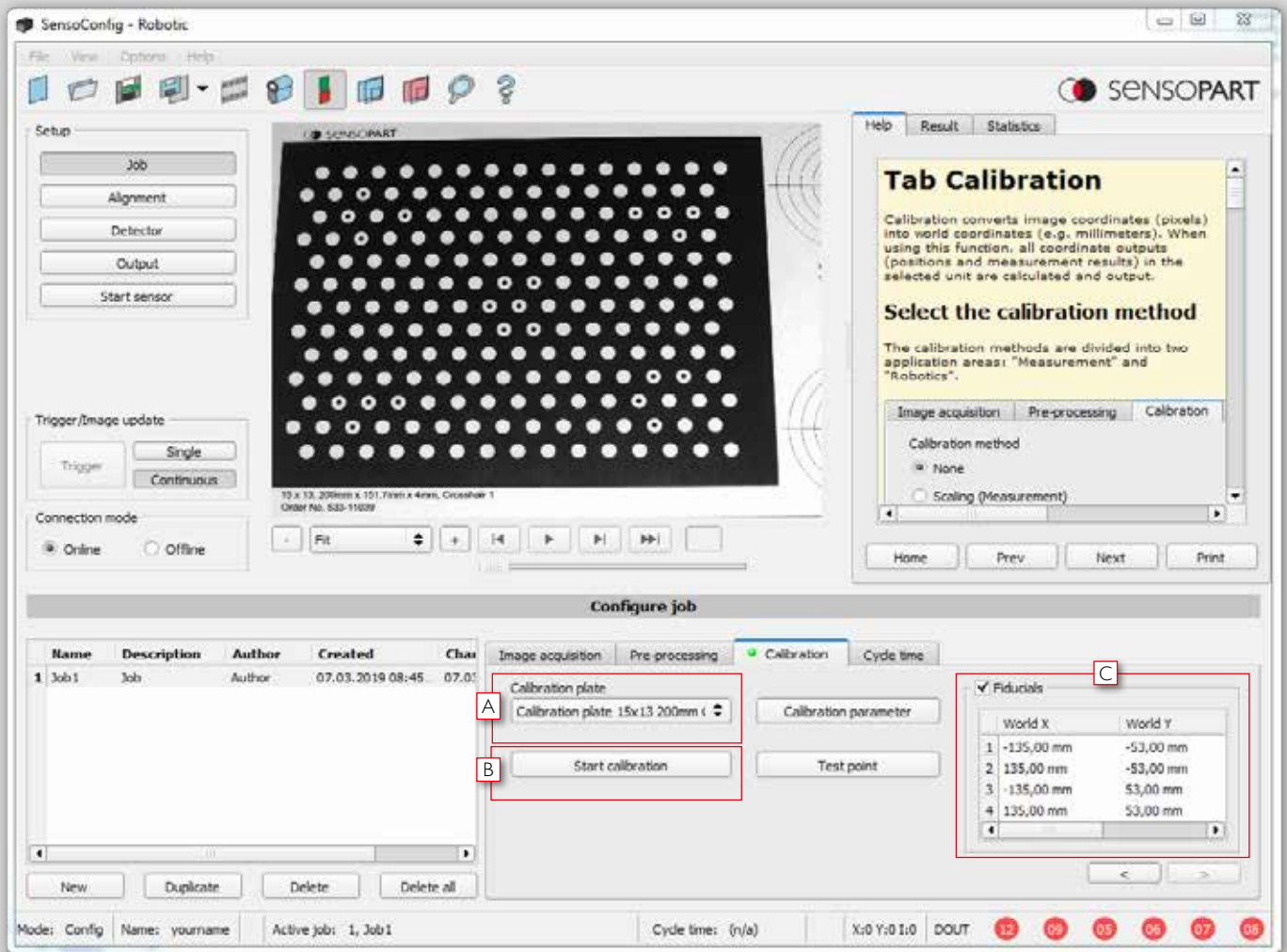
Expectations of today's robotics solutions are steadily rising in the context of Industry 4.0, paired with a simultaneous desire for greater ease-of-use. And this is precisely where the VISOR® Robotic demonstrates its outstanding ability. Available in several versions, it offers the perfect solution for a variety of automation tasks. Designed with integrated and standardised interfaces, VISOR® Robotic can be easily incorporated in existing installations and systems, and thanks to different calibration methods and flexible data structures, it is also suited to a diverse range of procedures.

Product variants VISOR® Robotic

	VISOR® Robotic	
	Robotics, presence, completeness, measurement, positioning	
	Advanced	Professional
Resolution		
V10 V10C 800 × 600	Monochrome	–
Number of images per second V10 V10 C	75	– –
V20 V20C 1440 × 1080	Monochrome Color	
Number of images per second V20 V20 C	40 20	
Lighting	white, red ¹ , infrared ¹	
Multishot	–	
Target laser	✓	
Lenses		
V10 wide medium narrow c-mount	✓ ✓ ✓ ✓	
V20 wide medium narrow c-mount	✓ ✓ ✓ ✓	
Interfaces		
Inputs outputs selectable	2 2 6	
Encoder input	✓	
Ethernet EtherNet/IP Profinet SensoWeb	✓ ✓ ✓ ✓	
Service port	✓	
Job/Detectors		
Number of jobs (max.)	255	
Number of detectors per job (max.)	255	
Calibration		
Calibration (scaling, perspective)	✓	
Robot calibration	✓	
Preprocessing		
Preprocessing filter	✓	
Multiple image capture/Shutter variation	✓	
Free-form search area	✓	
Position tracking		
Contour comparison (translation, rotation 360°)	✓	
Pattern matching (translation, rotation 360°)	✓	
Edge detection (translation, rotation)	✓	
Object detection		
Contour comparison (translation, rotation 360°)	✓	
Multiple contour detection	✓	
Pattern matching (translation, rotation 360°)	✓	
Grey level Contrast Brightness	✓	
Calliper	✓	
BLOB	✓	
Identification		
Datacode	–	✓
Datacode advanced	–	✓
Barcode	–	✓
Barcode advanced	–	✓
Clear text (OCR)	–	✓
Robotics functions		
Result offset	✓	
Checking space around gripper	✓	
Color detectors²		
Color field	–	
Color value	–	–
Color list	–	–
Color distance Binarisation	✓	✓

¹ not with color hardware V10C/V20C

² only color hardware



Guide to user interface

- A Select calibration plate:** choice of four different sizes.
- B Start calibration:** VISOR® is calibrated in just one click.
- C Fiducials:** image coordinates mapped to robot coordinates at four points.
- D Calibration method point pair list:** calibration with point pair list (robot) for automatic calibration on object.
- E Gripping space check:** a freely accessible object is always output if available.
- F Result offset:** define the result point and therefore the position that the robot moves to on the component.
- G Blob detector:** localise components regardless of their shape and size. No need to teach a reference.

VISOR® Code Reader

Reads whatever is printed, dot-peened and lasered.



The VISOR® Code Reader from SensoPart easily reads barcodes of numerous types as well as printed and directly marked data matrix codes according to the ECC200 standard, regardless of the carrier materials (metal, plastic, paper, glass). The sensor even easily deciphers skewed or distorted codes, or those on to convex, reflective or transparent surfaces.

Built-in early warning system: the VISOR® Code Reader evaluates the quality of your printed and directly marked data matrix codes on the basis of standardised quality parameters according to ISO and AIM standards.

The VISOR® Code Reader Standard offers suitable tools for easily readable barcodes and data matrix codes (e.g. printed). The Advanced or Professional versions provide high-performance reading algorithms for difficult codes (e.g. directly marked).

HIGHLIGHTS OF VISOR® CODE READER

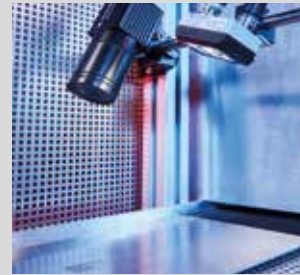
- Reliably reads barcodes as well as printed and directly marked data matrix codes, and even several codes simultaneously and mixed 1D/2D codes
- Supplementary object detection for characteristics other than codes
- Evaluation of quality parameters according to ISO/IEC 15415 and AIM DPM 2006
- Flexible definition of output data (header; trailer; net data)
- String comparison with message via the digital switching output
- Support of EtherNet/IP and DHCP, PROFINET
- Comprehensive options for archiving images and data
- Reading of optical characters with OCR



Printed barcodes



Code on shiny metallic surface



Dot-peened code with external lighting



*A lot of information in a small space:
up to 2,334 ASCII symbols (7 bit) or
3,116 digits can be coded with an
ECC-200 data matrix code.*

VISOR® Code Reader – product overview				
	Product variants	Resolution	Field of view	Integrated lighting
V20-CR-A3-xxx	Advanced	1440 × 1080	wide	White, red or infrared LEDs
V20-CR-A3-xxx	Advanced	1440 × 1080	medium	White, red or infrared LEDs
V20-CR-A3-xxx	Advanced	1440 × 1080	narrow	White, red or infrared LEDs
V20-CR-A3-C-2	Advanced	1440 × 1080	C-mount	None
V20-CR-P3-xxx	Professional	1440 × 1080	wide	White, red or infrared LEDs
V20-CR-P3-xxx	Professional	1440 × 1080	medium	White, red or infrared LEDs
V20-CR-P3-xxx	Professional	1440 × 1080	narrow	White, red or infrared LEDs
V20-CR-P3-C-2	Professional	1440 × 1080	C-mount	None
V10-CR-S3-xxx	Standard	800 × 600	wide	White, red or infrared LEDs
V10-CR-S3-xxx	Standard	800 × 600	medium	White, red or infrared LEDs
V10-CR-S3-xxx	Standard	800 × 600	narrow	White, red or infrared LEDs
V10-CR-A3-xxx	Advanced	800 × 600	wide	White, red or infrared LEDs
V10-CR-A3-xxx	Advanced	800 × 600	medium	White, red or infrared LEDs
V10-CR-A3-xxx	Advanced	800 × 600	narrow	White, red or infrared LEDs
V10-CR-A3-C-2	Advanced	800 × 600	C-mount	None
V10-CR-P3-xxx	Professional	800 × 600	wide	White, red or infrared LEDs
V10-CR-P3-xxx	Professional	800 × 600	medium	White, red or infrared LEDs
V10-CR-P3-xxx	Professional	800 × 600	narrow	White, red or infrared LEDs
V10-CR-P3-C-2	Professional	800 × 600	C-mount	None

The VISOR® Code Reader

System description

With its integrated object detection, the VISOR® Code Reader is unique in its price segment. The compact sensor reads conventional 1D barcodes, 2D data matrix codes and now also optical characters (OCR). It also has four detectors for object detection (pattern comparison, brightness, grey level and contrast), with which other object features – for example, stamps or logos – can be evaluated in a single reading pass. Codes and object features are even reliably detected with deviations from the taught-in position – using position tracking (optionally activated).

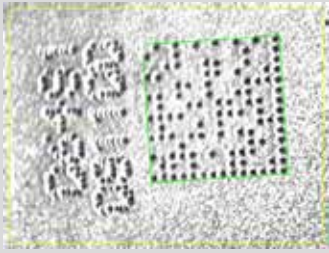
A special image filter with expanded setting options guarantees excellent reading performance even under difficult reading conditions. The test results can largely be evaluated within the sensor itself – with the option of string comparison or regular printouts – so, in many cases it eliminates the connection requirement to PLC or PC. If, however, this proves necessary, it can be easily and flexibly connected using freely available PLC function blocks for Siemens S7, Codesys and Allen Bradley.

With integrated quality parameters complying with ISO and AIM standards, the VISOR® Code Reader also permits the informative evaluation of printed and direct marked 1D and 2D codes. Integrated red, infrared or white light variants provide maximum functional reliability through optimum code illumination.

In addition, the robust, compact and industry-oriented housings guarantee reliability even where space is restricted. Integrated 6 mm or 12 mm optics or C-mount devices also save effort and costs through their optimum adaptation to the most varied of code sizes and operating distances. The V20 variants also offer a resolution of 1.5 megapixels for particularly small codes or large search areas.

Product variants VISOR® Code Reader

	VISOR® Code Reader		
	Reading of barcodes, 2D codes, text		
	Standard	Advanced	Professional
Resolution	Monochrome		
V10 V10C 800 x 600	75 –		
Number of images per second V10 V10 C	–		
V20 V20C 1440 x 1080	Monochrome		
Number of images per second V20 V20 C	– –	40 –	
Lighting	white, red ¹ , infrared ¹		
Multishot	–		
Target laser	–	✓	
Lenses			
V10 wide medium narrow c-mount	✓ ✓ ✓ –	✓ ✓ ✓ ✓	
V20 wide medium narrow c-mount	– – – –	✓ ✓ ✓ ✓	
Interfaces			
Inputs outputs selectable	2 2 4	2 2 6	
Encoder input	–	✓	
Ethernet EtherNet/IP Profinet SensoWeb	✓ ✓ ✓ ✓		
Service port	–	✓	
Job/Detectors			
Number of jobs (max.)	8	255	
Number of detectors per job (max.)	2	255	
Calibration			
Calibration (scaling, perspective)	–		
Robot calibration	–		
Preprocessing			
Preprocessing filter	–	–	✓
Multiple image capture/Shutter variation	–	–	✓
Free-form search area	–	–	✓
Position tracking			
Contour comparison (translation, rotation 360°)	–	✓	
Pattern matching (translation, rotation 360°)	–	✓	
Edge detection (translation, rotation)	–	✓	
Object detection			
Contour comparison (translation, rotation 360°)	–		
Multiple contour detection	–		
Pattern matching (translation, rotation 360°)	–	✓	
Grey level Contrast Brightness	–	✓	
Calliper	–		
BLOB	–		
Identification			
Datacode	✓	✓	
Datacode advanced	–	✓	
Barcode	✓	✓	
Barcode advanced	–	✓	
Clear text (OCR)	–	✓	
Robotics functions			
Result offset	–		
Checking space around gripper	–		
Color detectors²			
Color field	–		
Color value	–		
Color list	–		
Color distance Binarisation	–		



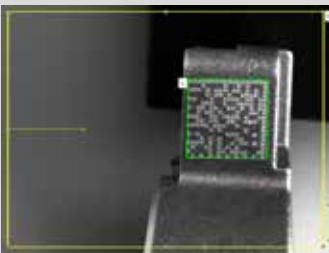
Dot-peened code on rough substrate
Code is made legible by powerful reading algorithm. Presence of the nailed imprint in plain text can be checked using object detection.



Low-contrast code
Code is made legible through high tolerance – also towards weakly contrasting codes.



Optical character reading
Dot matrix printing can also be read with OCR.



Code with small "quiet zone"
Even codes with a small quiet zone or damaged finder pattern can be read.



Code reading on solar cells
Even extremely small codes (e.g. on silicon solar cells) or highly reflective codes (e.g. on thin-layer solar cells) can be read.



Printed codes on pharmaceutical packaging
ECC200 or bar codes (e.g. EAN 13) can be searched for simultaneously. In addition to code reading, the presence of optical characters can also be checked using object detection.

Special features of the VISOR® Code Reader

- Can be used for all common 2D codes (e.g. ECC 200 data matrix) and common 1D bar codes
- Optimum cost-effectiveness through combination of two functions in one device: code reading and object detection
- High operating dependability through reliable detection of even poorly readable codes under difficult ambient conditions
- Flexible and simple connection to PC and PLC environments due to comprehensive possibilities for archiving pictures and read results, as well as freely available PLC function blocks for Siemens S7, Codesys and Allen Bradley
- Very high flexibility, e.g. also due to reading several similar or different codes in one reading pass
- Reading of optical characters with OCR based on neural networks, particularly suitable for point printing

Technical data

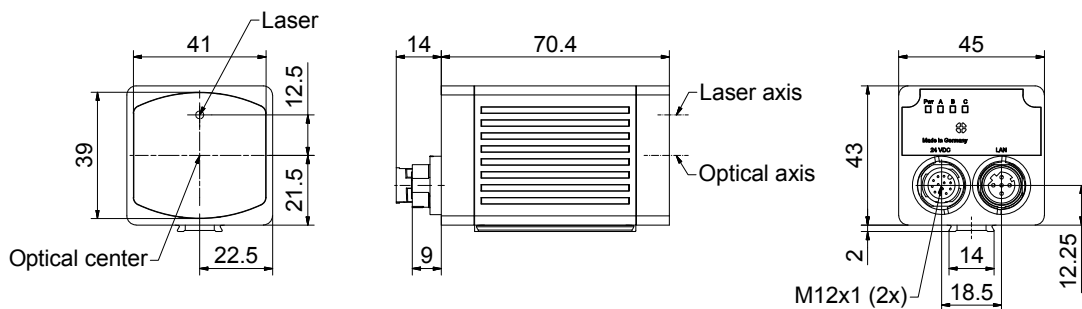
Optical data	
Number of pixels, chip size	VISOR®-V10...: 800 (H) × 600 (V) VISOR®-V20...: 1440 (H) × 1080 (V)
Technology	CMOS (mono / color)
Integrated measuring lighting	8 LEDs (except C-mount)
Integrated measurement distance	wide, medium, narrow, motorised focus

Electrical data		Mechanical data	
Operating voltage +U _B	18 ... 30V DC ¹	Dimensions	71 × 45 × 45 mm (without connector)
Power consumption (without I/O)	≤ 300 mA	Enclosure rating	IP 67
Protection circuits	Reverse-polarity protection, U _B / short-circuit protection of all outputs	Material housing	Aluminium, plastic, die-cast, RoHS compliant
Rise-time delay	Approx. 13 s after Power on	Material, front screen	Plastic
Outputs	PNP / NPN (switchable)	Ambient temperature: operating	0 ... +50° C ²
Max. output current (per output)	50 mA, 100 mA (pin 12)	Ambient temperature: Storage	-20 ... +60° C ²
Inputs	PNP/NPN High > U _B -1V, Low < 3V	Weight	Approx. 200 g
Input resistance	> 20 kΩ	Plug Connections	Supply and I/O M12, 12-pin, Ethernet M12, 4-pin
Encoder input	40 kHz	Vibration / shock resistance	EN 60947-5-2
Interfaces	Ethernet (LAN), RS422, RS232, EtherNet/IP, PROFINET, SensoWeb		
Inputs / Outputs	2 inputs, 2 outputs, 6 selectable inputs/outputs		



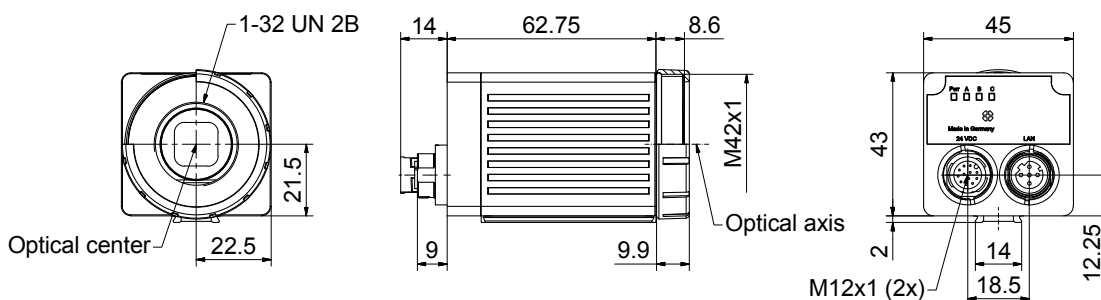
¹ Max. ripple < 5V_{SS} ² 80 % air humidity, non-condensing ³ dependent on model

Vision sensor VISOR® with integrated optics & lighting

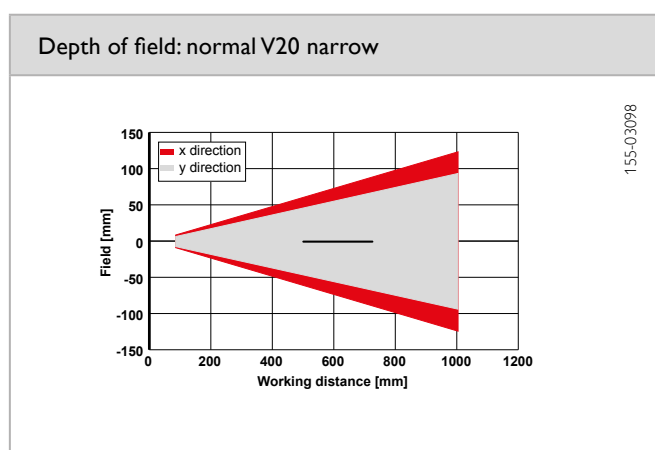
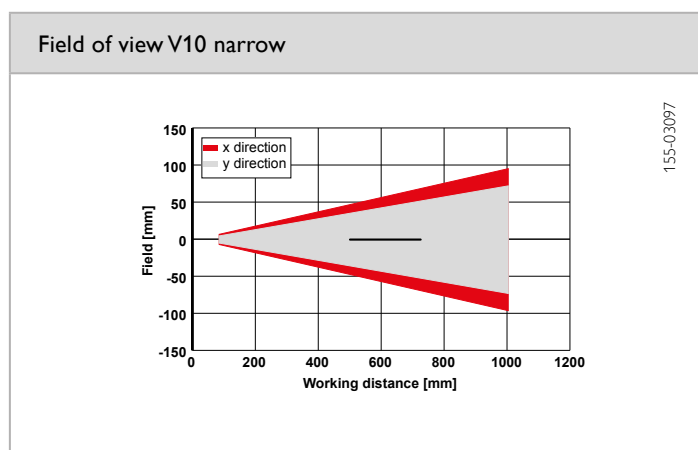
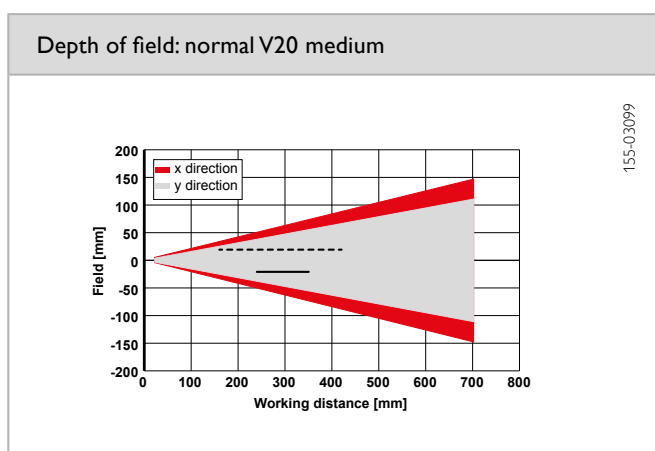
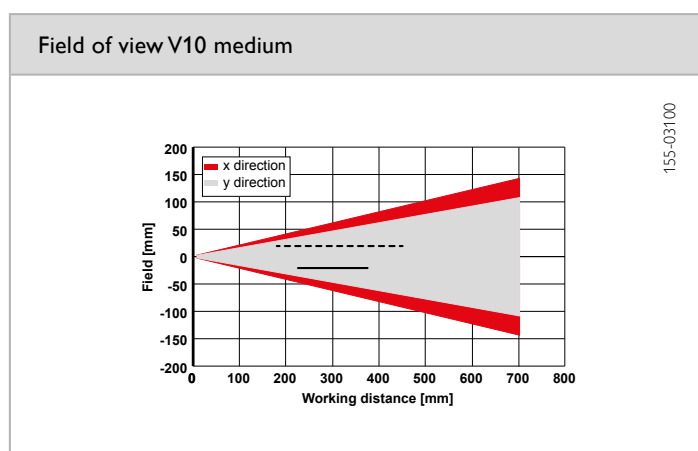
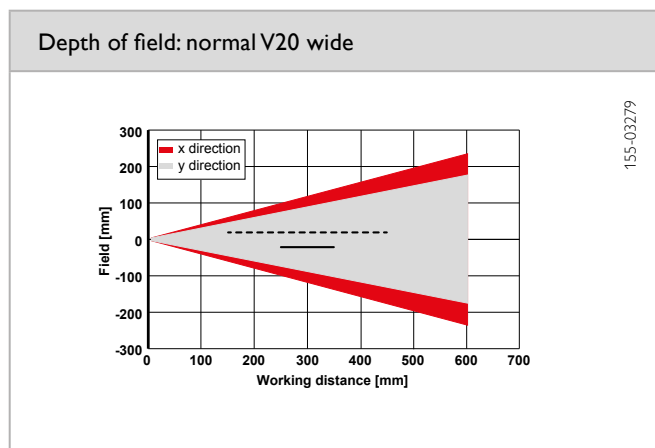
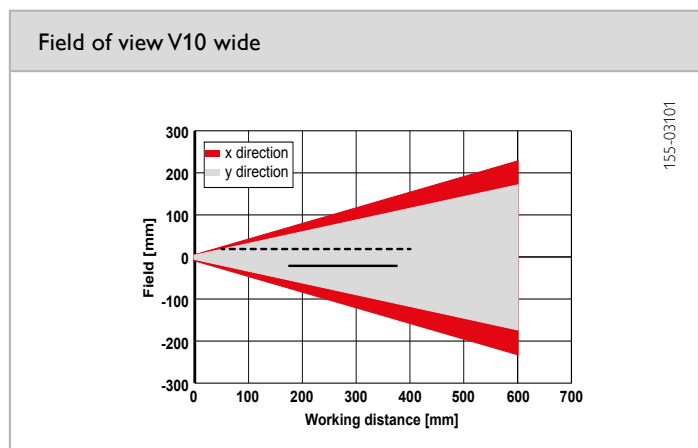


153-13554

Vision sensor VISOR® C-mount




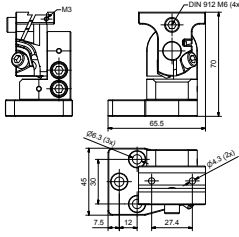

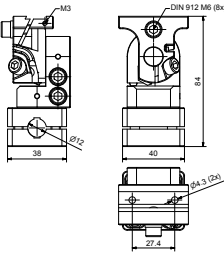
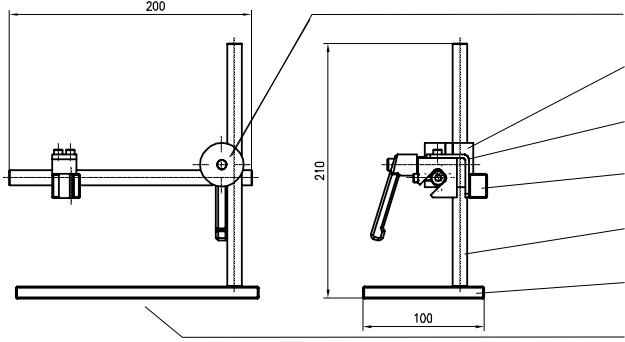

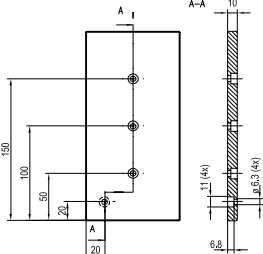

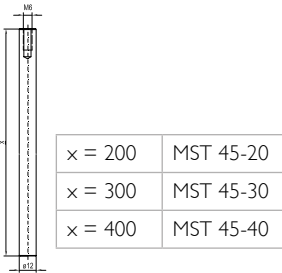
153-13555



----- Increased depth of field
 _____ Normal depth of field

Accessories

Brackets

Brackets for V10, V20 (Cont.)									
	 <p style="text-align: right;">153-01181</p>	<p>Part number / Article number</p> <hr/> <p>Description</p> <hr/> <p>Suitable for</p> <hr/>	<p>MG 3A / 543-11024</p> <p>Mounting hinge with 3 axes and drilled hole for mounting rod Material: anodised aluminium V10 / V20</p>						
	 <p style="text-align: right;">153-12553</p>	<p>Part number / Article number</p> <hr/> <p>Description</p> <hr/> <p>Suitable for</p> <hr/>	<p>MG 3A-MST12 / 543-11034</p> <p>Mounting hinge with 3 axes for fixing at mounting rods 12 mm Material: anodised aluminium V10 / V20</p>						
		<p>Mounting hinge (MG 45)</p> <p>Mounting block, rod (MB 45)</p> <p>Mounting angle (MA 45)</p> <p>Mounting clamp, dovetail (MK 45)</p> <p>Mounting rod (MST 45-x)</p> <p>Mounting plate (MP 45)</p> <p>Mounting rod (MST 45-x)</p>	<p>153-00435</p>						
	 <p style="text-align: right;">153-00547</p>	<p>Part number / Article number</p> <hr/> <p>Description</p> <hr/> <p>Suitable for</p> <hr/>	<p>MP 45 / 543-11003</p> <p>Mounting plate for mounting rod Material: anodised aluminium MST 45-xx</p>						
	 <table border="1" data-bbox="528 1709 754 1823"> <tr> <td>x = 200</td> <td>MST 45-20</td> </tr> <tr> <td>x = 300</td> <td>MST 45-30</td> </tr> <tr> <td>x = 400</td> <td>MST 45-40</td> </tr> </table> <p style="text-align: right;">153-00545</p>	x = 200	MST 45-20	x = 300	MST 45-30	x = 400	MST 45-40	<p>Part number / Article number</p> <hr/> <p>Description</p> <hr/> <p>Suitable for</p> <hr/>	<p>MST 45-20 / 543-11005 MST 45-30 / 543-11006 MST 45-40 / 543-11007</p> <p>Mounting rod with M6 internal thread Material: stainless steel</p> <p>MP 45, MB ST1, MG 45, MB 45, MZ 45, MG 3A, MG 3A-MST12</p>
x = 200	MST 45-20								
x = 300	MST 45-30								
x = 400	MST 45-40								

Brackets for V10, V20 (Cont.)			
		Part number / Article number	MA 45 / 543-11001
		Description	Mounting angle Material: stainless steel V2A
		Suitable for	MK 45 MK 45 L MB 45
		Part number / Article number	MA 45 L / 543-11013
		Description	Mounting angle, long Material: stainless steel V2A
		Suitable for	MK 45 MK 45 L MB 45
		Part number / Article number	MK 45 / 543-11000
		Description	Mounting clamp, dovetail Material: anodised aluminium Screw: steel
		Suitable for	V10 / V20
		Part number / Article number	MK 45 L / 543-11021
		Description	Mounting clamp, dovetail, long Material: anodised aluminium Screw: steel
		Suitable for	V10 / V20
		Part number / Article number	MZ 45 / 543-11004
		Description	Intermediate mounting piece for mounting rod Material: anodised aluminium
		Suitable for	MST 45-xx


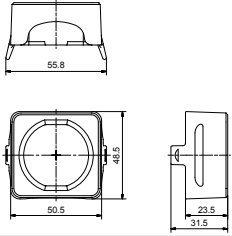
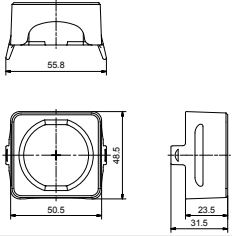
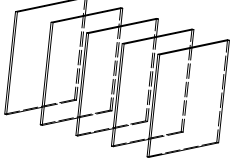
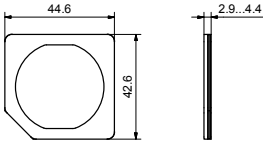
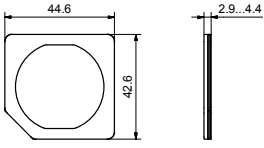
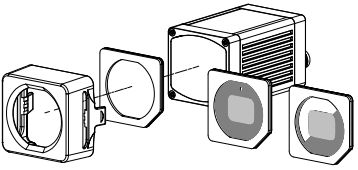
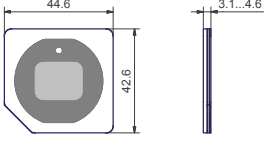
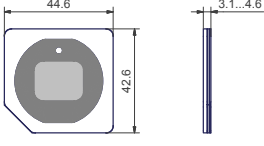
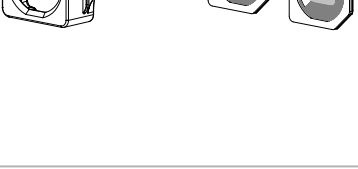
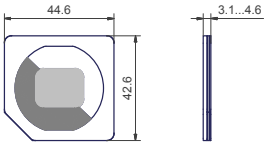
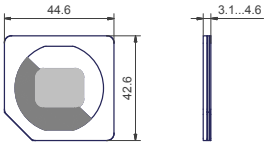
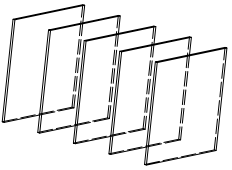
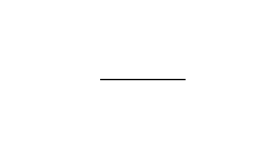
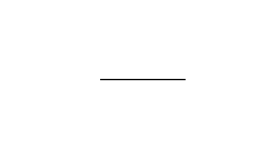



Accessories


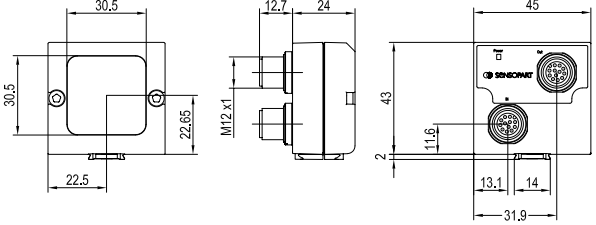
Lenses

Lenses, C-mount			
		<p>Part number / Article number</p> <p>Description</p> <p>Suitable for</p>	<p>LO C 8 / 526-51513</p> <p>C-mount lens 8 mm focal length Aperture/focus: manual Filter thread: 30.5/0.5 Diameter: 33.5 mm Max. length: 33.5 mm Weight: 70 g</p> <p>V10 / V20 C-Mount</p>
		<p>Part number / Article number</p> <p>Description</p> <p>Suitable for</p>	<p>LO C 12 / 526-51514</p> <p>C-mount lens 12 mm focal length Aperture/focus: manual Filter thread: 30.5/0.5 Diameter: 33.5 mm Max. length: 33.5 mm Weight: 65 g</p> <p>V10 / V20 C-Mount</p>
		<p>Part number / Article number</p> <p>Description</p> <p>Suitable for</p>	<p>LO C 16 / 526-51515</p> <p>C-mount lens 16 mm focal length Aperture/focus: manual Filter thread: 30.5/0.5 Diameter: 33.5 mm Max. length: 33.5 mm Weight: 65 g</p> <p>V10 / V20 C-Mount</p>
		<p>Part number / Article number</p> <p>Description</p> <p>Suitable for</p>	<p>LO C 25 / 526-51516</p> <p>C-mount lens 25 mm focal length Aperture/focus: manual Filter thread: 30.5/0.5 Diameter: 33.5 mm Max. length: 44.9 mm Weight: 75 g</p> <p>V10 / V20 C-Mount</p>
		<p>Part number / Article number</p> <p>Description</p> <p>Suitable for</p>	<p>LO C 35 / 526-51525</p> <p>C-mount lens 35 mm focal length Aperture/focus: manual Filter thread: 30.5/0.5 Diameter: 33.5 mm Max. length: 47.5 mm Weight: 87 g</p> <p>V10 / V20 C-Mount</p>
		<p>Part number / Article number</p> <p>Description</p> <p>Suitable for</p>	<p>LO C 50 / 526-51113</p> <p>C-mount lens 50 mm focal length Aperture/focus: manual Filter thread: 30.5/0.5 Diameter: 33.5 mm Max. length: 47.2 mm Weight: 90 g</p> <p>V10 / V20 C-Mount</p>

Accessories


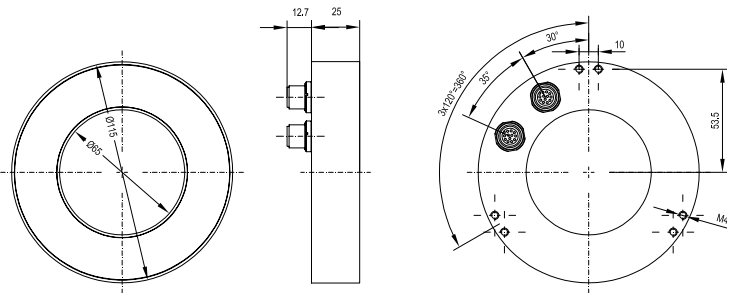
Protective casing and polarizer glasses


Protective casing and polarizer glasses (Cont.)				
		153-13556	Part number / Article number	LPCVxx / 651-01001
			Description	Removable protective casing for Vx0 with integrated lens/lighting
		153-13556	Suitable for	V10 / V20
		153-13559	Part number / Article number	LPCVxx S1-5 / 651-01002
			Description	Replacement panels (glass) for LPC Vxx, set of 5 pieces Material: coated glass
		153-13559	Suitable for	LPC Vxx
		153-13557	Part number / Article number	LPFVxx S1 / 651-01003
			Description	Polarising filter panel for LPC Vxx (100% coverage) Material: coated glass
		153-13557	Suitable for	V10 / V20
		153-13558	Part number / Article number	LPFVxx S2 / 651-01004
			Description	Polarising filter panel for LPC Vxx (50% coverage, reversible) Material: coated glass
		153-13558	Suitable for	V10 / V20
			Part number / Article number	LPFVxx S1-5 / 651-01005
			Description	Polarising filter panel for LPCVxx (100% coverage), set of 5 pieces Material: coated glass
			Suitable for	LPC Vxx
			Part number / Article number	Z-USB-VISOR® / 651-01000
			Description	USB stick with VISOR® PC software
			Suitable for	V10 / V20


Surface light for V10,V20			
	Part number	Article number	Description
	LF45 W-24-2L12	525-51147	Surface light,V10 / V20, white, 12-pin
	LF45 R-24-2L12	525-51148	Surface light,V10 / V20, red, 12-pin
	LF45 IR-24-2L12	525-51149	Surface light,V10 / V20, infrared, 12-pin*
			153-00924

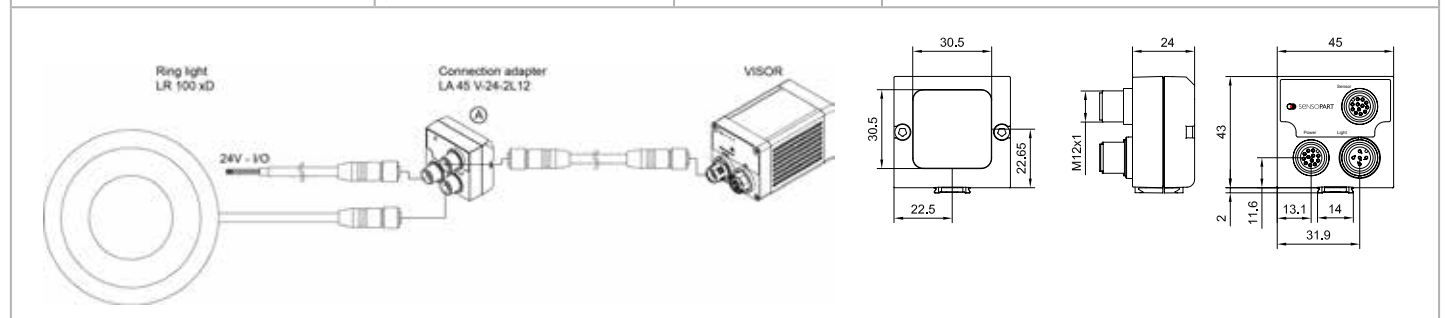
* External IR illumination can only be combined with IR Types or C-Mount sensors.
LED area lighting for incidental illumination in IP67 housings. Can be cascaded to illuminate from several directions.
No switching amplifier required.

Illumination

Ring light for V10,V20				
	Part number	Article number	Description	Angle bracket
	LFR 115 WD-24-2L12	525-51150	Ring light,V10 /V20, white, diffuse, 12-pin	543-11015
	LFR 115 RD-24-2L12	525-51151	Ring light,V10 /V20, red, diffuse, 12-pin	543-11015
	LFR 115 ID-24-2L12	525-51152	Ring light,V10 /V20, infrared, diffuse, 12-pin*	543-11015
	LFR 115 WK-24-2L12	525-51153	Ring light,V10 /V20, white, clear, 12-pin	543-11015
	LFR 115 RK-24-2L12	525-51154	Ring light,V10 /V20, red, clear, 12-pin	543-11015
	LFR 115 IK-24-2L12	525-51155	Ring light,V10 /V20, infrared, clear, 12-pin*	543-11015
			Does not require switching amplifier	
				153-00926

Spot illumination V10,V20			
	Part number	Article number	Description
	LS 55 x 46 WK-24-A13 2L12	532-51101	Ring light,V10/V20, white, diffuse, 12-pin
	LS 55 x 46 RK-24-A13 2L12	532-51102	Ring light,V10/V20, red, diffuse, 12-pin
	LS 55 x 46 iRK-24-A13 2L12	532-51103	Ring light,V10/V20, infrared, diffuse, 12-pin*
			Does not require switching amplifier

Connection adapter for illumination on V10,V20V10,V20			
	Part number	Article number	Description
	LA45V-24-2L12	525-01001	V10 /V20 connection adapter for LED illumination with 5-pin M12 plug
	LA45VT-24-2L12	525-01002	V10 /V20 connection adapter for LED illumination with 5-pin M12 plug, with trigger output



* External IR illumination is only possible for IR types or C-Mount sensors.

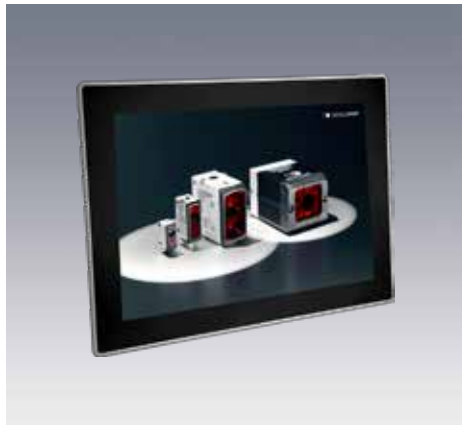
LED ring lighting for the incidental illumination of objects in IP67-tight housings. No switching amplifier is required and cascading is possible.

Accessories

Cables

Part number	Article number	Description
M12, 12-pin		Supply and I/O lines i.a. for V10,V20 shielded 360°, suitable for drag chains, suitable for robotics applications
C L12FG-S-2m-PUR	902-51801	2 m, straight, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12FG-S-5m-PUR	902-51796	5 m, straight, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12FG-S-10m-PUR	902-51797	10 m, straight, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12FG-S-20m-PUR	902-51805	20 m, straight, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12FG-S-30m-PUR	902-51845	30 m, straight, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12FW-S-2m-PUR	902-51798	2 m, 90°, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12FW-S-5m-PUR	902-51799	5 m, 90°, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12FW-S-10m-PUR	902-51800	10 m, 90°, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12FW-S-20m-PUR	902-51821	20 m, 90°, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12FW-S-30m-PUR	902-51846	30 m, 90°, a-coded, PUR, IP 65 / IP 67 / IP 68
M12, 3-pin		Supply and I/O lines i.a. for V10,V20 (3-pin - 24V, GND, trigger) shielded, suitable for drag chains, suitable for robotics applications
C L12/3FG-S-2m-PUR	902-51833	2 m, straight, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12/3FG-S-5m-PUR	902-51834	5 m, straight, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12/3FG-S-10m-PUR	902-51835	10 m, straight, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12/3FG-S-20m-PUR	902-51839	20 m, straight, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12/3FG-S-30m-PUR	902-51847	30 m, straight, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12/3FW-S-2m-PUR	902-51836	2 m, 90°, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12/3FW-S-5m-PUR	902-51837	5 m, 90°, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12/3FW-S-10m-PUR	902-51838	10 m, 90°, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12/3FW-S-20m-PUR	902-51840	20 m, 90°, a-coded, PUR, IP 65 / IP 67 / IP 68
C L12/3FW-S-30m-PUR	902-51848	30 m, 90°, a-coded, PUR, IP 65 / IP 67 / IP 68
M12, 4-pin to RJ45, D-coding		Ethernet lines i.a. for V 10,V 20, IO-Link master shielded 360°, suitable for drag chains, suitable for robotics applications
CI L4MG/RJ45G-GS-3m-PUR	902-51754	3 m, straight, d-coded, PUR, IP 65 / IP 67 / IP 68
CI L4MG/RJ45G-GS-5m-PUR	902-51782	5 m, straight, d-coded, PUR, IP 65 / IP 67 / IP 68
CI L4MG/RJ45G-GS-10m-PUR	902-51784	10 m, straight, d-coded, PUR, IP 65 / IP 67 / IP 68
CI L4MG/RJ45G-GS-20m-PUR	902-51820	20 m, straight, d-coded, PUR, IP 65 / IP 67 / IP 68
CI L4MG/RJ45G-GS-30m-PUR	902-51843	30 m, straight, d-coded, PUR, IP 65 / IP 67 / IP 68
CI L4MW/RJ45G-GS-3m-PUR	902-51786	3 m, 90°, d-coded, PUR, IP 65 / IP 67 / IP 68
CI L4MW/RJ45G-GS-5m-PUR	902-51788	5 m, 90°, d-coded, PUR, IP 65 / IP 67 / IP 68
CI L4MW/RJ45G-GS-10m-PUR	902-51790	10 m, 90°, d-coded, PUR, IP 65 / IP 67 / IP 68
CI L4MW/RJ45G-GS-20m-PUR	902-51822	20 m, 90°, d-coded, PUR, IP 65 / IP 67 / IP 68
CI L4MW/RJ45G-GS-20m-PUR	902-51844	30 m, 90°, d-coded, PUR, IP 65 / IP 67 / IP 68
M12 4-pin to M12 12-pin		Illumination lines for V10,V20 shielded 360°, suitable for drag chains
CB L12FS/L12FS-0,35m-GG-PUR	902-51841	0.35 m, M12 straight socket a-coded to 12-pin straight Buchse a-coded, PUR, IP 65 / IP 67 / IP 68
CB L12FS/L12FS-0,5m-GG-PUR	902-51806	0.5 m, M12 straight socket a-coded to 12-pin straight Buchse a-coded, PUR, IP 65 / IP 67 / IP 68
CB L12FS/L12FS-2m-GG-PUR	902-51807	2 m, M12 straight socket a-coded to 12-pin straight socket a-coded, PUR, IP 65 / IP 67 / IP 68
CB L12FS/L12FS-10m-GG-PUR	902-51854	10 m, M12 straight socket a-coded to 12-pin straight socket a-coded, PUR, IP 65 / IP 67 / IP 68
CB L12FS/L12FS-0,35m-WW-PUR	902-51842	0.35 m, M12 90° socket a-coded to 12-pin 90° socket a-coded, PUR, IP 67 / IP 69K
CB L12FS/L12FS-0,5m-WW-PUR	902-51808	0.5 m, M12 90° socket a-coded to 12-pin 90° socket a-coded, PUR, IP 67 / IP 69K
CB L12FS/L12FS-2m-WW-PUR	902-51809	2 m, M12 90° socket a-coded to 12-pin 90° socket a-coded, PUR, IP 67 / IP 69K

Display and configuration device for SensoPart vision sensors



PRODUCT HIGHLIGHTS

- Display and configuration device for SensoPart vision sensors and systems
- Suitable for installation in switching cabinet doors and operating panels
- Completely preconfigured

Functions	
Resolution	1024 x 768
Aspect ratio	4 : 3
Technology	TFT
Colors	16.2 millions
Backlight	LED
Backlight life time	30,000 h
Luminance ¹⁾	350 cd/m ²
Contrast ratio ¹⁾	1200 : 1
Operating system	Windows® 10 IoT

Electrical data		Mechanical data	
Operating voltage +U _B	24V DC ± 20 %	Dimensions	266 x 213.2 x 52.4 mm
CPU	AMD® GX-415GA / Quad Core™ / 1.5 GHz 64 Bit / 2 MB Cache	Enclosure rating	IP 65
USB	2 x USB Host 3.0	Ambient temperature: operation	0 ... +50 °C
Ethernet	2 x 1 Gbit Ethernet	Ambient temperature: storage	-10 ... +70 °C
Communication	1 x RS232	Weight	1700 g
Video	1 x DVI-I		
Memory	4 GB DDR3L		
Storage	64 GB MLC		
BIOS	AMI BIOS, supports ACPI function		

¹⁾ The values are referring to the displays only

Part number	Article number	Description
PV-AW10IoT10.4TX	533-01031	Panel PC 10.4", Win10 IoT, XGA, Touch, front panel mount
PV-AW10IoT10.4TX-V	533-01032	Panel PC 10.4", Win10 IoT, XGA, VESA mount

Accessories	
Connection cable (Ethernet cable)	From Page A-34

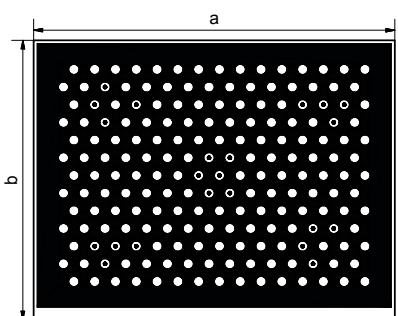
ZCP

Calibration accessories for SensoPart vision sensors

Calibration plates				
	Part number	Article number	Description	Typ
	ZCP 50-13x15	533-11030	15x13 points, 50 mm x 37,9 mm	Standard
	ZCP 100-13x15	533-11031	15x13 points, 100 mm x 75,8 mm	Standard
	ZCP 200-13x15	533-11032	15x13 points, 200 mm x 151,7 mm	Standard
	ZCP 500-13x15	533-11033	15x13 points, 500 mm x 379,2 mm	Standard
	ZCP 50-13x15-X01	533-11037	15x13 points, crosshairs, 50 mm x 37,9 mm	X01
	ZCP 100-13x15-X01	533-11038	15x13 points, crosshairs, 100 mm x 75,8 mm	X01
	ZCP 200-13x15-X01	533-11039	15x13 points, crosshairs, 200 mm x 151,7 mm	X01
	ZCP 500-13x15-X01	533-11040	15x13 points, crosshairs, 500 mm x 379,2 mm	X01
	ZCP 100-13x15-X02	533-11035	15x13 points, fiducials, 100 mm x 75,8 mm	X02
	ZCP 50-13x15-X03	533-11042	15x13 points, fitting holes, 50 mm x 37,9 mm	X03
	ZCP 100-13x15-X03	533-11041	15x13 points, fitting holes, 100 mm x 75,8 mm	X03
	ZCP 100-ECC200	533-11036	Calibration plate for Code Reader ECC200 quality parameters	-

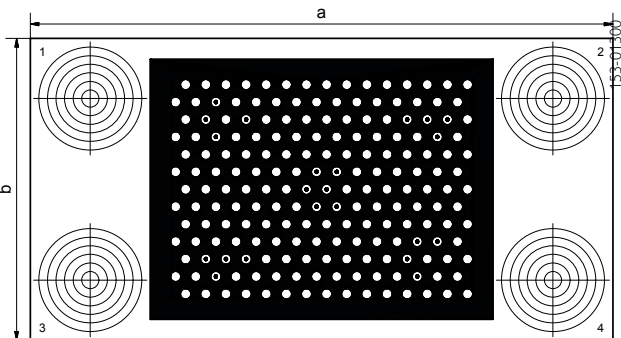
The calibration plates are used for calibrating the VISOR® vision sensor.

Scaling, tilt angle against perpendicular view to the measurement plane or by lens distortion are all corrected.

Dimensional drawing Standard								
	a	b	c	d	e Ø	t	Recommended field of view	
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
	ZCP 50-13x15	54	47				2	22 - 50
	ZCP 100-13x15	104	85				2	30 - 100
	ZCP 200-13x15	204	161				4	60 - 200
ZCP 500-13x15	504	389				4	150 - 500	

Supports calibration method „Calibration plate (Measurement)“.

Reference marks: none.

Dimensional drawing X01								
	a	b	c	d	e Ø	t	Recommended field of view	
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
	ZCP 50-13x15-X01	98	54				2	22 - 50
	ZCP 100-13x15-X01	180	100				2	30 - 100
	ZCP 200-13x15-X01	340	176				4	60 - 200
ZCP 500-13x15-X01	820	403				4	150 - 500	

Supports calibration method „Calibration plate (Robotics)“.

With the reference marks, a reference to the absolute coordinate system is established.

Reference marks: crosshairs.

Calibration plates (Cont.)

Dimensional drawing X02

		a [mm]	b [mm]	c [mm]	d [mm]	e Ø [mm]	t [mm]	Recommended field of view [mm]
	ZCP 100-13x15-X02	295	215	250	170	7	4	30 - 100

For establishing an absolute reference, reflex marks are available. The transformation is calculated in the robot.
Reference marks: fiducials, crosshairs.

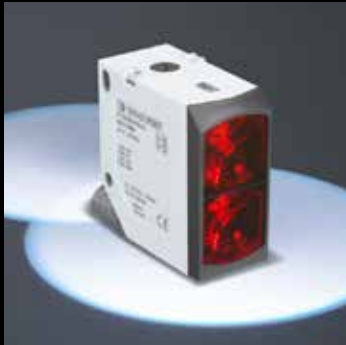
Dimensional drawing X03

		a [mm]	b [mm]	c [mm]	d [mm]	e Ø [mm]	t [mm]	Recommended field of view [mm]
	ZCP 50-13x15-X03	298	218	250	170	7	4	22 - 50
	ZCP 100-13x15-X03	298	218	250	170	7	4	30 - 100

See version X02.
Reference marks: fitting holes, crosshairs.

Dimensional drawing ZCP 100-ECC200

Calibration plate for ECC200 Codes, sample code in quality grade „A“ according ISO/IEC 15415.



“We gauge ourselves not by what is possible today, but by our vision of what can be achieved” – this has been our motto since the foundation of SensoPart in 1994. Our goal is to always be a step ahead and to be able to offer our customers the most innovative sensor for industrial automation.

True to this motto, we offer easy-to-integrate VISOR® vision sensors and compact laser sensors with outstanding background suppression made in Germany.

We still also have plenty of ideas for the future - watch this space.

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