SENSOPART

VISOR® Product Overview

VISOR® vision sensors for factory automation

VISOR® vision sensors for factory automation

Image processing can be so easy.

In the global automation of industrial processes, a vast number of decisions have to be made every second. Here, however, more complex links of detector results are necessary to achieve a safe and reliable good/bad decision. With our portfolio of vision solutions, we cover a wide spectrum of industrial image processing. Now even more complex applications can be evaluated with an easy-to-use vision sensor and without the need for a PC during operation. Whether detection & inspection, identification, measurement, positioning, or color detection – the VISOR® vision sensor family offers the right product for every application.

The foundation for this is a powerful smart camera in a compact and lightweight sensor housing.

Perfectly in tune:
- A combination of sophisticated hardware and easily configurable software

Flexibility:
- One of the most extensive vision sensor families on the market to solve your applications

Scalability:
- Select your VISOR® to suit to your own requirements.

Connectivity:
- Comprehensive protocols (e.g. PROFINET, Ethernet/IP) for seamless integration into your environment

In many industries and applications the VISOR® can help to achieve the requirements of the automation task:

Automotive industry

Assembly & Handling

Robotics

Electronics

Food & Beverages

Plastics technology

Lab automation

Pharmaceuticals & Cosmetics

Solar industry

Packaging technology

The VISOR® helps to ensure quality, to increase plant efficiency through the results gained, to increase availability and thus also to reduce costs. Depending on the task, SensoPart offers the VISOR® with suitable ranges of integrated detectors and functions. We distinguish between:

Standard: To solve simple image processing tasks

Advanced: An extended scope of functions for more challenging applications

Professional: The complete detector package suited to even very complex tasks

VISOR® vision sensors

One camera, one software, any application

Detection & inspection

Measurement

Reliable detection in any situation

Most production lines require assembly and quality control checks. The VISOR® Object provides the answer to the most important questions that arise:

- Is the object present and correct?
- Is it the correct type / object?
- Is the object in the right place?
- Is the number of objects correct?
- Is the object dimensionally accurate?
- Is it free of errors?
- Does it have the right color?

- **VISOR® Object Standard**
  - The standard for reliable object detection
  - 7 detectors for presence check, completeness check or simple position check
  - Simple compensation of position variations even with components that are not precisely guided
- **VISOR® Object Advanced**
  - Challenging inspection tasks simply solved
  - Variants with resolutions up to 5 megapixels
  - All software functions of the standard variant
  - Further alignment and detectors for counting and evaluating objects
  - Easy integration into the system by calculating results directly in the VISOR®
  - Accurate measurement results in the entire field of view through calibration with just a few mouse clicks
- **VISOR® Object Color models**
  - Color inspection
  - Higher robustness through use of color information and color filters

Identification

Positioning

Reliable differentiation and tracking of objects

Parts are generally labelled with one-dimensional barcodes or two-dimensional data matrix codes, which are either printed or applied using dot-peen or laser marking technology (direct marking). Our VISOR® Code Readers reliably read all industry standard code types.

- **VISOR® Code Reader**
  - Accurately reads all industry standard code types
  - Reliable interpretation of extremely small printed codes or codes marked on difficult surfaces thanks to various optics and illumination variants
- **VISOR® Allround**
  - Reading of engraved or raised lettering
  - Multishot technology to make height changes visible

Reliable detection of any position

The precise positioning of parts is a key process in industrial production. Our vision sensors always have an eye on the exact position, and supply the values in robot coordinates in a few simple steps.

- **VISOR® Robotic**
  - Using special functions, such as gripper space check and point offset, enable a precise gripping of parts
  - Sensor data is directly transfered into the robot coordinates, avoiding the need for additional complex programming work in the robot's control system
  - Function blocks available for many robot types make integration particularly easy
- **VISOR® Object**
  - Fine positioning without calibration in real-world coordinates

Setup requires just a few simple steps

Complex tasks made easy - with VISOR® software packages

Unpack, set up, go

Vision sensors have never been as easy and intuitive to use despite unprecedented levels of performance. Our VISOR® vision sensors are the perfect solution for both beginners and experts. 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

Step by step towards the goal

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

Once the sensor has been started, a PC is no longer necessary.

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

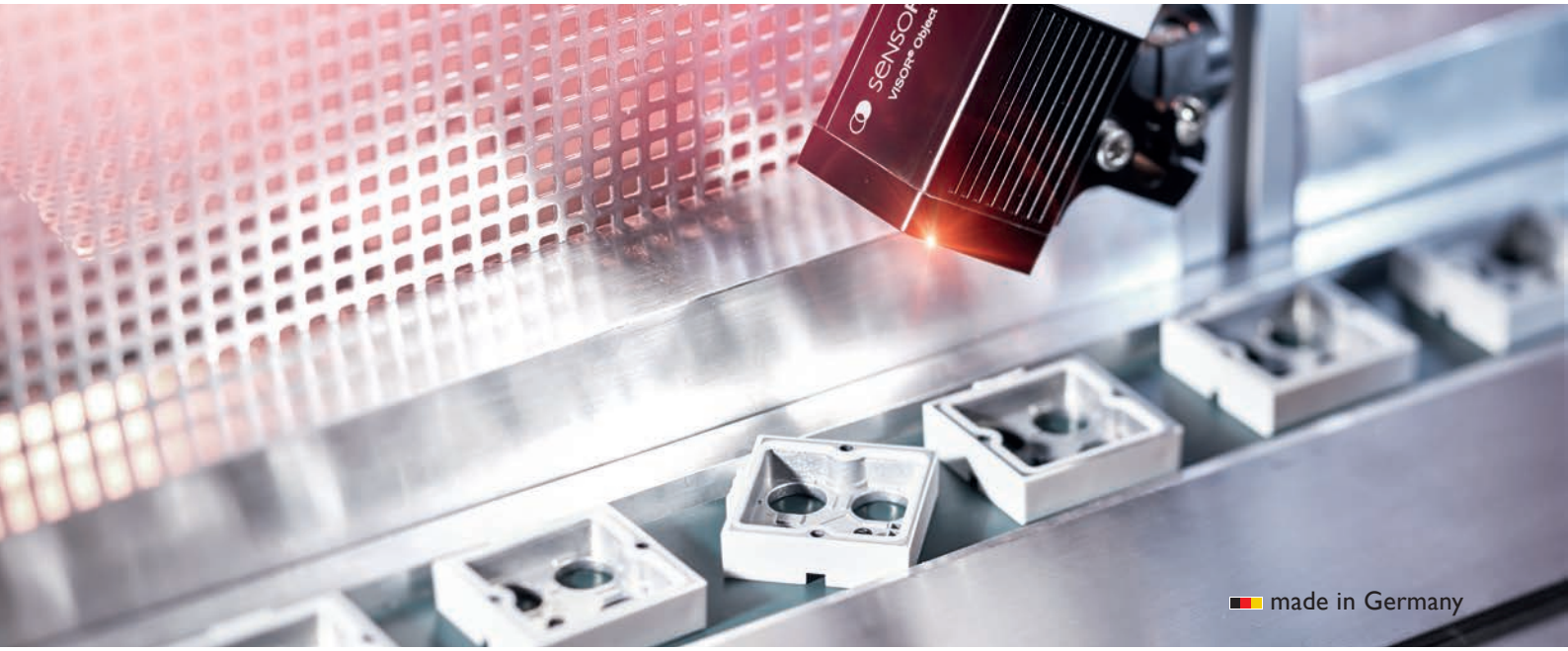
Complex inspection tasks can be easily set up in a step by step process. The effect of each setting is immediately visible on the screen. Comprehensive logic functions enable the direct assignment of complex inspection results to one of six digital result outputs. The integrated image recorder, which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

VISOR® Object Standard

The standard for reliable object detection



The right color in the right place?
The Color variant detects different colors faster and more reliably than the human eye.
This makes it possible, for example, to sort parts based on their color, check the correct wiring of a connector or verify the correct function of LED components.

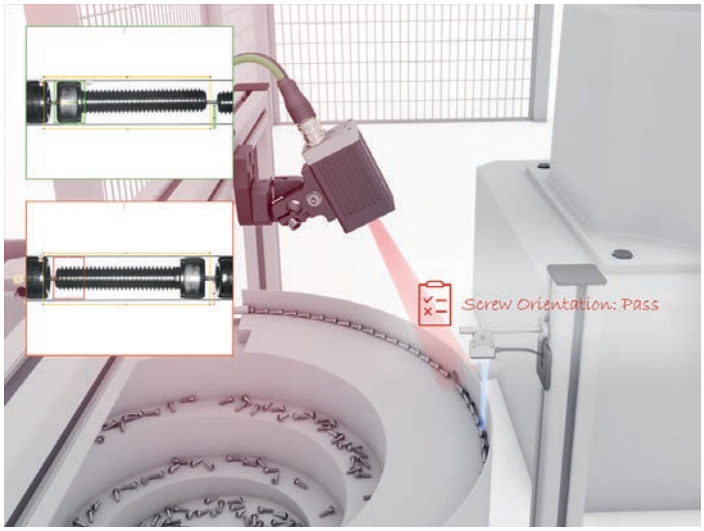
HIGHLIGHTS VISOR® OBJECT STANDARD

- **Seven detectors for solving presence inspection, completeness inspection or part differentiation tasks**
- Robust contour alignment for the compensation of position deviations even with non-precisely guided components
- Extensive logic functions, flexible result delay of the switching outputs for easy integration into the system
- All models available as color variants for reliable color inspection

The right package for your individual application:

VISOR® Object Standard: Presence and completeness check, sorting of parts

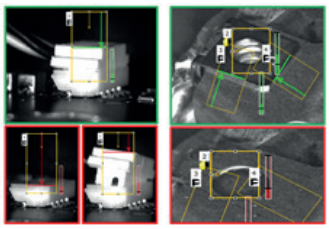
- Easy-to-use configuration and viewer software
- Easy integration with three field-of-view options and an electrical focus
- Trigger signal input delay, output signal delay, and 300mA output control can eliminate the need for a PLC in conveyor and vibratory bowl feeder applications
- Reduces setup and maintenance requirements



VISOR® Object Advanced

Challenging inspection tasks simply solved

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.



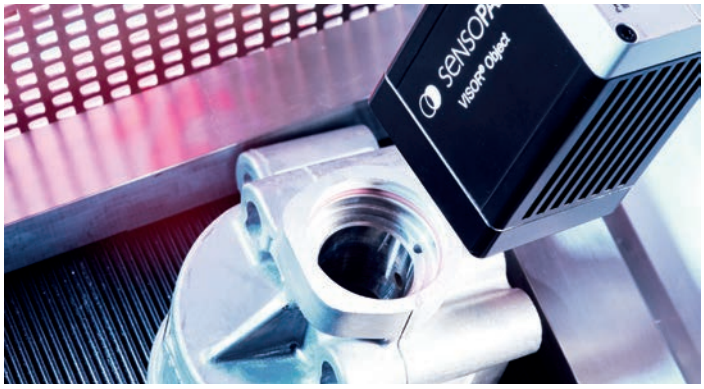
Fits, wiggles and has air
Not only the presence, but also the correct fit of the connector or mounting clip can be easily checked with the VISOR® Object.

HIGHLIGHTS VISOR® OBJECT ADVANCED

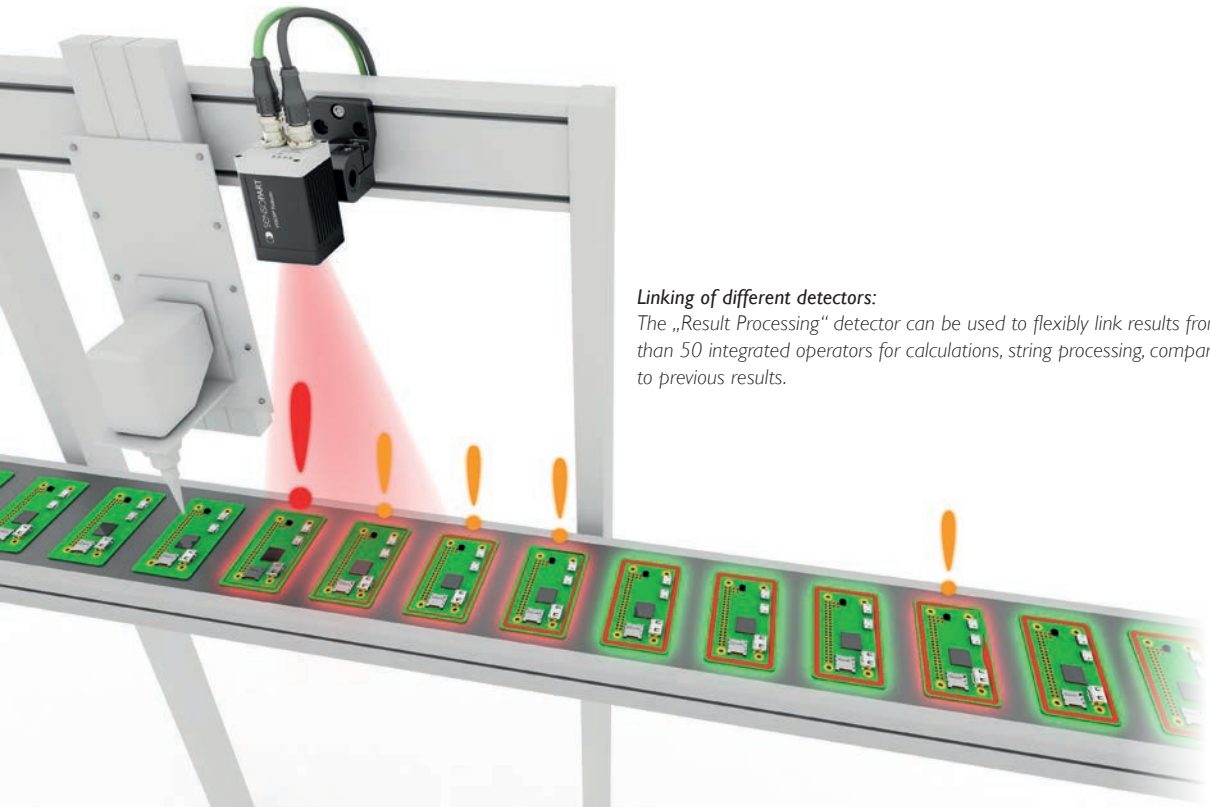
- **All functions of the VISOR® Object Standard**
- **Hardware variants up to 5 megapixels for highest accuracy or largest fields of view**
- **Additional detectors for counting and evaluating objects, as well as for solving measuring and positioning tasks**
- Three position alignment systems for compensation of position variations even with non-precisely guided components
- Correction of distortion, conversion to millimeters thanks to easy calibration
- Extensive logic and calculation functions for maximum flexibility, memory for access to previous results
- Flexible definition of output data for easy communication with PLC or PC

The right package for your individual application:

VISOR® Object Advanced: Presence and completeness check, position control, counting of objects, sorting of parts, part recognition and differentiation, simple measuring and quality control tasks.



- Reliable detection and evaluation via 12 flexible detectors
- Simple compensation of position variations even with components that are not precisely guided
- Differentiation of color nuances and compensation of variances via image pre-processing
- Trouble-free integration in any installation situation thanks to various resolution levels from 0.5 to 5 megapixels, internal optics with three field-of-view variants and electrical focus, as well as a C-Mount variant and a large portfolio of illumination and accessories
- 255 jobs with up to 255 detectors, so that even diverse tasks can easily be solved



Linking of different detectors:
The „Result Processing" detector can be used to flexibly link results from different detectors. It offers more than 50 integrated operators for calculations, string processing, comparisons and decisions, as well as access to previous results.

VISOR® Robotic

An eye on everything – the vision sensor for Robot guidance

The VISOR® Robotic detects the position of the component in a load carrier and transmits the gripping position directly to the robot.

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

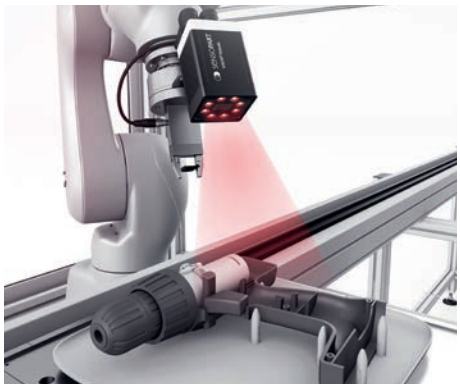
- **Compact and lightweight housing for moving or stationary applications**
- Calibration methods tailored to the application
- 2D or 3D localisation in robot coordinates
- Simplified setup through 3D gripper point transformation
- Less robot programming when images are captured in diverse positions

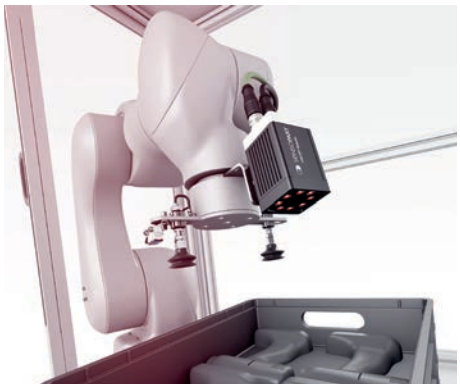
The right package for your individual application:

VISOR® Robotic Advanced: For solving common image-based robotics applications

- Simple calibration methods for robotics applications
- Result offset 3D for direct gripper point transmission to robot
- Easy adjustment of the work plane
- Target Mark 3D technology provides 3D object poses in no time

VISOR® Robotic Professional: Extended functionality for identification, extended calibration methods and localization in 3D

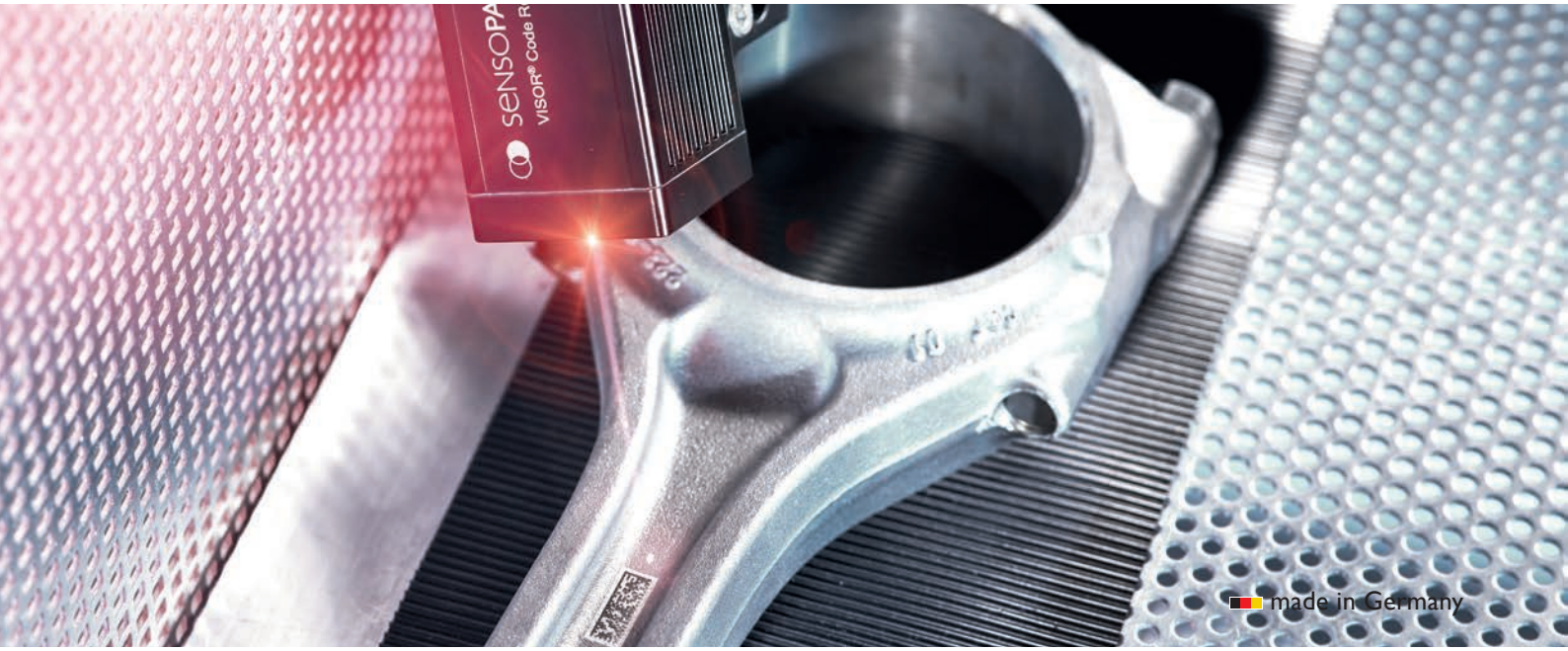




- Calibration methods tailored to the application
- Can be used for all common 2D codes, common 1D barcodes and OCR

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 onto 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.

HIGHLIGHTS OF VISOR® CODE READER

- **Evaluation of quality parameters according to ISO/IEC 15415 and AIM DPM 2006**
- Supplementary object detection for characteristics other than codes (pattern matching, brightness, grey threshold and contrast)
- Flexible definition of output data (header, trailer, net data)
- String comparison with message via the digital switching output
- Support of EtherNet/IP, PROFINET (Conformance Class B) and EtherNet (TCP/IP)
- Comprehensive options for archiving images and data
- Reading of optical characters with OCR

The right package for your individual application:

VISOR® Code Reader Standard: Reliable reading of printed codes and labels

- Can be used for all common 2D codes and common 1D barcodes
- Comprehensive tools for flexible and easy connection to PC and PLC environments

VISOR® Code Reader Advanced: Reading of printed and directly marked codes on all surfaces

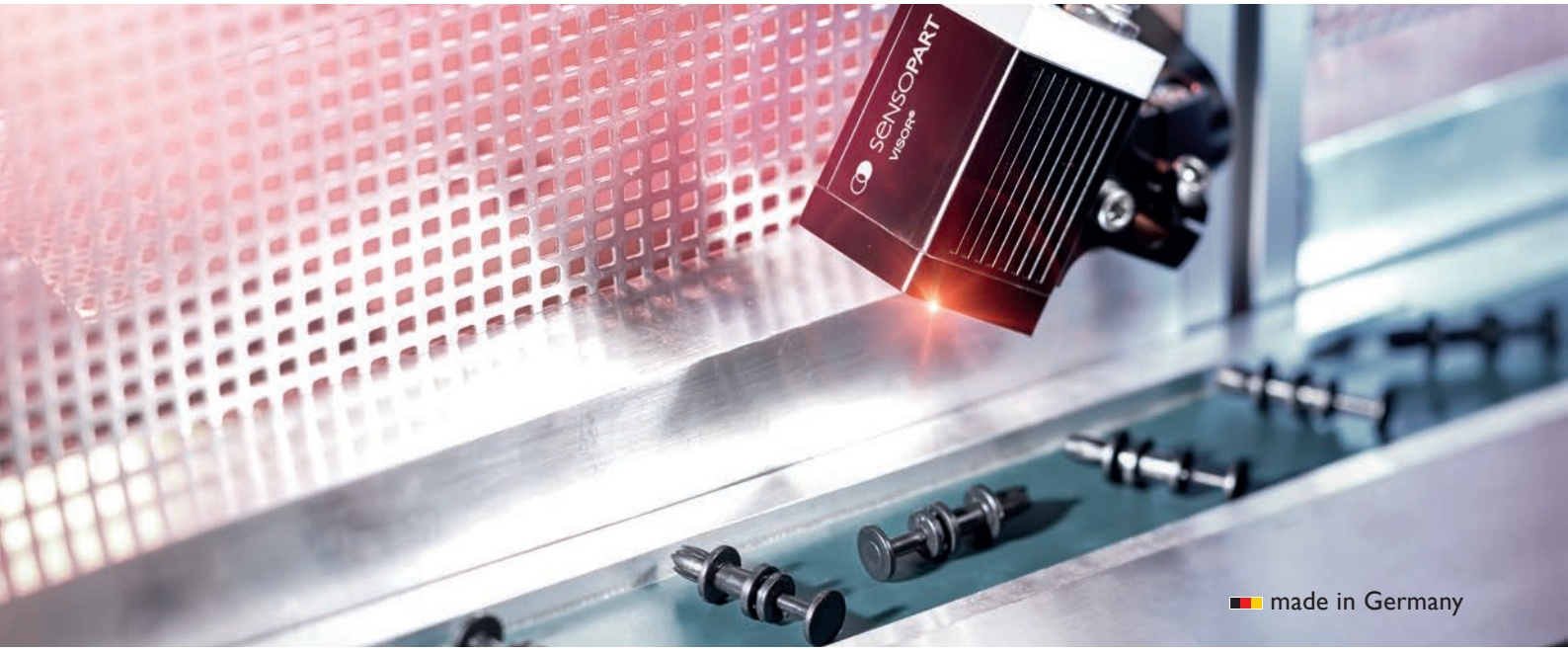
- Reliable detection of even poorly readable codes under difficult ambient conditions
- Reading of several similar or differing types of codes in one reading pass
- Combination of two functions in one device: code reading and object detection (only VISOR® V10 Code Reader Advanced, C-Mount)

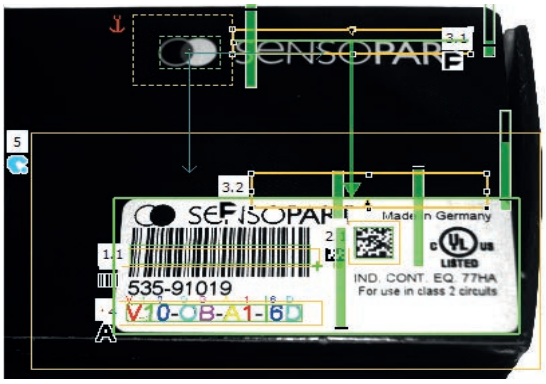
VISOR® Code Reader Professional: The comprehensive package of detectors (incl. optical character reading with OCR) even for very complex tasks

- Combination of two functions in one device: code reading and some features of object detection
- Reading OCR fonts

VISOR® Allround

Advanced allround vision sensor for complex inspection tasks

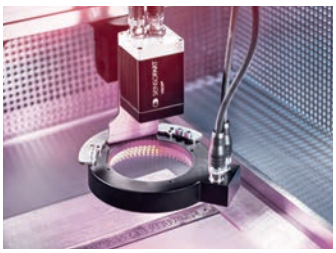




VISOR® Allround – Object detection in color plus identification united in one device
In the allround version, the device combines the functions of the object sensor (i.a. calibration, pattern matching, contour, calliper, BLOB) with the powerful tools of the code reader (barcode, datamatrix and optical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

HIGHLIGHTS OF VISOR® ALLROUND

- **Highly accurate evaluation via 5 megapixel chip**
- All evaluations („Detectors") of VISOR® Object and VISOR® Code Reader united in one device
- Powerful color detection of version with color chip
- EtherNet/IP PROFINET (Conformance Class B) and TCP/IP is supported
- Multishot function reveals minimal height differences and suppresses printed markings
- Calibration function for measurement tasks and robotics applications



VISOR® Mulitshot:
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 the VISOR® vision sensor range from SensoPart.

The right package for your individual application:

VISOR® Allround Advanced: Color object detection and identification combined in one device

- All evaluations (“Detectors”) of object sensor and code reader united in one device
- Real-world engineering units at a mouse click
- Precise determination of X/Y position, orientation and tracking
- Can be used for all common 2D codes (ECC 200-Datamatrix) and common 1D barcodes
- Detection of differences in height in the pseudo height image with Multishot technology

VISOR® Allround Professional: Additionally solving of robotics applications

- Real-world engineering units and robot coordinates at a mouse click
- Unified, easy-to-use configuration and viewer software with staggered user rights and context help

Thoroughly equipped

Sophisticated design and extensive features

16 x VISOR® ready-to-use:

- VISOR® Allround
- VISOR® Object
- VISOR® Robotic
- VISOR® Code Reader

3x VISOR® C-Mount ready-to-use:

High-resolution monochrome or color imaging chip

- 800 x 600 pixels
- 1440 x 1080 pixels
- **2560 x 1936 pixels**

- User-friendly configuration software (also available offline)
- External panel PC for visualisation

- Integrated lens (wide, medium, narrow)
- Motorised focus adjustment
- Optional C-Mount version

- Target Laser

- High-performance, integrated LED lighting (white, red, infrared)
- Can be combined with external illumination

- C-Mount lens (various focal lengths)

- 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

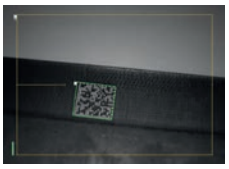
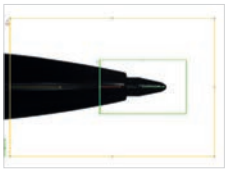
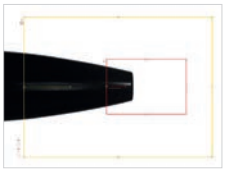
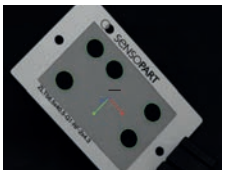
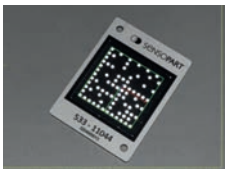
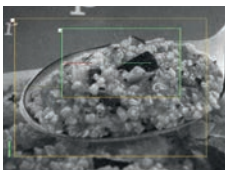
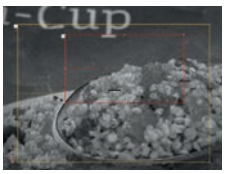
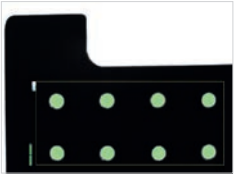
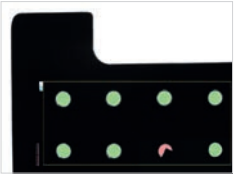
- Power supply
- I/Os
- Encoder
- External lighting

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

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

VISOR® vision sensor

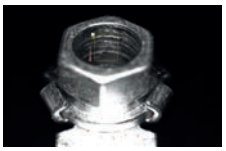
Detectors and application examples

Identification				
	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 dotpeened 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.		–
	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.		–
Positioning				
	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.		
	3D Contour	3D localisation of individual or multiple objects. Inclination of up to ± 15° and height offset are precisely detected. No CAD models are required.		
	Target Mark 3D	Reading highly specific 3D information and position data and transmitting it to the robot. The position of the target mark is referenced only once during the initial setup of the camera. The smallest deviations in the working position and even large angular deviations are precisely detected.		
	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.		
	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).		

Inspection

Brightness

Brightness analysis in search zone. Definition of result output via switching threshold.

Grey threshold

Analysis of grey threshold in search zone. Definition of result output via switching threshold.

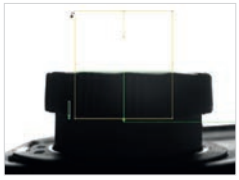
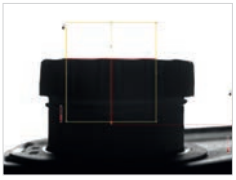

Contrast

Contrast analysis in search zone. Definition of result output via switching threshold.

Measurement

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.

Result processing

Result processing: Text

Comparison of character strings; formatting, adding and cutting of character strings; sorting, simple calculations.
Output of a digital (good/bad) result.

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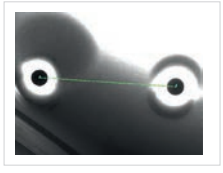
Result processing: Math

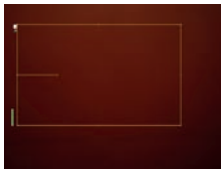
Offset of numerical results; calculation of distances and angles; comparison of results.
Output of a digital (good/bad) result.




Color detection

Color value

Output of color values via interfaces, setting options for color space: RGB, HSV, LAB.



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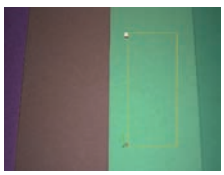
Color list

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.



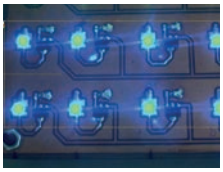
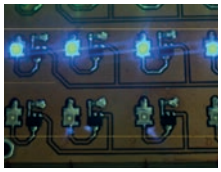

VISOR® vision sensor

Detectors and application examples

Color detection (continued)

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.

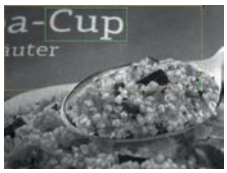
Position tracking

Edge detection

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.


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. Detection of rotated patterns.



Contour

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.

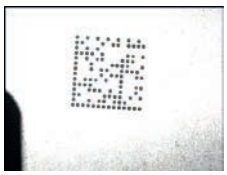

Functions & preprocessing filters

Freeform tool

Innovative freeform tool for creating user-defined teach-in areas for pattern matching and contour, as well as for creating user-defined search areas for contrast, grey threshold, brightness and BLOB.

Filter

Large number of preprocessing filters to improve the picture before actual image processing.




Color filters

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)

Interfaces

SensoWeb	Visualisation of images and results. Easy connection to system visualisation by web browser.
PROFINET®	Industrial Ethernet in compliance with PROFINET standard (Conformance Class B) through integrated Ethernet interface. VISOR® control options via PROFINET commands.
EtherNet/IP™	Industrial Ethernet in compliance with EtherNet/IP standard through integrated Ethernet interface. VISOR® control options via EtherNet/IP commands.
Ethernet TCP/IP	Ethernet interface with user-configurable protocol. VISOR® control options via TCP/IP commands.

Calibration

Calibration (scaling/ perspective)	Output of results in customised units (mm, cm, m, inch). Effects of perspective corrected according to the calibration method.
Robotic calibration 	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.

Product overview VISOR® vision sensors

Software

VISOR® Object

Presence, completeness, measurement, position check, color

VISOR® Robotic

Robotics, presence, completeness, measurement, positioning

	Standard	Advanced	Advanced	Professional
Calibration				
Scaling | Perspective	✓ | –	✓ | ✓	✓ | ✓	
Point-pair list | Calibration plate (robot)	–	– | –	✓ | ✓	
Hand-eye | Base-eye calibration (robot)	–		–	✓
Preprocessing				
Preprocessing filter	–	✓	✓	
Multiple image capture | Shutter variation	–	✓	✓	
Freeform search area	✓		✓	
Position tracking				
Contour comparison (translation, rotation 360°)	✓		✓	
Pattern matching (translation, rotation 360°)	–	✓	✓	
Edge detection (translation, rotation)	–	✓	✓	
Object detection				
Contour | Multiple detection	✓ | –	✓ | ✓	✓ | ✓	
Pattern comparison | Multiple detection	✓ | –	✓ | ✓	✓ | ✓	
Grey level | Contrast | Brightness	✓		✓	
Calliper	✓		✓	
BLOB	–	✓	✓	
3D contour	–	–	–	✓
Target Mark 3D	–	–	✓	
Identification				
Barcodes | Datacode	–		–	✓ | ✓
Barcode Advanced | Datacode Advanced	–		–	✓ | ✓
Clear text (OCR)	–		–	✓ | ✓
Robotics functions				
Result offset image | 2D | 3D	– | – | –	– | – | –	✓ | ✓ | ✓	
Checking space around gripper	–		✓	
Color detectors V10C / V20C / V50C				
Color field | Color value | Color list	✓ | – | –	✓ | ✓ | ✓	✓ | ✓ | ✓	
Color distance | Binarisation	– | –	✓ | ✓	✓ | ✓	
Result processing				
Result processing - Text | Math	– | –	– | ✓	– | ✓	✓| ✓

VISOR® Code Reader

Reading of barcodes, 2D codes, text

VISOR® Allround

Presence, completeness, measurement, position check, color, reading of barcodes, data codes, text, Multishot

	Standard	Advanced	Professional	Advanced	Professional
Calibration					
Scaling | Perspective	–			✓ | ✓	
Point-pair list | Calibration plate (robot)	–			–	✓
Hand-eye | Base-eye calibration (robot)	–			–	✓
Preprocessing					
Preprocessing filter	–	✓	✓	✓	
Multiple image capture | Shutter variation	–	✓	✓	✓	
Freeform search area	–	–	✓	✓	
Position tracking					
Contour comparison (translation, rotation 360°)	–		✓	✓	
Pattern matching (translation, rotation 360°)	–		✓	✓	
Edge detection (translation, rotation)	–		✓	✓	
Object detection					
Contour | Multiple detection	– | –			✓	
Pattern comparison | Multiple detection	– | –		✓ | ✓	✓	
Grey level | Contrast | Brightness	–		✓	✓	
Calliper	–			✓	
BLOB	–			✓	
3D contour	–			–	✓
Target Mark 3D	–			✓	✓
Identification					
Barcodes | Datacode	✓			✓	
Barcode Advanced | Datacode Advanced	–	✓		✓	
Clear text (OCR)	–		✓	✓	
Robotics functions					
Result offset image | 2D | 3D	– | – | –			–	✓
Checking space around gripper	–			–	✓
Color detectors V10C / V20C / V50C					
Color field | Color value | Color list	– | – | –			✓ | ✓ | ✓	
Color distance | Binarisation	– | –			✓ | ✓	
Result processing					
Result processing - Text | Math	– | –	✓ | –		✓ | ✓	

[1] not with color hardware V10C/V20C [2] only color hardware

Product overview VISOR® vision sensors

Hardware

VISOR® Object

Presence, completeness, measurement, position check, color

VISOR® Robotic

Robotics, presence, completeness, measurement, positioning

	Standard	Advanced	Advanced	Professional
Resolution				
V10 (800 x 600): Mono | Color	✓		✓	–
Images per second: Mono | Color	75 | 50		75	–
V20 (1440 x 1080): Mono | Color	–	✓	✓	
Number of images per second: Mono | Color	–	40 | 20	40 | 20	
V50 (2560 x 1936): Mono | Color	–	✓	–	✓
Images per second: Mono | Color	–	22 | 8	–	22 | 8
Lighting	white, red[1], infrared[1]			
Multishot (Mono)	–		–	
Target laser	–	✓	✓	
Lenses				
V10 wide | medium | narrow | C-Mount	✓| ✓| ✓| –	✓| ✓| ✓| ✓	✓ | ✓| ✓| ✓	–
V20 wide | medium | narrow | C-Mount	– | – | – | –	✓| ✓| ✓| ✓	✓ | ✓| ✓| ✓	
V50 wide | medium | narrow | C-Mount	– | – | – | –	✓| ✓| – | ✓	–	✓| ✓| – | ✓
Interfaces	Ethernet/EtherNet/IP/PROFINET			
Inputs | outputs | selectable	2 | 2 | 4	2 | 2 | 6	2 | 2 | 6	
Encoder input	–	✓	✓	
Ethernet | EtherNet/IP | PROFINET | SensoWeb	✓ | ✓| ✓| ✓		✓ | ✓| ✓| ✓	
Service Port	–	✓	✓	
Job / Detectors				
Number of jobs (max.) | Detectors per job (max.)	32 | 32	255 | 255	255 | 255	
Job checksum	–	✓	✓	

VISOR® Code Reader

VISOR® Allround

	Reading of barcodes, 2D codes, text			Presence, completeness, measurement, position check, color, reading of barcodes, data codes, text, multi-shot	
	Standard	Advanced	Professional	Advanced	Professional
Resolution					
V10 (800 x 600): Mono | Color	✓ | –			✓	–
Images per second: Mono | Color	75 | –			75 | 50	–
V20 (1440 x 1080): Mono | Color	✓ | –			✓	
Number of images per second: Mono | Color	40 | –			40 | 20	
V50 (2560 x 1936): Mono | Color	–	✓ | –		–	✓
Images per second: Mono | Color	–	22 | –		–	22 | 8
Lighting	white, red[1], infrared[1]				
Multishot	–			✓	
Target laser	only V20	✓		✓	
Lenses					
V10 wide | medium | narrow | C-Mount	✓| ✓| ✓| –	✓| ✓| ✓| ✓		✓ | ✓| ✓| ✓	–
V20 wide | medium | narrow | C-Mount	✓| ✓| ✓| –	✓| ✓| ✓| ✓		✓ | ✓| ✓| ✓	
V50 wide | medium | narrow | C-Mount	–	✓| ✓| – | ✓		–	✓| ✓| – | ✓
Interfaces	Ethernet/EtherNet/IP/PROFINET				
Inputs | outputs | selectable	2 | 2 | 4	2 | 2 | 6		2 | 2 | 6	
Encoder input	–	✓		✓	
Ethernet | EtherNet/IP | PROFINET | SensoWeb	✓| ✓| ✓| ✓			✓ | ✓| ✓| ✓	
Service Port	–	✓		✓	
Job / Detectors					
Number of jobs (max.) | Detectors per job (max.)	8 | 2	255 | 255		255 | 255	
Job checksum	–	✓		✓	

[1] not with color hardware V10C/V20C

[2] only color hardware

Technical data

Optical data

Number of pixels, chip size	VISOR®-V10 ...: 800 (H) x 600 (V) VISOR®-V20 ...: 1440 (H) x 1080 (V) VISOR®-V50...:2560 (H) x 1936 (V)
Technology	CMOS (mono / color)
Lighting (integrated)	8 LEDs (except C-Mount) (white, red, infrared)
Fields of view	wide, medium, narrow, motorised focus

Electrical data

Operating voltage $+U_B$	18 … 30 V DC[1]
Power consumption (without I/O)	≤ 300 mA
Protection circuits	Reverse-polarity protection, U_B / short-circuit protection of all outputs
Rise-time delay	Approx. 13 s after Power on
Outputs	PNP/NPN (switchable)
Max. output current (per output)	50 mA, 100 mA (pin 12)
Inputs	PNP/NPN High > U_B-1 V, Low < 3 V
Input resistance	> 20 kΩ
Encoder input	40 kHz
Interfaces	Ethernet (LAN), EtherNet/IP, PROFINET, SensoWeb
Inputs / Outputs	2 inputs, / 2 outputs, 6 selectable inputs/outputs[3]

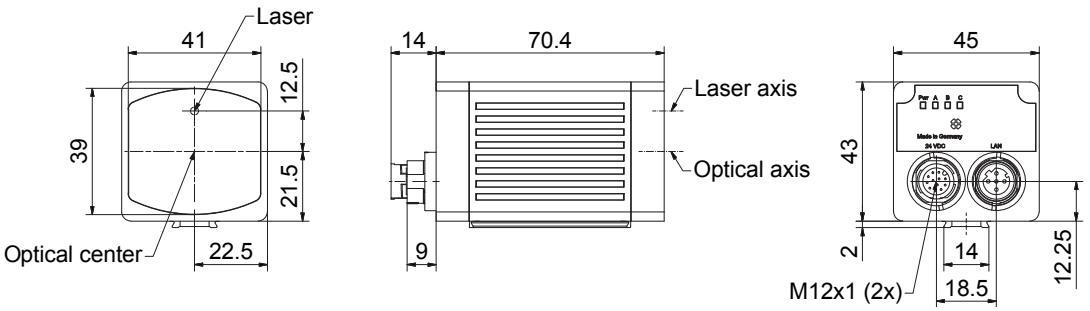
Mechanical data

Dimensions	71 x 45 x 45 mm (without connector)
Enclosure rating	IP 67
Material housing	Aluminium, die-cast, RoHS compliant
Material, front screen	Plastic
Ambient temperature: operating	0 … +50° C[2]
Ambient temperature: Storage	-20 … +60° C[2]
Weight	Approx. 200 g
Plug Connections	Supply and I/O M12, 12-pin, Ethernet M12, 4-pin
Vibration / shock resistance	EN 60947-5-2

c UL us LISTED CE

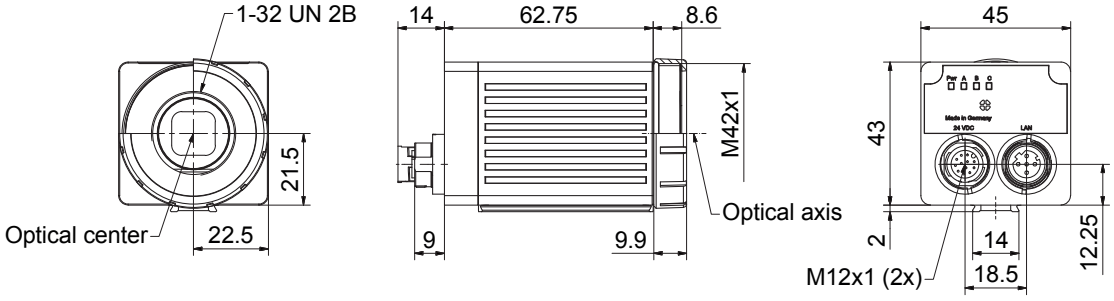
[1] Max. ripple < 5 V_{SS} [2] 80 % air humidity, non-condensing [3] dependent on model

Vision sensor VISOR® with integrated optics & lighting



153-13554

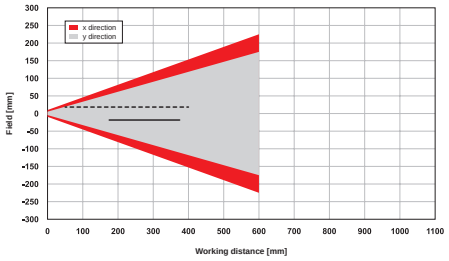
Vision sensor VISOR® C-Mount



153-13555

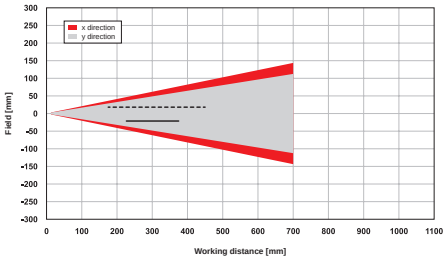
Fields of view and depths of field

Field of view V10 wide



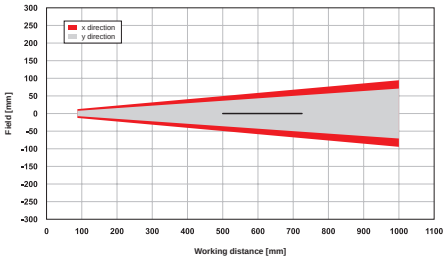
155-03101

Field of view V10 medium



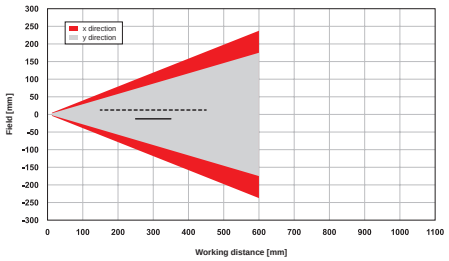
155-03100

Field of view V10 narrow



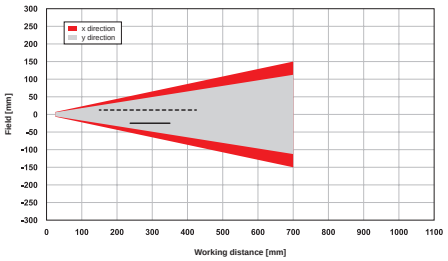
155-03097

Field of view V20 wide



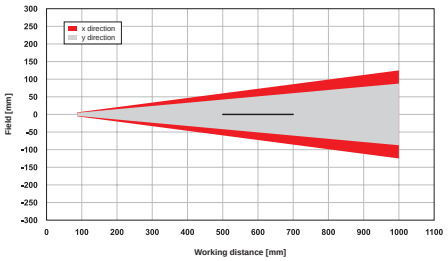
155-03279

Field of view V20 medium



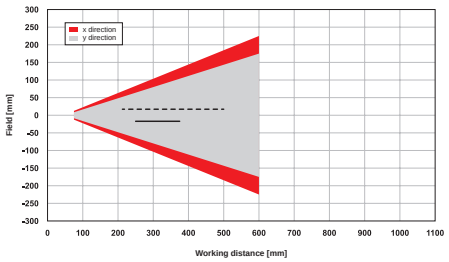
155-03099

Field of view V20 narrow



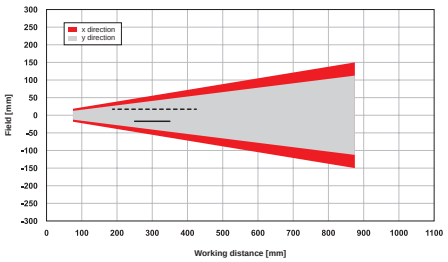
155-03098

Field of view V50 wide



155-03626

Field of view V50 medium



155-03559

Increased depth of field
Normal depth of field

SensoCalc

Wizard for optical calculations

SensoCalc is an assistant for performing basic calculations for camera applications. The calculations are especially designed for the components of SensoPart.
The following modules are available:

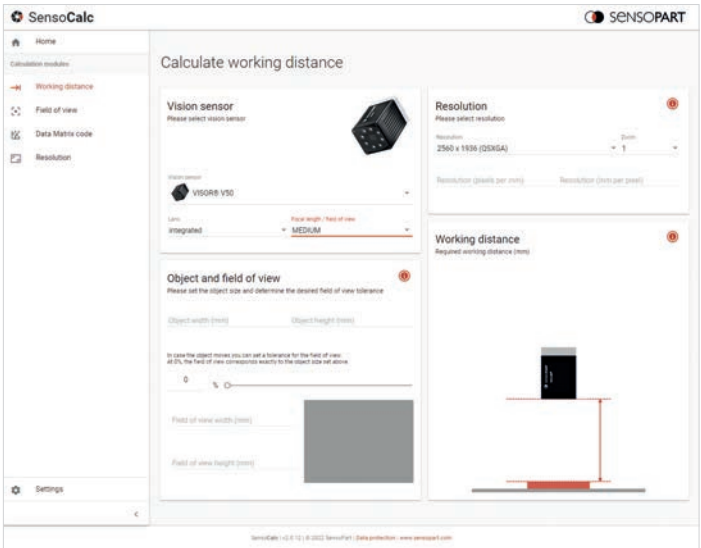
WORKING DISTANCE

FIELD OF VIEW

DATA MATRIX CODE

RESOLUTION

Link to SensoCalc



Accessories

Brackets, display, cables, lenses, illumination, robotics

Brackets for V10, V20, V50: Mounting hinges

Part number / Article number

Mounting hinge with 3 axes:

MG 3A / 543-11024
MG 3A-MST12 / 543-11034

QR-Code for more information

Display and configuration devices

Part number / Article number

Panel PC 10.4“:

PV-AW10IoT10.4TX / 533-01031
PV-AW10IoT10.4TX-V / 533-01032

QR-Code for more information

Cables: Voltage and IO (12-wire, 3-wire), Ethernet, illumination cables

Part number / Article number

M12 socket, 12-pin:

C L12FG-S-2m-PUR / 902-51801
C L12FG-S-5m-PUR / 902-51796
C L12FG-S-10m-PUR / 902-51797

M12 socket, 3-pin:

C L12/3FG-S-2m-PUR / 902-51833
C L12/3FG-S-5m-PUR / 902-51834
C L12/3FG-S-10m-PUR / 902-51835

M12 plug 4-pin, d-coding to RJ45 plug:

CI L4MG/RJ45G-GS-3m-PUR / 902-51754
CI L4MG/RJ45G-GS-5m-PUR / 902-51782
CI L4MG/RJ45G-GS-10m-PUR / 902-51784

M12 socket 4-pin to M12 socket 12-pin:

CB L12FS/L12FS-0,35m-GG-PUR / 902-51841
CB L12FS/L12FS-0,5m-GG-PUR / 902-51806
CB L12FS/L12FS-2m-GG-PUR / 902-51807

QR-Code for more information

Optical accessories: Lenses, intermediate rings, red filter, infrared filter

Part number / Article number

C-Mount lenses:

LOC-08-HD-30.5x0,5 / 526-51535 (8 mm focal length)
LOC-12-HD-27x0,5 / 526-51536 (12 mm focal length)
LOC-16-HD-27x0,5 / 526-51537 (16 mm focal length)
LOC-25-HD-27x0,5 / 526-51538 (25 mm focal length)

LOC-35-HD-27x0,5 / 526-51539 (35 mm focal length)
LOC-50-HD-27x0,5 / 526-51540 (50 mm focal length)
LOC-75-HD-34x0,5 / 526-51541 (75 mm focal length)

Intermediate ring:

LR 5 / 543-11011
ETS / 527-51143

Filter:

LOF-BP-R635-30,5x0,5 / 533-01015
LOF-LP-IR850- 30,5x0,5 / 533-01010
LOF-PF-30,5 x 0,5 / 526-51531

QR-Code for more information

Optical accessories: C-Mount protective casing, protective casing and polarizer glasses

Part number / Article number

C-Mount protective casing:

LPT Vxx-G37.5 / 651-01006

Protective tube extension:

LPT Vxx-25.0 / 651-01007

Removable protective casing:

LPC Vxx / 651-01001

Polarising filter panels:

LPC Vxx S1-5 / 651-01002

LPF Vxx S1 / 651-01003

LPF Vxx S2 / 651-01004

QR-Code for more information

Illumination: Ring light, spot illumination, connection adapter for illumination

Part number / Article number

Ring light:

LFR 115 WD-24-2L12 / 525-51150

LFR 115 RD-24-2L12 / 525-51151

LFR 115 ID-24-2L12 / 525-51152

LFR 115 WK-24-2L12 / 525-51153

LFR 115 RK-24-2L12 / 525-51154

LFR 115 IK-24-2L12 / 525-51155

Spot illumination:

LS 55 x 46 WK-24-A13 2L12 / 532-51101

LS 55 x 46 RK-24-A13 2L12 / 532-51102

LS 55 x 46 iRK-24-A13 2L12 / 532-51103

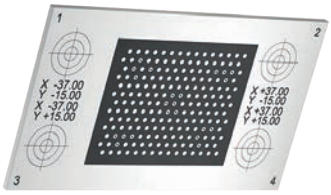
Connection adapter:

LA 45 V-24-2L12 / 525-01001

LA 45 VT-24-2L12 / 525-01002

QR-Code for more information

Robotics: Calibration plates and target marks



Part number / Article number

Standard:

ZCP 50-13x15 / 533-11030

ZCP 100-13x15 / 533-11031

ZCP 200-13x15 / 533-11032

ZCP 500-13x15 / 533-11033

X01

ZCP 50-13x15-X01 / 533-11037

ZCP 100-13x15-X01 / 533-11038

ZCP 200-13x15-X01 / 533-11039

ZCP 500-13x15-X01 / 533-11040

Others:

ZCP 100-13x15-X02 / 533-11035

ZCP 50-13x15-X03 / 533-11042

ZCP 100-13x15-X03 / 533-11041

ZCP 100-ECC200 / 533-11036

Target Mark:

ZTM 100-D2-RF-4x3.3 / 533-11045

ZTM 38-D2-RF-2x3.3 / 533-11044

ZTM 58.5-G1-RF-2x4.3 / 533-11043

QR-Code for more information

We are SensoPart

www.sensopart.com

SensoPart is one of the leading manufacturers of photoelectric sensors and image processing vision sensors for factory automation. We also offer inductive and ultrasonic sensors, thereby covering a wide spectrum of industrial automation tasks. Our products are used in countless applications and sectors today – from automotive construction and mechanical engineering to electronics manufacturing and the solar industry, as well as the food sector and pharmaceutical industry.

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