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

**Ease-of-Use:**
- Modern AI-based solutions solve applications more easily than ever

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, increase plant efficiency, reduce scrap, and reduce costs. The VISOR offers multiple ranges of integrated detectors and functionalities depending on the task:

**Standard:** Solves simple image processing tasks

**Advanced:** An extended scope of functions for more challenging applications

**Professional:** The complete detector package suited to the most 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
- **VISOR® Object AI**
  - Classification of objects made even easier with artificial intelligence
  - All functions of VISOR® Object Advanced

## 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

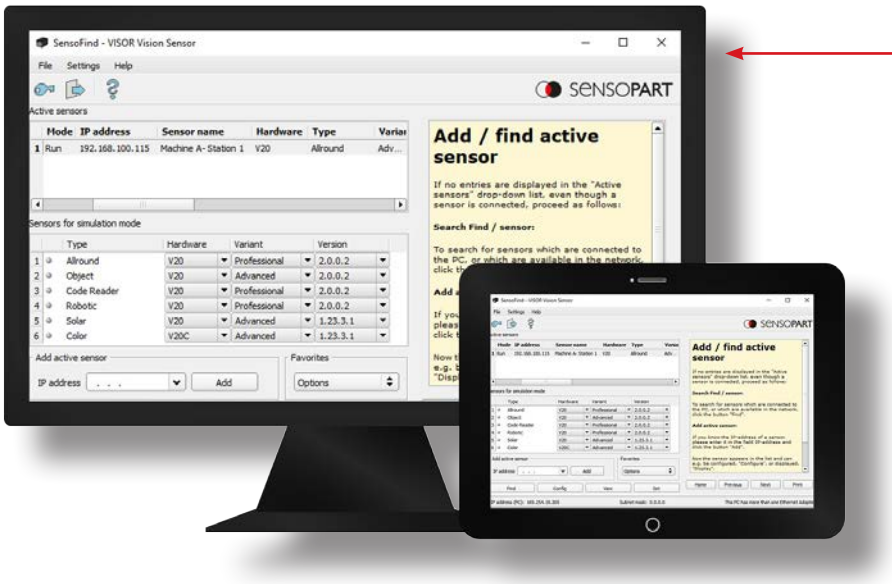
### Unpack, set up, go

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. A special feature is that the offline simulation mode not only works with preset sample images, but also your own images can be uploaded and tested. All this works even without a sensor being connected.


## 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

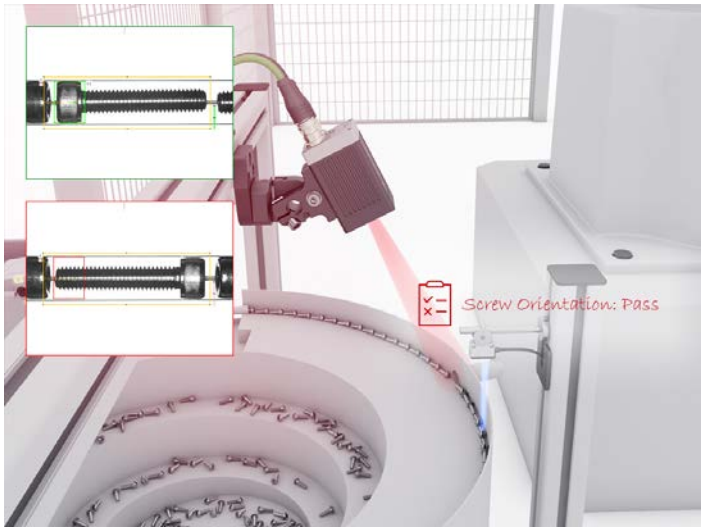
- **Seven detectors for solving presence inspection, completeness inspection or part differentiation tasks**
- Robust contour alignment for the compensation of position deviations even with non-precisely guided components
- Extensive logic functions, flexible result delay of the switching outputs for 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

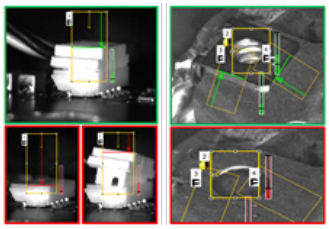


# VISOR® Object Advanced

## 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.*



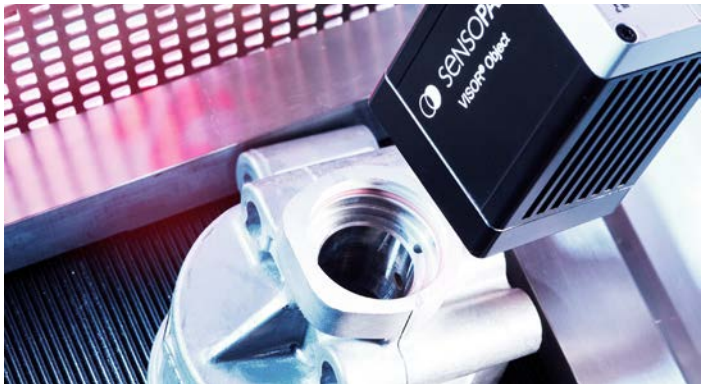
***Fits, wiggles and has air***
*Not only the presence, but also the correct fit of the connector or mounting clip can be easily checked with the VISOR® Object.*

### HIGHLIGHTS VISOR® OBJECT ADVANCED

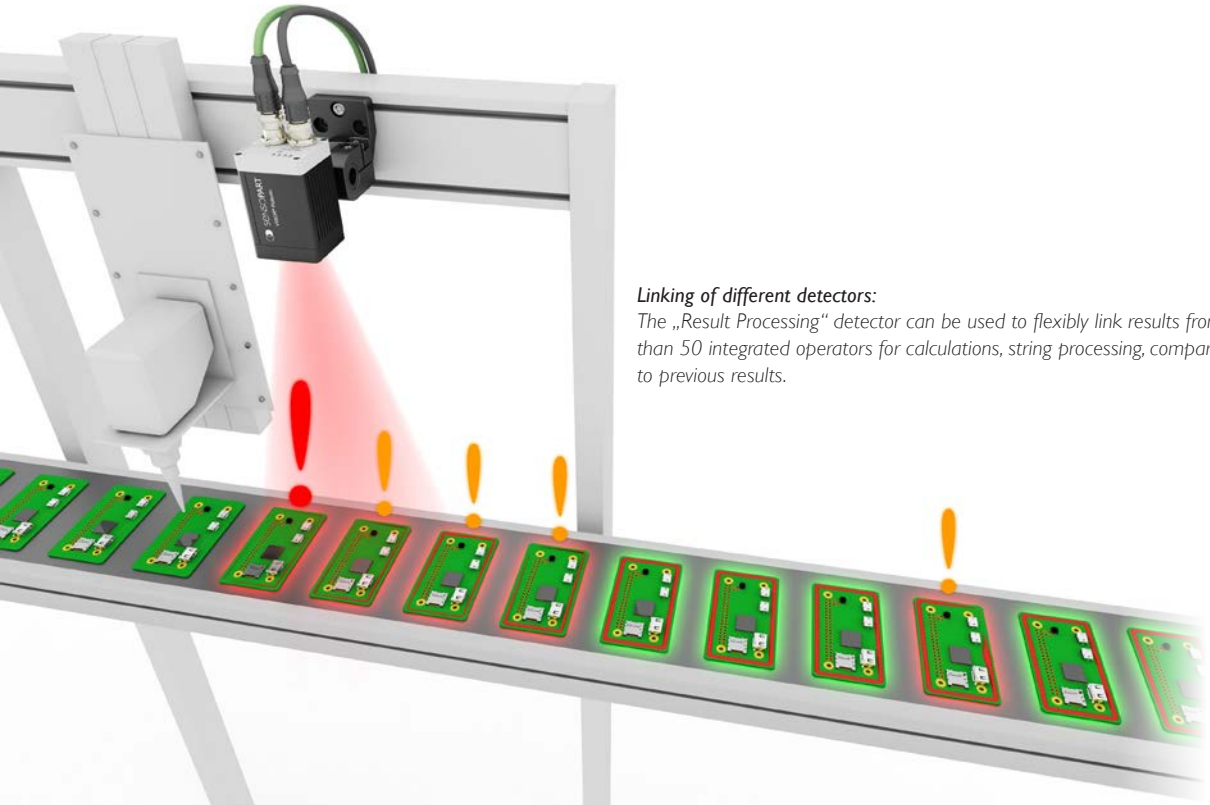
- **All functions of the VISOR® Object Standard**
- **Hardware variants up to 5 megapixels for highest accuracy or largest fields of view**
- **Additional detectors for counting and evaluating objects, as well as for solving measuring and positioning tasks**
- Three position alignment systems for compensation 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.

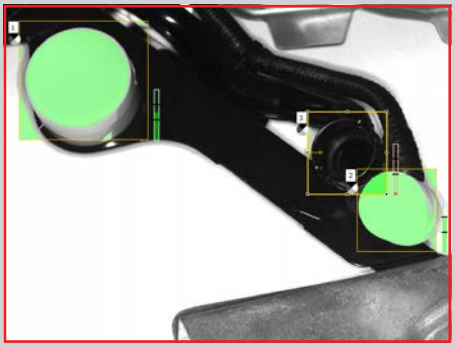



- Reliable detection and evaluation via 12 flexible detectors
- Simple compensation of position variations even with components that are not precisely guided
- Differentiation of color nuances and compensation of variances via image pre-processing
- Trouble-free integration in any installation situation 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.*

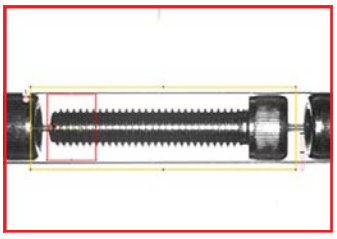
## Presence check of protective caps

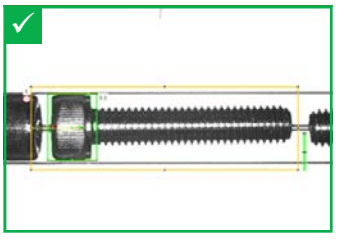


The VISOR® Object in combination with a robot provides the necessary flexibility for inspecting hard-to-see protective caps. Thus, the desired image acquisition for a reliable inspection succeeds. The software provides the function to determine the presence of the caps based on a unique grey value and, if necessary, to check their position. To check different types of caps with the same hardware, the vision sensor offers the possibility to change jobs. The duration of the image evaluation is only a few milliseconds, so that a protective cap inspection is possible in passing.

## Check of the correct feeding of screws in the right position

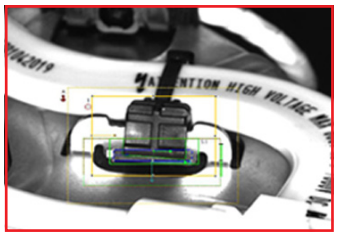
The VISOR® Object can be configured in terms of time so that it starts evaluating the fed screws at the right time, even if the trigger is staggered. Likewise, a specially designed output, which can be loaded with up to 100mA, can also be parameterized as an ejector. Thus the signal comes at the right time as well as in the right interval. Due to the integrated autofocus and the integrated illumination, the image acquisition can be easily set in the VISOR® software. To check the alignment of the screws, a simple contour detector can be parameterized in just a few steps.

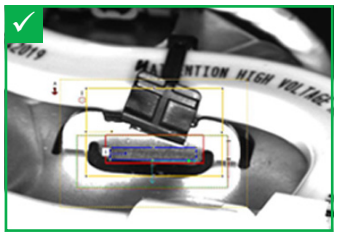


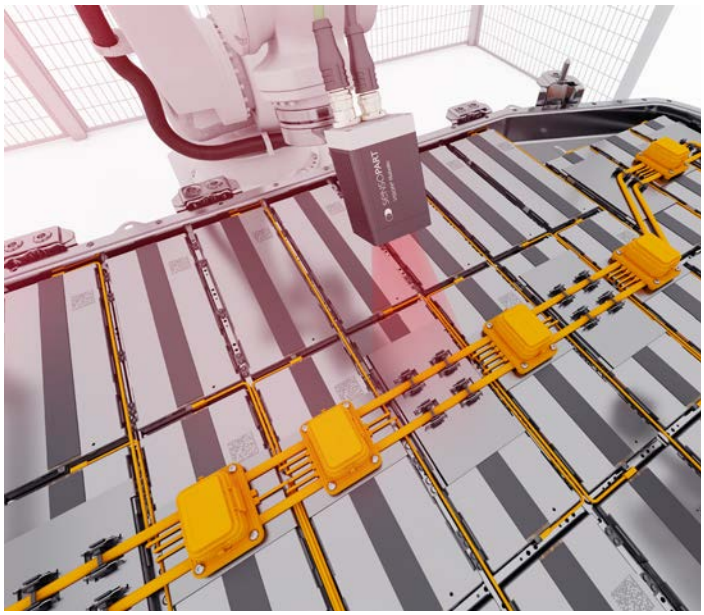


# Position control of the fastening clips of cable harnesses

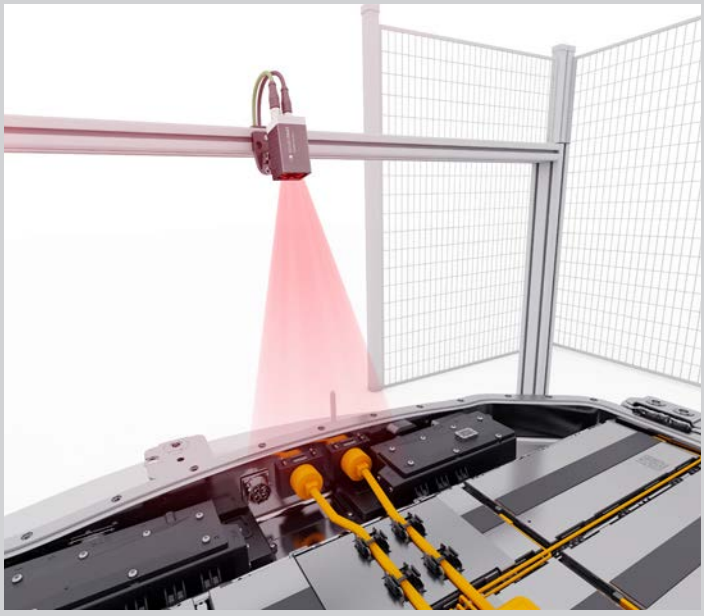
The VISOR® Object in combination with a robot provides the necessary flexibility for inspecting fastening clips that are difficult to see. Thus, the desired image acquisition for a reliable inspection succeeds. The software offers the function to teach a unique contour, which can then be searched and checked in its position. In addition, different clamp types can be stored as identification jobs in the software and checked with the same hardware. The duration of the image evaluation is only a few milliseconds, so that clamp inspection is possible on the fly, which significantly reduces the time required.



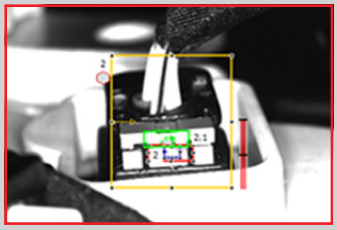


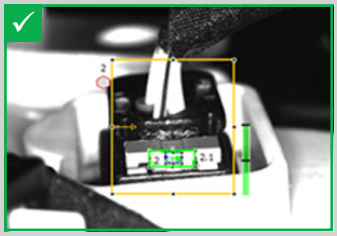


# Locking check of the connections



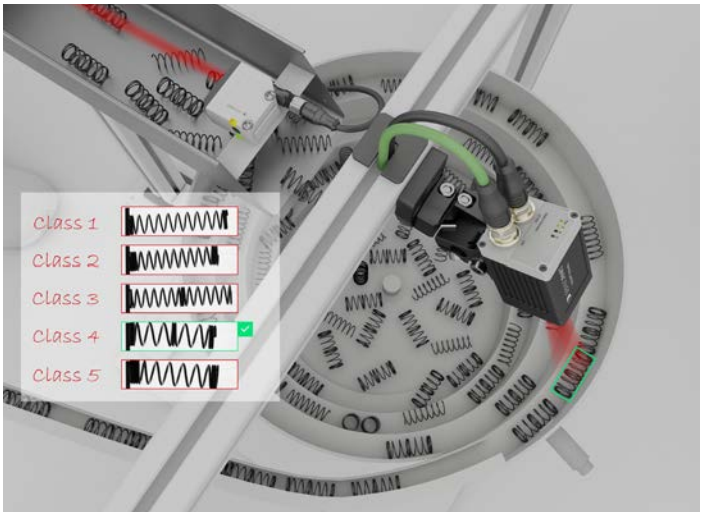
The VISOR® Object, mounted stationary or in combination with a robot as required, provides the necessary flexibility for inspecting connectors that are difficult to see. Thus, the desired image acquisition for a reliable inspection is achieved. The VISOR® software offers the function to teach a unique contour, which can then be searched and inspected in its position. Job changes are available to check different fasteners with the same hardware. The duration of the image evaluation is only a few milliseconds, so that a connector inspection is possible in passing, which significantly reduces the time required.





# VISOR® Object AI

Artificial intelligence. Real results.


*Checking the right spring type:*
*With the classification detector, even very similar looking springs are reliably distinguished and correctly fed to the machine.*

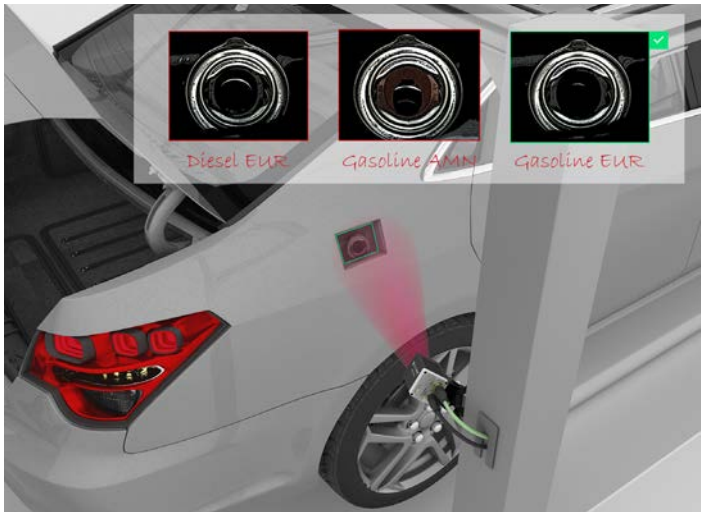
## HIGHLIGHTS VISOR® OBJECT AI

- **Easy setup without image processing knowledge**
- **AI technology in a robust vision sensor, made for industrial automation**
- Train the detector with a few images on your PC
- Reliable results with strong varying processes and products

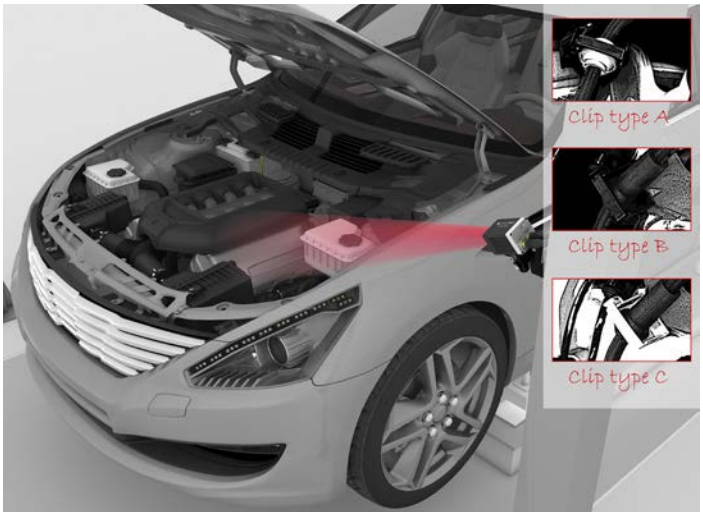
**The VISOR® Object AI makes machine vision easier than ever before:**

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

- Robust and compact VISOR® family hardware with full flexibility of the VISOR® Object Advanced Software
- Detector „Classification (AI)" makes object classification even easier and more stable
- Objects are robustly and reliably assigned to the correct class and can be differentiated into up to 200 classes
- Set up Pass/Fail criteria in as few as 3-5 images
- For quality control or presence check, objects can be automatically rated as „pass" or „fail"
- The detector learns the distinguishing features based on a few sample images thanks to built-in artificial intelligence (AI)
- Only a few steps and no expert knowledge required for setup
- Even process and product variations such as varied products in lots, stains, reflections, misalignment, etc. can easily be taught to the detector with just a few mouse clicks

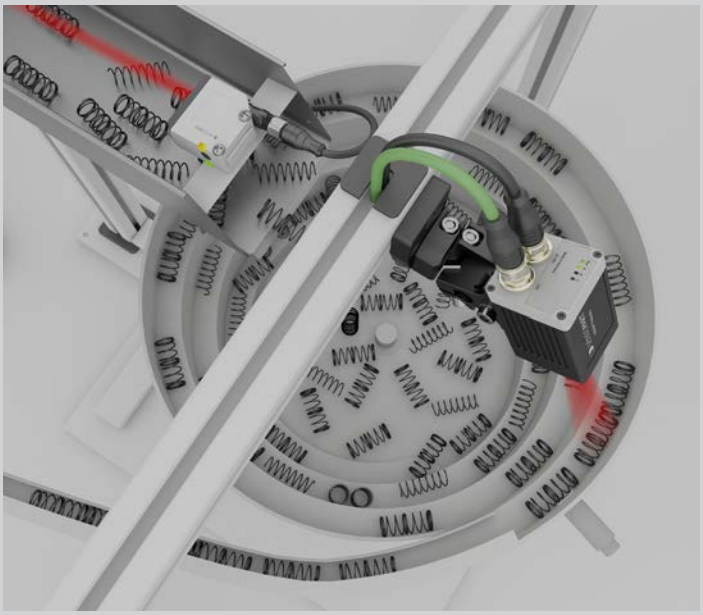



*Check the right type of fuel filler necks:*
*The VISOR® Object AI easily checks whether the correct type of fuel filler necks has been installed in the different cars on a production line.*

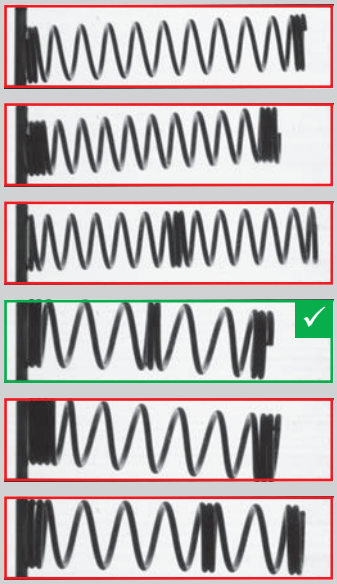



*Check the right type of fuel hoses and clips:*
*The VISOR® Object AI detects the different fuel hoses and respective clips in different cars and reliably checks whether the correct ones have been installed.*

## Classification of springs



With the classification detector of the VISOR® Object AI, even very similar looking springs are reliably distinguished and correctly fed to the machine. By assigning only a few examples of each class, the classifier automatically learns to distinguish the different types.

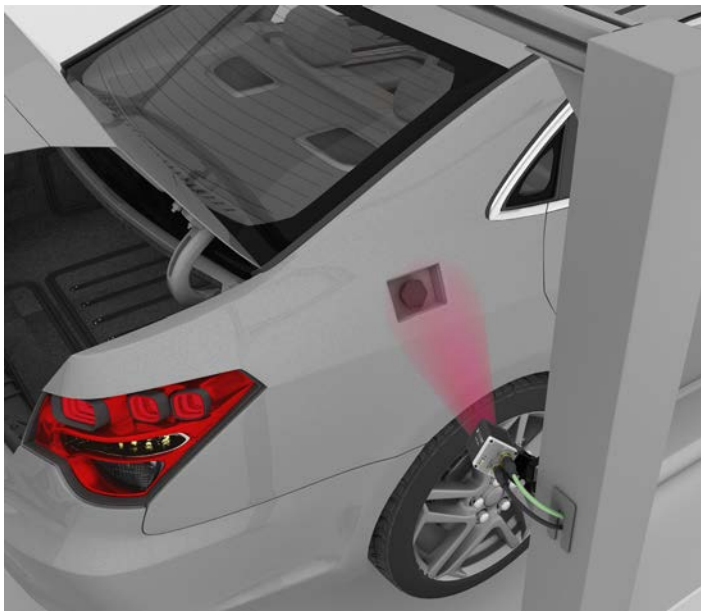


## Check the right type of switches on the dashboard

Depending on the chosen additional equipment, a dashboard has different switches, which the classification detector in the VISOR® Object AI reliably distinguishes and checks.

# Check the right type of fuel filler necks

The VISOR® Object AI easily and reliably checks whether the correct type of fuel filler necks has been installed in the different cars on a production line. By assigning only a few examples of each class, the classifier automatically learns to distinguish the different types. Variations in position and reflections can be shown to the detector and it learns the necessary features.



# Check the right type of fuel hoses and clips

The VISOR® Object AI detects the different fuel hoses and respective clips in different cars and reliably checks whether the correct ones have been installed. By assigning only a few examples of each class, the classifier automatically learns to distinguish the different types. Variations in position can be shown to the detector and it learns the necessary features.

# 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

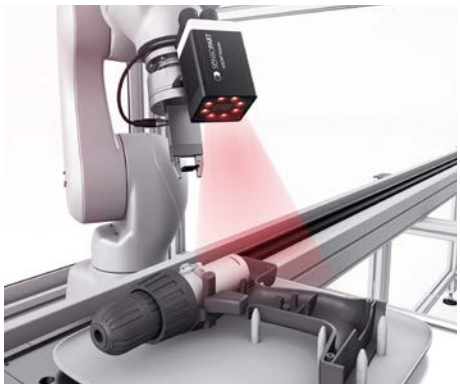
- **Compact and lightweight housing for moving or stationary applications**
- Calibration methods tailored to the application
- 2D or 3D localisation in robot coordinates
- Simplified setup through 3D gripper point transformation
- Less robot programming when images are captured in diverse positions

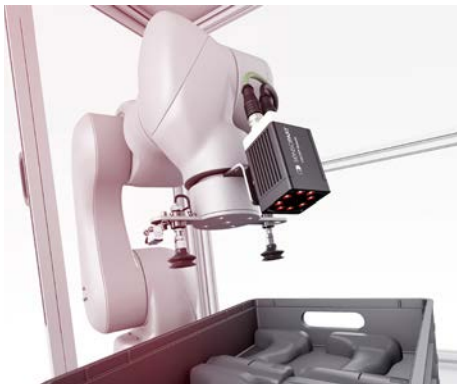
**The right package for your individual application:**

**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

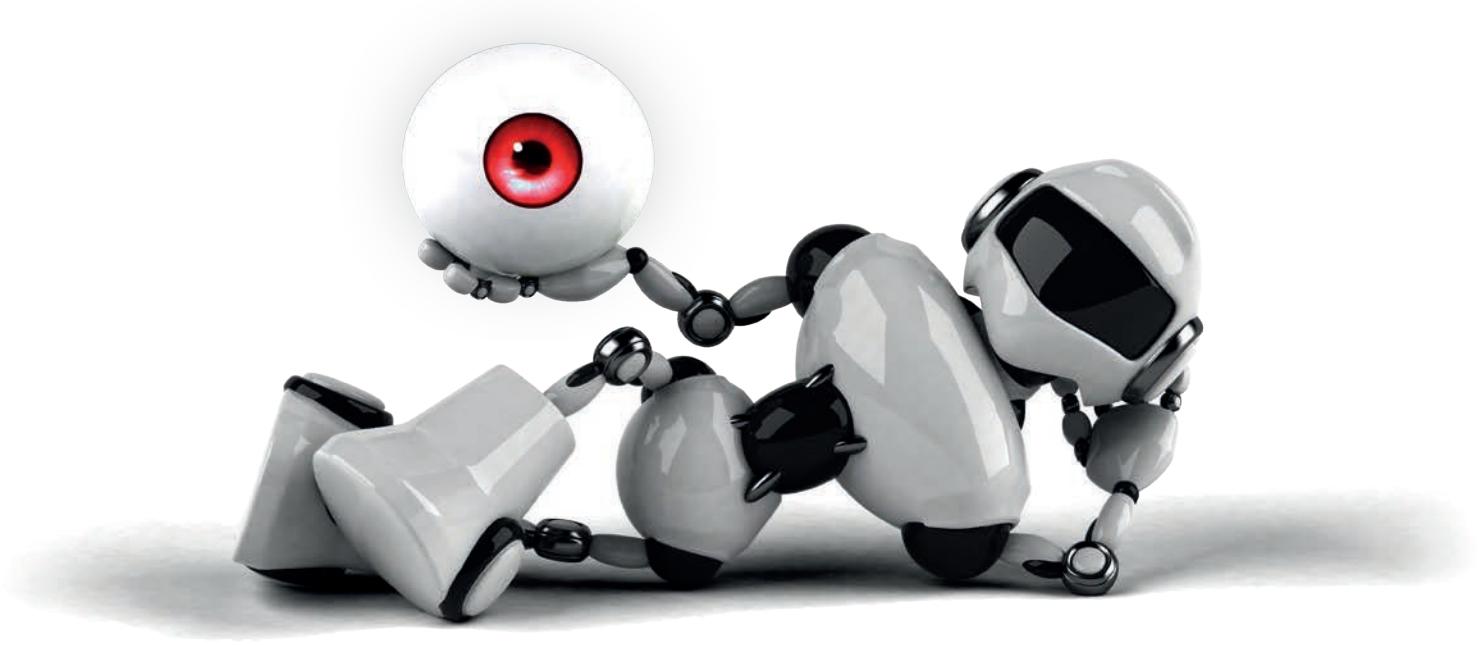




- Calibration methods tailored to the application
- Can be used for all common 2D codes, common 1D barcodes and OCR

# VISOR® Robotic

Easy.Robot.Vision.



**Simple connection to robot systems from leading manufacturers**

The VISOR® Robotic vision sensor was specially developed for the challenges in robotics applications. With its integrated, standardised interfaces, it can be easily incorporated in existing installations and robot systems from leading manufacturers. Specially developed apps and function modules allow seamless communication between the vision sensor and robot, and considerably facilitate setup, operation and data exchange. This enables fast integration of the sensor in numerous applications.

**Easy connection to solutions of leading manufacturers**

In addition to the apps and function modules developed by us, the setup of robotics applications is also simplified by the offerings of other solution providers.
Of course, the cooperation of these programs with our VISOR® Robotic works without problems. Their additional tools make the communication with robots and their setup and operation even more comfortable and expand your possibilities considerably.

ABB · KUKA · UNIVERSAL ROBOTS · ARTIMINDS · wandelbots · DENSO · MITSUBISHI ELECTRIC · YASKAWA · drag&bot · FANUC · DOOSAN · STÄUBLI · READY ROBOTICS

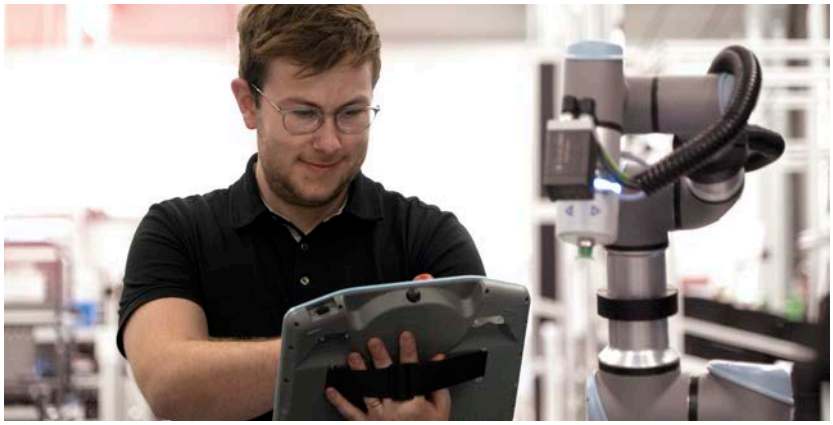
## VISOR® Robotic Starter Kits

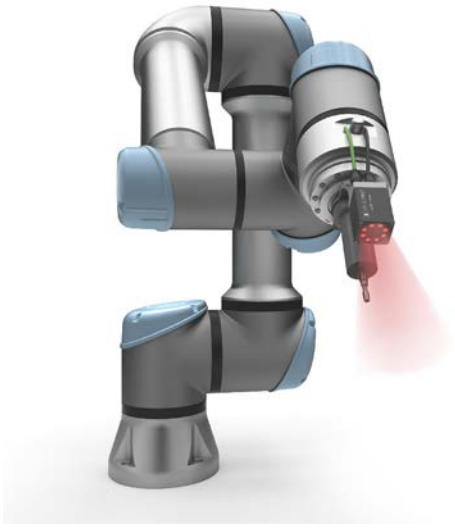
- Everything you need to get started with one single part number
- 3 different hardware levels ranging from basic to advanced
- Kits suited for stationary or end-of-arm configurations
- Compatible with different robot manufacturers
- For more information, visit **www.EasyRobotVision.com**

# VISOR® Robotic URCap

One with the robot. Easy. Quick. Flexible. VISOR®.

**The VISOR® Robotic URCap guides you through all the necessary steps to set up your vision-guided robotics applications and provides prepared program routines for pick-and-place tasks.**

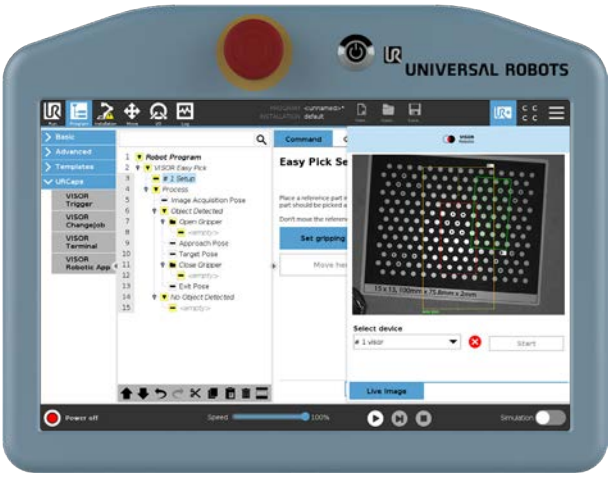





## How does it work?

The VISOR® Robotic in combination with the URCap offers a flexible, fast and robust solution for 2D vision guided robotics. A new program is set up in **less than 15 minutes**, thanks to:

- Simple VISOR® configuration
- Step-by-step guide to camera calibration in the URCap software package
- Guided commissioning when setting up Pick and Place applications
- QR codes that link to tutorial videos for each step



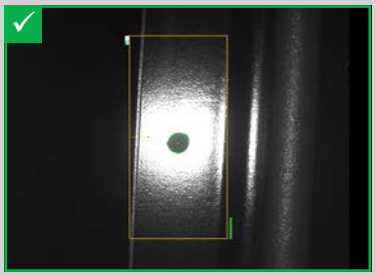

## VISOR® Robotic URCap highlights

- Find all sensors in the network with one click
- Operate up to 8 VISOR® Robotics in parallel
- Live image from the vision sensor showing the part position
- Support from SensoPart's „assisted calibration process" (ACP)
- Backup functions and QuickStart jobsets

UNIVERSAL ROBOTS+ Certified

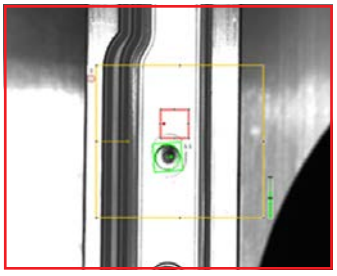
## Automated bolting of the upper housing part

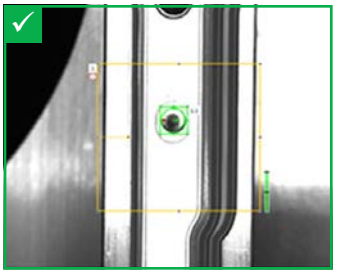
The VISOR® Robotic in the variant with a narrow field of view precisely detects the drill holes at a sufficient distance. Thus, there is enough distance between the screw system and the battery pack to avoid damage. Due to the hand-eye calibration included in the sensor, it communicates directly in robot coordinates. The calibration can be carried out at any location and, via an integrated robot-camera data exchange, it is still possible to work within the robot's entire working area. An additional ring light makes the inside of the hole appear darker, thus creating a clear contour for position detection. Due to the high computing performance of the VISOR®, the position coordinates are available just a few milliseconds after image acquisition.

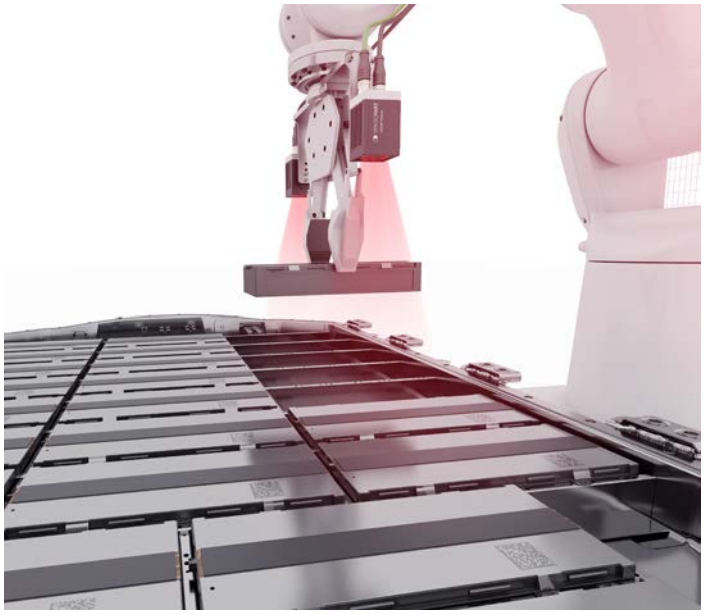


## Inserting battery modules into the housing bottom part

With the VISOR® Robotic, the exact position of the housing bottom part is determined and transferred to the controller in robot coordinates. Due to its compact and robust design, the vision sensor can be easily integrated directly into the robot gripper. With the help of standardized calibration plates, the image coordinates can be converted into world coordinates.

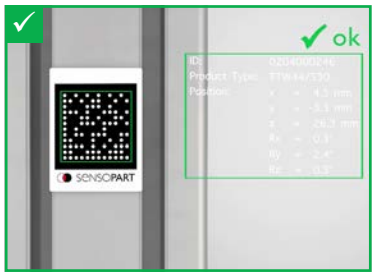






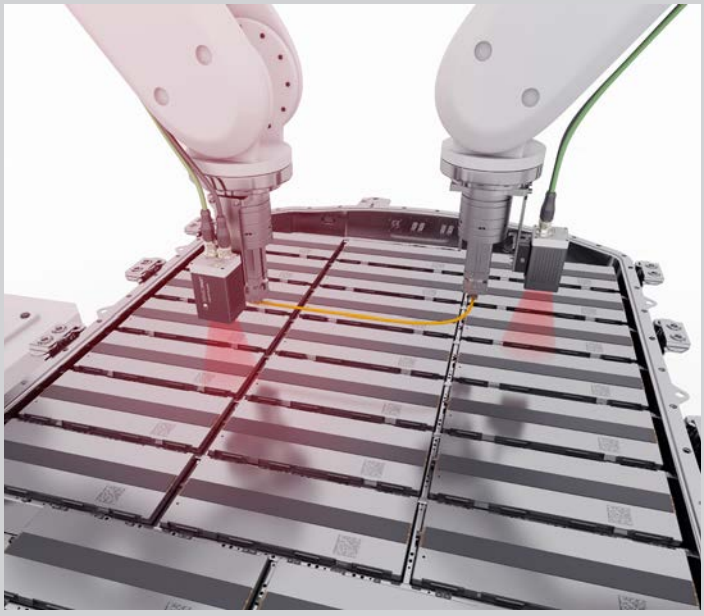
# Precision for mobile workstations

The use of mobile robots (including AMR's and AGV's) is an attractive solution for machine tending processes. Yet this flexibility can cause robot positions to be comparatively imprecise. Target Mark 3D technology solves this problem by placing a coded mark on the machine. The robot program is then written and references the mark. By offering significant cost benefits, reduced maintenance and more sustainable and ecological operation by deploying individual robots for multiple tasks on different machines this makes the use of robotics a viable solution. Furthermore the unique simplicity of a one-click setup allows processes to be automated without expert knowledge. A high process reliability is achieved even when robots are inaccurately positioned.

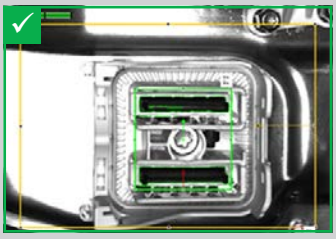


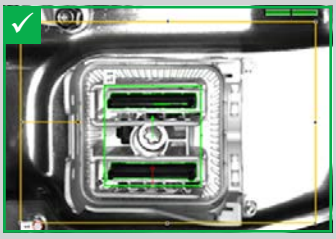


# Automated assembly of electrical plug connections



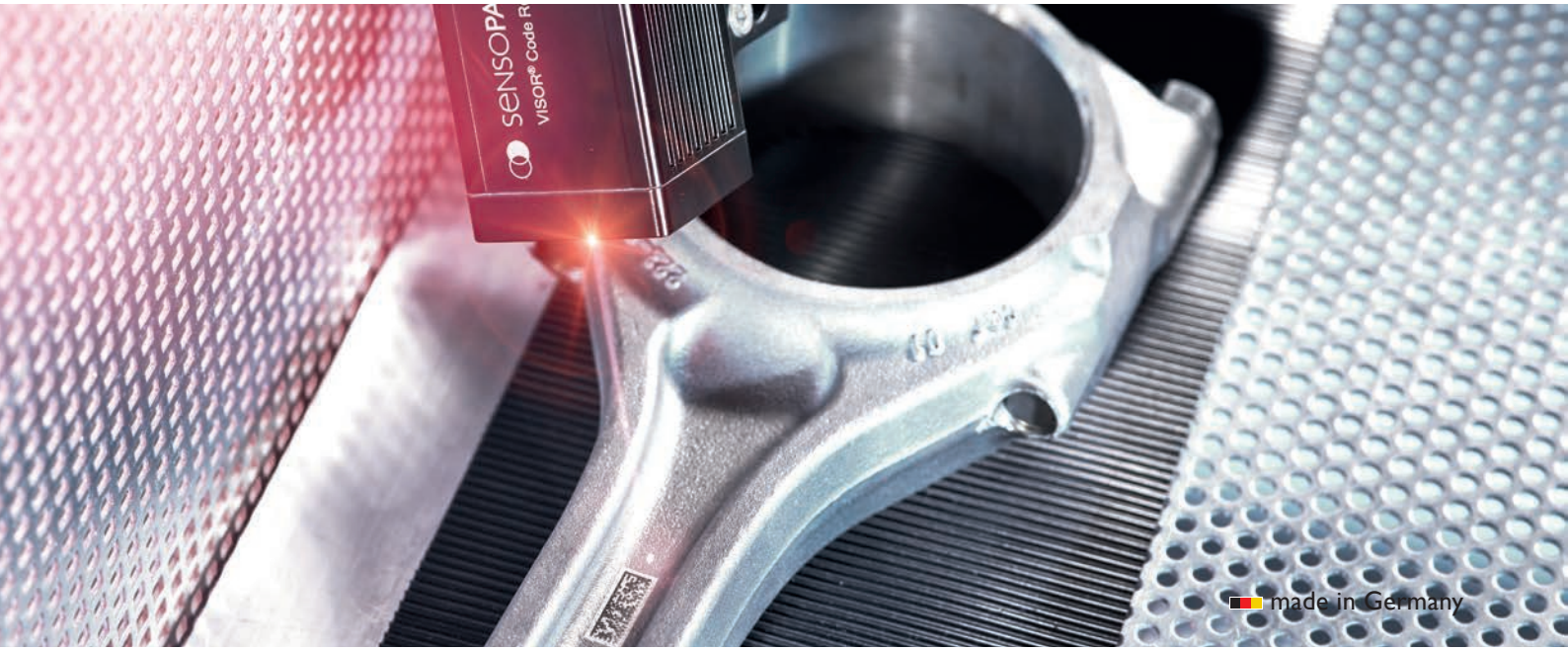
Robot automation makes it possible to avoid assembly errors with serious consequences. Cooperating robots each grip one end of the cable and carry out the plugging process synchronously with movements coordinated in terms of time and geometry. With one VISOR® Robotic each, the corresponding robot detects the real position of the plug-in slots. The compact and robust design of the vision sensor allows it to be integrated into the robot gripper. The VISOR® in the variant with narrow field of view provides sufficient distance between the gripper and the object.





# 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

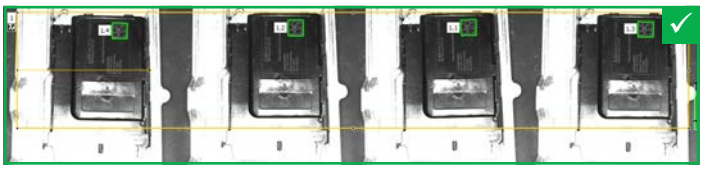
- Combination of two functions in one device: code reading and some features of object detection
- Reading OCR fonts

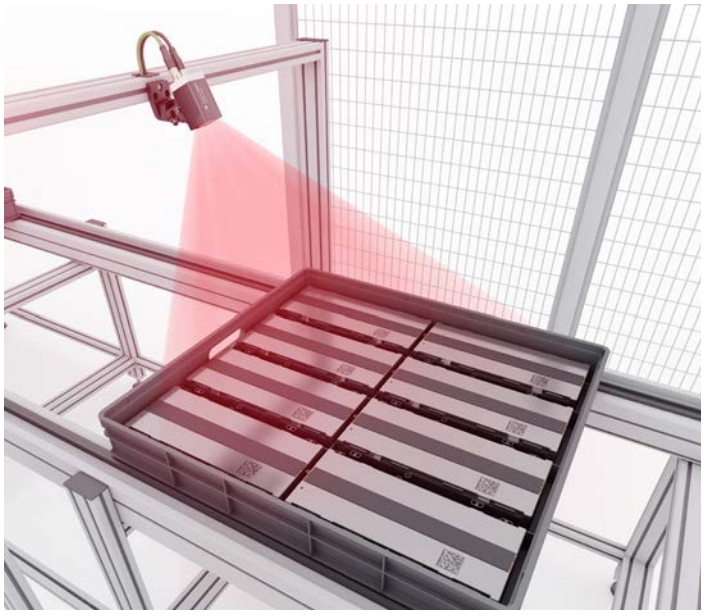
## Reading the delivery note

With optional accessories, e.g. spotlights, the delivery notes can be well illuminated even from a great distance, so that the contents can be read reliably even in changing ambient light. With the associated software, it is very easy to store different label types as identification jobs. In addition, it is possible to flexibly select between barcode, datacode and OCR in each of these jobs. Particularly the VISOR® Code Reader in the 5-megapixel variant can reliably read the delivery notes in motion.


## Identification by means of directly marked codes

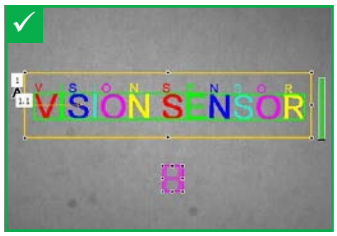
The code readers of the VISOR® series are available in different lens and illumination variants, so that the right hardware solution is available for every given installation situation.
With the VISOR® Code Reader V50 in the 5-megapixel variant and its high image quality, codes in motion can be read reliably in a large field of view. Depending on the requirements, the distance between the vision sensor and the object to be detected can be set up to suit the application. Directly marked codes are no challenge for the VISOR®. It can read the code reliably even at large distances and with moving objects and low contrasts. With the Auto-Tune feature the setup is easily and quickly done.





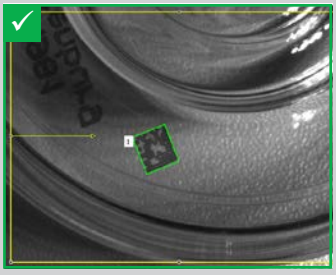
# Optical character recognition (OCR)

The identification of products, components or packaging by means of printed or directly marked - nailed or lasered - codes or plain text is common in many areas of the industry today. The VISOR® Code Reader recognizes at a glance which part it is facing. The detector OCR is suitable for plain text reading of printed, lasered or pinned fonts and offers a high reading rate for difficult fonts or fluctuating marking quality by using neural networks. It is suitable, for example, for reading dot fonts such as those used in the automotive industry. In addition, fonts for the pharmaceutical and semiconductor industries as well as the food sector are pre-installed.



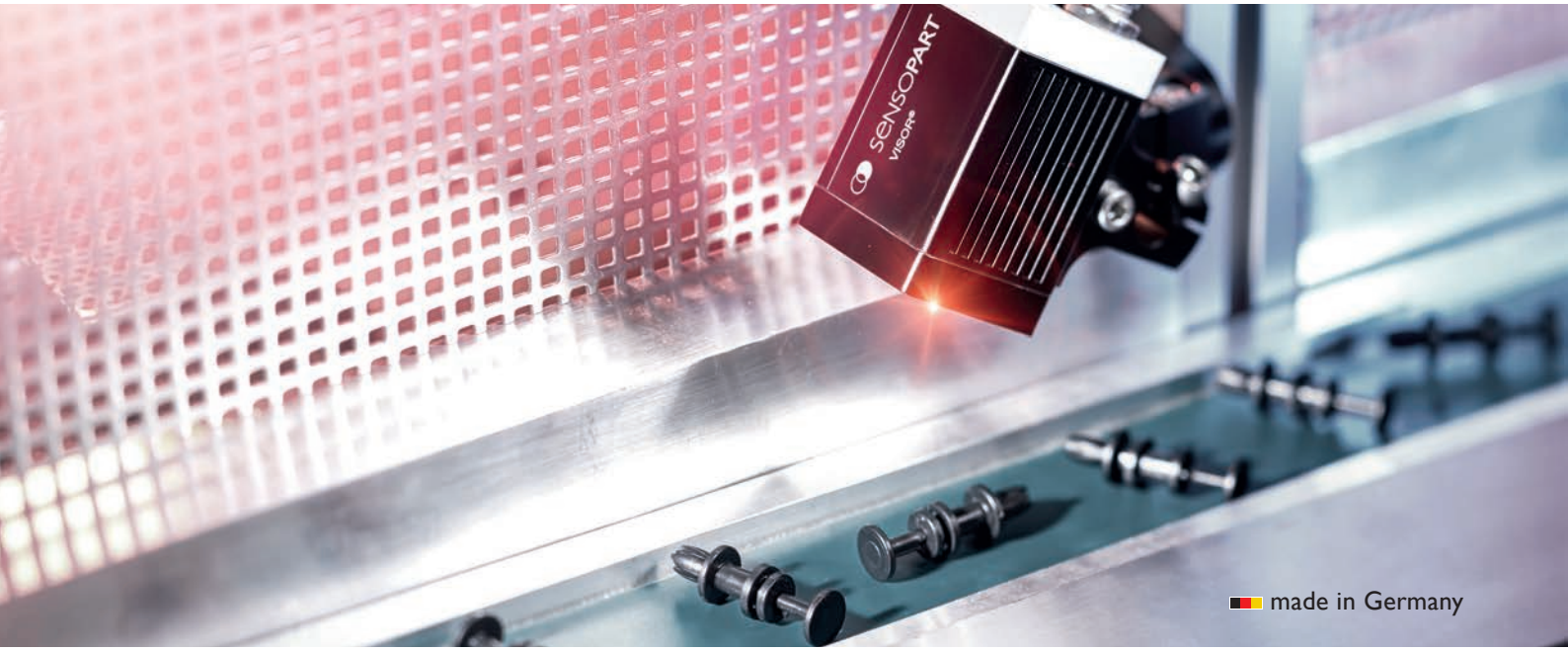

# Reading difficult codes

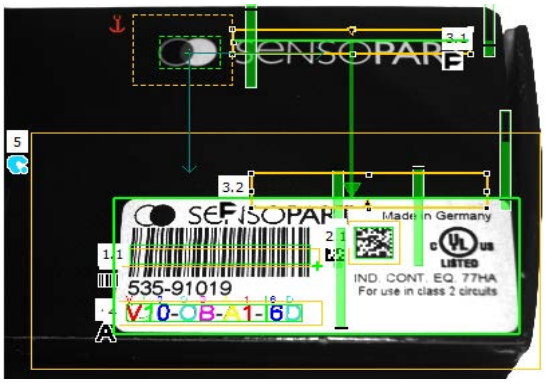

The VISOR® Code Reader reads even skewed, distorted codes or codes applied to convex, reflective or transparent surfaces and can routinely decipher them. It also performs robust reading of difficult codes (low-contrast, dirty, damaged, ...). Its built-in early warning system uses standardized quality parameters according to ISO and AIM standards to evaluate the quality of your printed and directly marked data matrix codes. The innovative „result processing" detector makes it possible to link results from previous assessments and other jobs, now allowing the identification of changes and trends over longer periods. If the part is moving the reading process can be even more difficult For this use the repeat mode, in which the VISOR takes multiple images, helps getting reliable results.



# VISOR® Allround

## Advanced allround vision sensor for complex inspection tasks

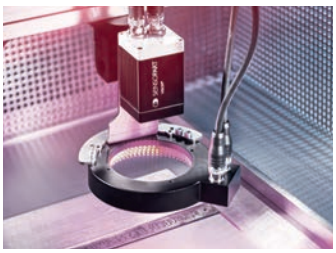


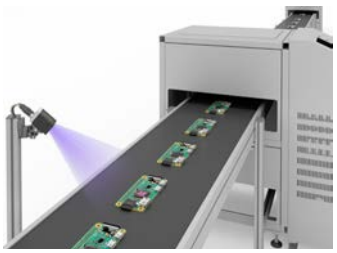

***VISOR® Allround – Object detection in color plus identification united in one device***
*In the allround version, the device combines the functions of the object sensor (i.e. calibration, pattern matching, contour, calliper, BLOB) with the powerful tools of the code reader (barcode, datamatrix and 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
- Only vision sensor with integrated UV lighting on the market



***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.*



***VISOR® UV:***
*The VISOR® UV with integrated UV illumination can evaluate markings, inscriptions and codes that are invisible to the human eye. With its wide range of functions the VISOR® UV is unique on the market and opens up a variety of additional applications.*

The right package for your individual application:

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

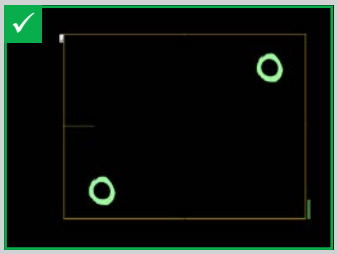

- All evaluations (“Detectors”) of object sensor and code reader united in one device
- Real-world engineering units at a mouse click
- Precise determination of X/Y position, orientation and tracking
- Can be used for all common 2D codes (ECC 200-Datamatrix) and common 1D barcodes
- Detection of differences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

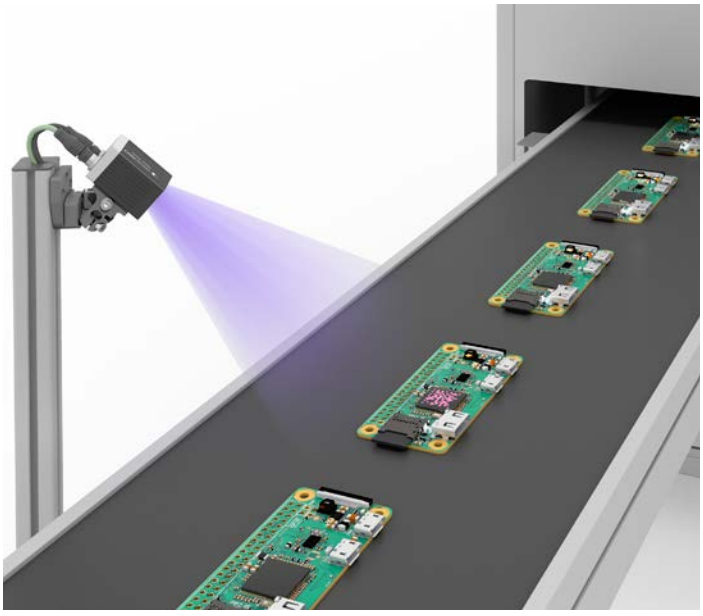
## Presence of invisible product safety characteristics

Often screws are sealed by a fluorescent ink to be able to check whether they have been opened or if the product is still sealed. It's done with invisible ink so that the end customer does not see the marking. The presence of this fluorescent ink can be checked by the VISOR® Allround UV. For the evaluation of the luminescent markings, the user has the same extensive detection tools at his disposal as the classic illumination variants (white, red, infrared) of the VISOR® Allround series.



## Invisible ink code identification

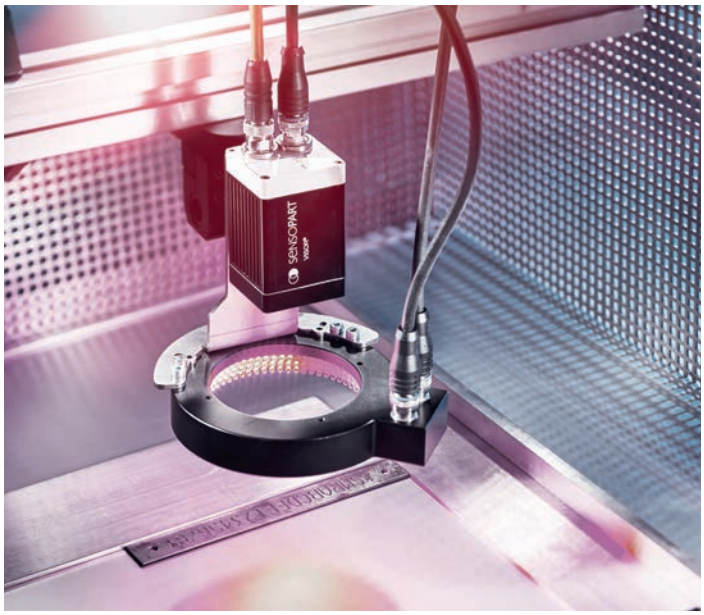
PCB boards are often marked with a data matrix code with invisible ink to be able to identify the board without allowing the end customer to see the marking. Thus the product can be tracked during production process by the VISOR® Allround UV. It can reliably check the presence of the luminescent ink. For the evaluation of the luminescent markings, the user has the same extensive detection tools at his disposal as the classic illumination variants (white, red, infrared) of the VISOR® Allround series.



# Detecting characters on shiny metal

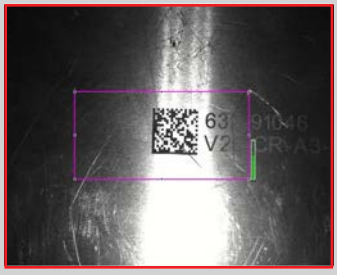
Rough and shiny metal surfaces make it very difficult to detect markings with standard algorithms. By using the multishot feature of the VISOR® Allround the characters are clearly visible and it's very easy to solve these kind of applications.

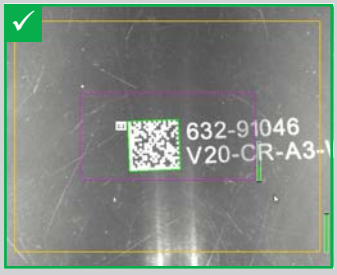





# Identification of a code on a shiny surface


Trouble with shiny surfaces? No problem! This is where a polarizing filter kicks in. With this helpful accessory, details can be detected regardless of the reflectivity of the surface. The switchable version with 50% coverage of the LEDs can reliably detect the object even if the texture of the surface varies without changing the filter. Installation is very easy by simply „clicking" it onto the VISOR®.





# 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, ultraviolet)
- 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

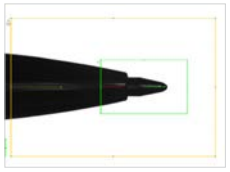
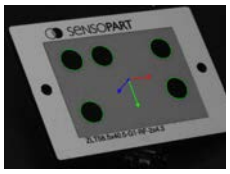
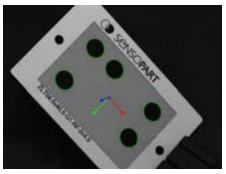
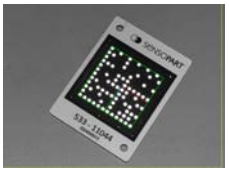
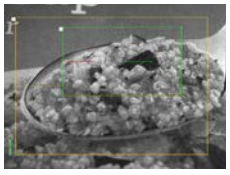
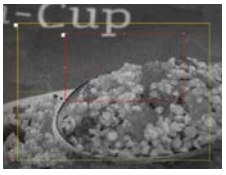
- Power supply
- I/Os
- Encoder
- External lighting

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

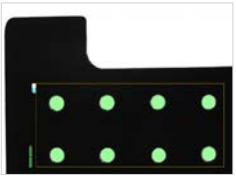
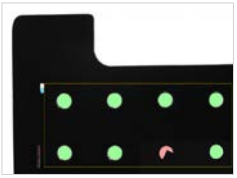
- Ethernet
- EtherNet/IP
- PROFINET
- sFTP/SMB archiving
- SensoWeb

# VISOR® vision sensor

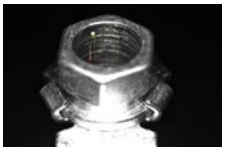
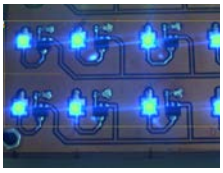
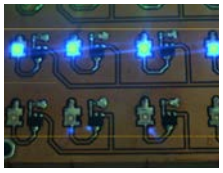
## Detectors and application examples

| | | | | |
|---|---|---|---|---|
| **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. |  | – |
| | 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. |  | – |
| | 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. |  | – |
| **Positioning / Inspection** | | | | |
| | 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. |  |  |
| | Contour 3D | 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. |  |  |

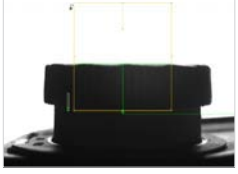
## Positioning / Inspection (continued)

| | | | |
|---|---|---|---|
| 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

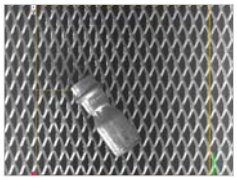
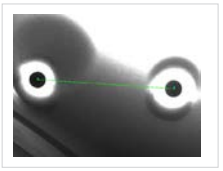
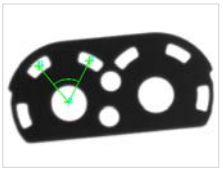
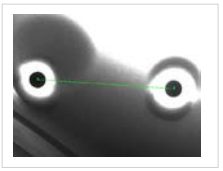
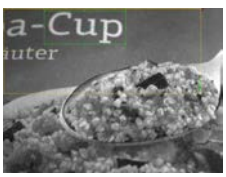
| | | | |
|---|---|---|---|
| Brightness | Brightness analysis in search zone. Definition of result output via switching threshold. |  |  |
| Contrast | Contrast analysis in search zone. Definition of result output via switching threshold. |  |  |
| Gray | Analysis of grey threshold in search zone. Definition of result output via switching threshold. |  |  |
| Color value | Output of color values via interfaces, setting options for color space: RGB, HSV, 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. |  |  |

## Measurement

| | | | |
|---|---|---|---|
| Caliper | 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. |  |  |

# VISOR® vision sensor

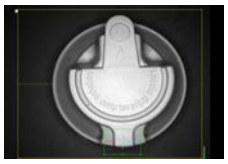
## Detectors and application examples

| | | | | |
|---|---|---|---|---|
| **Classification** | | | | |
| | Classification (AI) | Assign objects into different classes. This detector assigns a class to an object or feature within the region of interest. These classes are defined using sample images. Pass/Fail judgments can be made or up to 200 different classes can be defined. |  |  |
| | 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. |  |  |
| **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. |  | – |
| | Result processing: Math | Offset of numerical results; calculation of distances and angles; comparison of results. Output of a digital (good/bad) result. |  |  |
| | Result processing: Robotic | Processing of results for the type Pose 3D (X, Y, Z, Angle X, Y, Z) |  | – |
| **Position alignment** | | | | |
| | 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. |  |  |

## Position alignment (continued)

### 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.



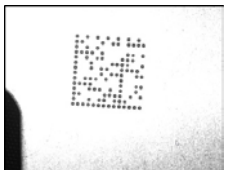
## Functions & preprocessing filters

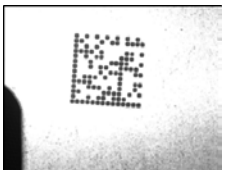
### Freeform tool

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)


# VISOR® vision sensor

## Interfaces

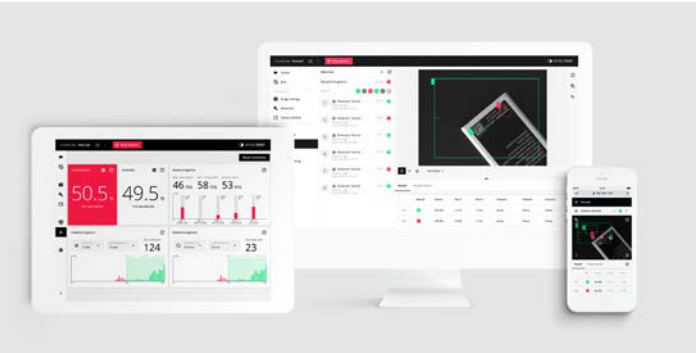
| Interfaces | |
|---|---|
| **Ethernet TCP/IP** | Ethernet interface with user-configurable protocol. VISOR® control options via TCP/IP commands. |
| PROFINET® | Industrial Ethernet in compliance with PROFINET standard (Conformance Class B) through integrated Ethernet interface. VISOR® control options via PROFINET commands. |
| EtherNet/IP™ | Industrial Ethernet in compliance with EtherNet/IP standard through integrated Ethernet interface. VISOR® control options via EtherNet/IP commands. |

# SensoWeb

## Versatile monitoring for the VISOR®

**New design, additional functions:**
SensoPart vision sensors of the VISOR® series are equipped with the pre-installed monitoring software SensoWeb, which enables convenient monitoring of the sensors during operation with common web browsers. In addition to the current status, differentiated statistical evaluations can now also be displayed. In combination with an external WLAN router, the results can also be output on mobile devices such as smartphones or tablets as well as on common machine operating panels.

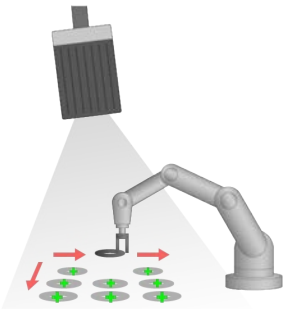
- New, modern design
- Easier user guidance
- More efficient process monitoring
- Statistics function
- Personalized display possible
- Platform-independent visualization solution



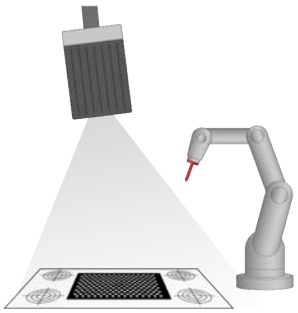
| Calibration | |
|---|---|
| Calibration (scaling/ perspective)  | Output of results in customised units (mm, cm, m, inch). Effects of perspective corrected according to the calibration method. |
| Robotic calibration  | Output of results in customised units (mm, cm, m, inch) in a world coordinates system. A number of different methods are available for high flexibility. |

## Calibration methods

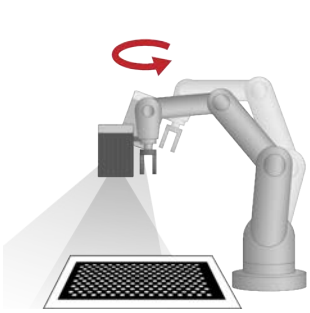
For a wide range of applications



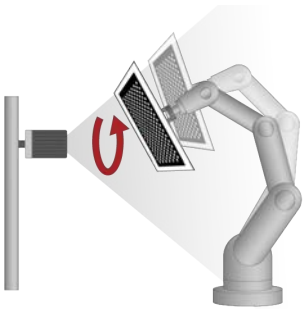
Point pair list



Calibration plate



Hand-Eye



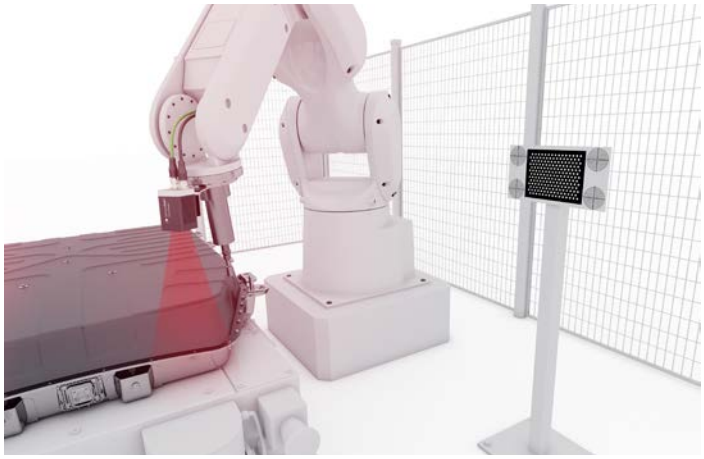
Base-Eye

## Hand-Eye-Calibration

Reduce downtime to a minimum

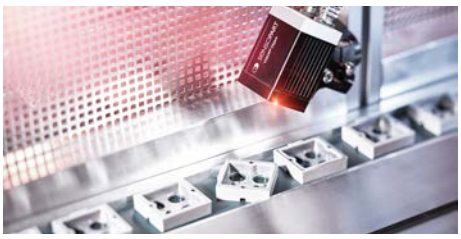
**True non-contact calibration that gets a system back up and running in minutes and reduces downtime to a minimum:**

- No worker in workspace area required
- Fully automated
- Independent from mechanical TCP
- Calibration area can be anywhere
- Workspace can be anywhere



# Product overview VISOR® vision sensors

## Software

| | VISOR® Object | | VISOR® Object AI |
|---|---|---|---|
| |  | |   |
| | Presence, completeness, measurement, position check, color | | Presence, completeness, measurement, position check, color, artificial intelligence |
| | Standard | Advanced | Advanced |
| **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 | – | – | – |
| Classification (AI) | – | – | ✓ |
| **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 | – \| – | – \| ✓ | – \| ✓ |

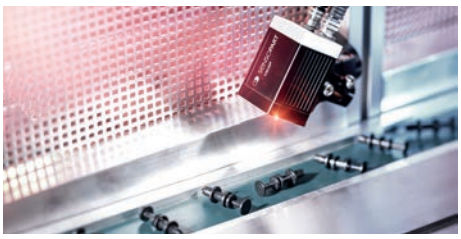
## VISOR® Robotic

Robotics, presence, completeness, measurement, positioning

## VISOR® Code Reader

Reading of barcodes, 2D codes, text

## VISOR® Allround



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

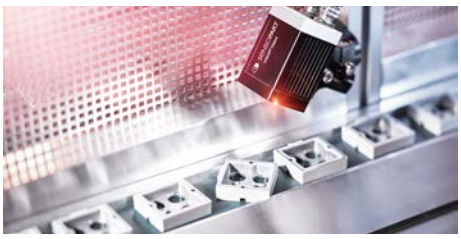
| Advanced | Professional | Standard | Advanced | Professional | Advanced | Professional |
|---|---|---|---|---|---|---|
| | | | | | | |
| ✓ \| ✓ | | – | | | ✓ \| ✓ | |
| ✓ \| ✓ | | – | | | – | ✓ |
| – | ✓ | – | | | – | ✓ |
| | | | | | | |
| ✓ | | – | ✓ | ✓ | ✓ | |
| ✓ | | – | ✓ | ✓ | ✓ | |
| ✓ | | – | – | ✓ | ✓ | |
| | | | | | | |
| ✓ | | – | | ✓ | ✓ | |
| ✓ | | – | | ✓ | ✓ | |
| ✓ | | – | | ✓ | ✓ | |
| | | | | | | |
| ✓ \| ✓ | | – \| – | | | ✓ | |
| ✓ \| ✓ | | – \| – | | ✓ \| ✓ | ✓ | |
| ✓ | | – | | ✓ | ✓ | |
| ✓ | | – | | | ✓ | |
| ✓ | | – | | | ✓ | |
| – | ✓ | – | | | – | ✓ |
| ✓ | | – | | | ✓ | ✓ |
| – | | – | | | – | ✓ |
| | | | | | | |
| – | ✓ \| ✓ | ✓ | | | ✓ | |
| – | ✓ \| ✓ | – | ✓ | | ✓ | |
| – | ✓ \| ✓ | – | | ✓ | ✓ | |
| | | | | | | |
| ✓ \| ✓ \| ✓ | | – \| – \| – | | | – | ✓ |
| ✓ | | – | | | – | ✓ |
| | | | | | | |
| ✓ \| ✓ \| ✓ | | – \| – \| – | | | ✓ \| ✓ \| ✓ | |
| ✓ \| ✓ | | – \| – | | | ✓ \| ✓ | |
| | | | | | | |
| – \| ✓ | ✓\| ✓ | – \| – | ✓ \| – | | ✓ \| ✓ | |

[1] not with color hardware V10C/V20C

[2] only color hardware

# Product overview VISOR® vision sensors

## Hardware

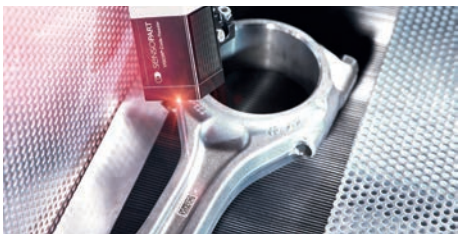
| | VISOR® Object | | VISOR® Object AI |
|---|---|---|---|
| |  | |  |
| | Presence, completeness, measurement, position check, color | | Presence, completeness, measurement, position check, color |
| | Standard | Advanced | Advanced |
| **Resolution** | | | |
| V10 (800 x 600): Mono \| Color | ✓ | | ✓ |
| Images per second: Mono \| Color | 75 \| 50 | | 75 \| 50 |
| 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 | – | ✓ | ✓ |
| Integrated UV lighting | – | | – |
| **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 | – | ✓ | ✓ |

*Up to 10 detectors of type „Classification (AI)“ per jobset

## VISOR® Robotic

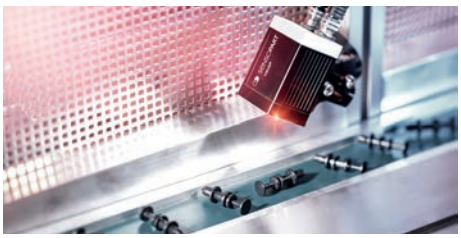
Robotics, presence, completeness, measurement, positioning

## VISOR® Code Reader



Reading of barcodes, 2D codes, text

## VISOR® Allround



Presence, completeness, measurement, position check, color, reading of barcodes, data codes, text, multi-shot

| Advanced | Professional | Standard | Advanced | Professional | Advanced | Professional |
|---|---|---|---|---|---|---|
| | | | | | | |
| ✓ | – | ✓ \| – | | | ✓ | – |
| 75 | – | 75 \| – | | | 75 \| 50 | – |
| ✓ | | ✓ \| – | | | ✓ | |
| 40 \| 20 | | 40 \| – | | | 40 \| 20 | |
| – | ✓ | – | ✓ \| – | | – | ✓ |
| – | 22 \| 8 | – | 22 \| – | | – | 22 \| 8 |
| | | | | | | |
| white, red[1], infrared[1] | | | | | | |
| – | | – | | | ✓ | |
| ✓ | | only V20 | ✓ | | ✓ | |
| – | | – | | | only V20 | only V50 |
| | | | | | | |
| ✓ \| ✓\| ✓\| ✓ | – | ✓\| ✓\| ✓\| – | ✓\| ✓\| ✓\| ✓ | | ✓ \| ✓\| ✓\| ✓ | – |
| ✓ \| ✓\| ✓\| ✓ | | ✓\| ✓\| ✓\| – | ✓\| ✓\| ✓\| ✓ | | ✓ \| ✓\| ✓\| ✓ | |
| – | ✓\| ✓\| – \| ✓ | – | ✓\| ✓\| – \| ✓ | | – | ✓\| ✓\| – \| ✓ |
| | | | | | | |
| Ethernet/EtherNet/IP/PROFINET | | | | | | |
| 2 \| 2 \| 6 | | 2 \| 2 \| 4 | 2 \| 2 \| 6 | | 2 \| 2 \| 6 | |
| ✓ | | – | ✓ | | ✓ | |
| ✓ \| ✓\| ✓\| ✓ | | ✓\| ✓\| ✓\| ✓ | | | ✓ \| ✓\| ✓\| ✓ | |
| ✓ | | – | ✓ | | ✓ | |
| | | | | | | |
| 255 \| 255 | | 8 \| 2 | 255 \| 255 | | 255 \| 255 | |
| ✓ | | – | ✓ | | ✓ | |

[1] not with color hardware V10C/V20C

[2] only color hardware

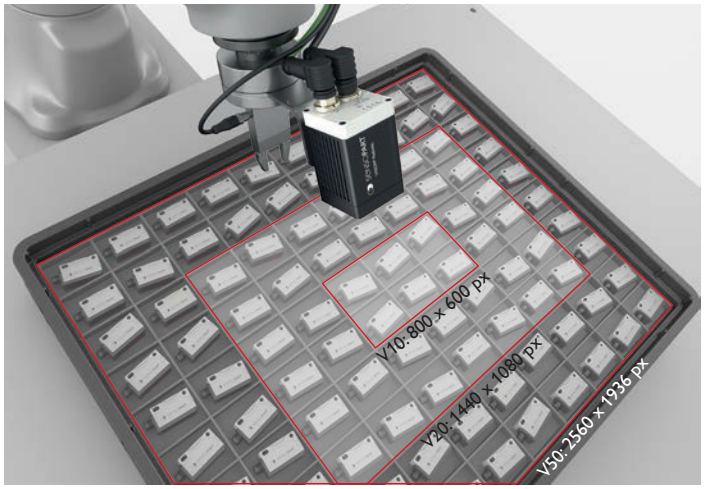
# Fields of view and depths of field

## The right VISOR® for every application

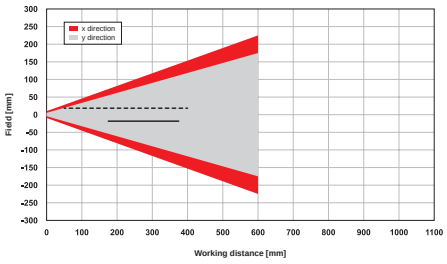
VISOR® vision sensors are available in 3 resolution variants:
- V10: 800 x 600 pixels
- V20: 1440 x 1080 pixels
- V50: 2560 x 1936 pixels

Furthermore, the field of view can be selected from 3 variants:
- wide
- medium
- narrow

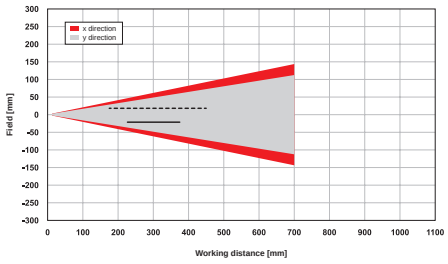
This means that the suitable VISOR® variant can be chosen for each application, precisely tailored to the requirements.



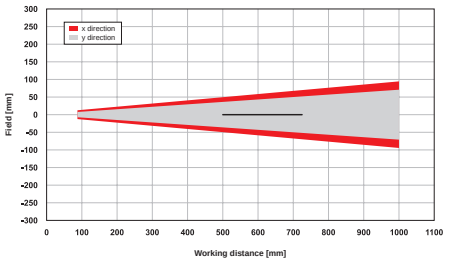

### Field of view V10 wide



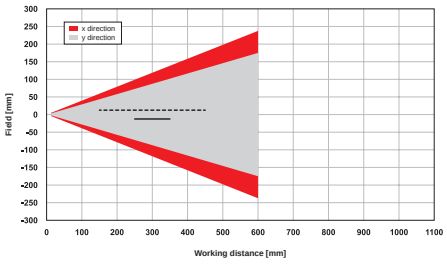

### Field of view V10 medium



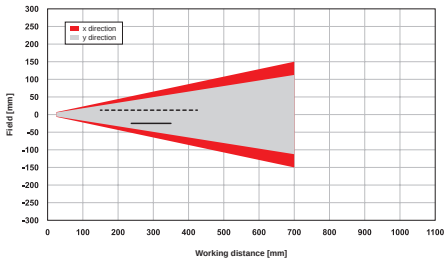

### Field of view V10 narrow



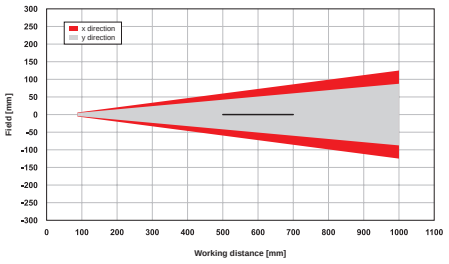

### Field of view V20 wide



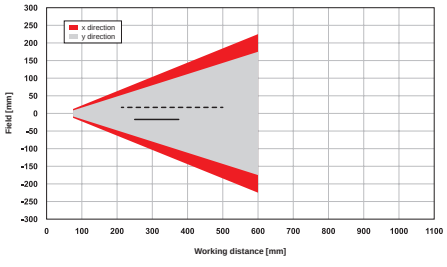

### Field of view V20 medium



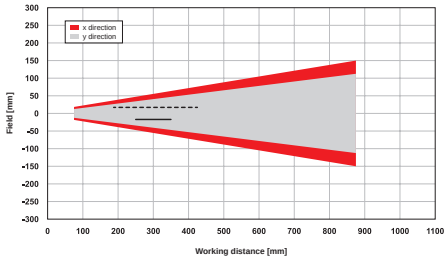

### Field of view V20 narrow




### Field of view V50 wide




### Field of view V50 medium

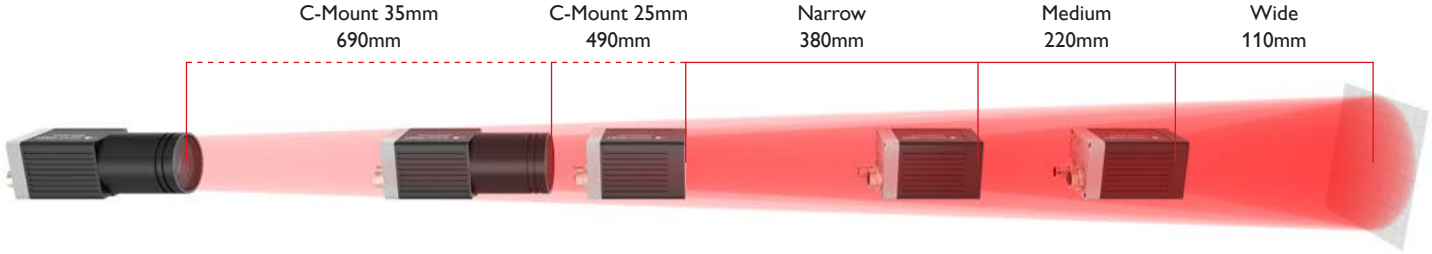



Increased depth of field
Normal depth of field

# C-mount

## Full flexibility in distance and field of view

With the VISOR® c-mount variants, the optics of the VISOR® can be flexibly adapted to the needs of the user. Depending on the desired working distance, different c-mount lenses can be attached to the VISOR® in order to ideally match the camera to the application.
A narrow field of view allows the smallest details to be detected at a great distance, while a wide field of view allows several features of a component or different components to be detected at the same time. If the application changes and the working distance is different, only the lens needs to be changed in the c-mount variant. Lenses are available in 8, 12, 16, 25 ,35, 50 and 75 mm.



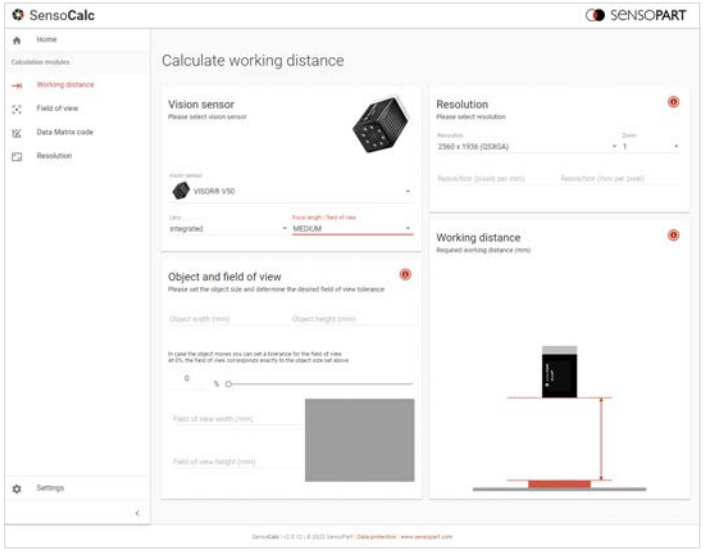

# SensoCalc

## Wizard for optical calculations

Senso**Calc** 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

Go to SensoCalc



# Accessories

## Power I/O cables

**1: VISOR®:** VISOR® Object, VISOR® Object AI, VISOR® Robotic, VISOR® Code Reader, VISOR® Allround

VISOR® Object

VISOR® Object AI

VISOR® Robotic

VISOR® Code Reader

VISOR® Allround

QR-Code for more information

**2. Power I/O cables:** 12-wire, 3-wire

**M12 socket, 3-pin (24V, GND, Trigger), Straight Connector:**

C L12/3FG-S-2M-PUR / 2m (6'6") / 902-51833

C L12/3FG-S-5M-PUR / 5m (16'4") / 902-51834

C L12/3FG-S-10M-PUR / 10m (32'9") / 902-51835

C L12/3FG-S-20M-PUR / 20m (65'7") / 902-51839

**M12 socket, 3-pin (24V, GND, Trigger), Angled Connector:**

C L12/3FW-S-2M-PUR / 2m (6'6") / 902-51833

C L12/3FW-S-5M-PUR / 5m (16'4") / 902-51834

C L12/3FW-S-10M-PUR / 10m (32'9") / 902-51835

C L12/3FW-S-20M-PUR / 20m (65'7") / 902-51839

**M12 socket, 12-pin (24V, GND, Trigger, Ready, 8 additional I/O), Straight Connector:**

C L12FG-S-2M-PUR / 2m (6'6") / 902-51801

C L12FG-S-5M-PUR / 5m (16'4") / 902-51796

C L12FG-S-10M-PUR / 10m (32'9") / 902-51797

C L12FG-S-20M-PUR / 20m (65'7") / 902-51805

**M12 socket, 12-pin (24V, GND, Trigger, Ready, 8 additional I/O), Angled Connector:**

C L12FW-S-2M-PUR / 2m (6'6") / 902-51798

C L12FW-S-5M-PUR / 5m (16'4") / 902-51799

C L12FW-S-10M-PUR / 10m (32'9") / 902-51800

C L12FW-S-20M-PUR / 20m (65'7") / 902-51821

Part number / Length / Article number

QR-Code for more information

# Accessories

## Ethernet cables, brackets, displays, optical accessories

### 3. Ethernet cables:

Part number / Length / Article number

| Straight Connector: | | Angled Connector: | |
|---|---|---|---|
| CI L4MG/RJ45G-GS-1.5M-PUR / 1.5m (4'11") / 902-51887 | CI L4MG/RJ45G-GS-10M-PUR / 10m (32'9") / 902-51784 | CI L4MW/RJ45G-GS-1.5M-PUR / 1.5m (4'11") / 902-51888 | CI L4MW/RJ45G-GS-10M-PUR / 10m (32'9") / 902-51790 |
| CI L4MG/RJ45G-GS-3M-PUR / 3m (9'10") / 902-51754 | CI L4MG/RJ45G-GS-20M-PUR / 20m (65'7") / 902-51820 | CI L4MW/RJ45G-GS-3M-PUR / 3m (9'10") / 902-51786 | CI L4MW/RJ45G-GS-20M-PUR / 20m (65'7") / 902-51822 |
| CI L4MG/RJ45G-GS-5M-PUR / 5m (16'4") / 902-51782 | CI L4MG/RJ45G-GS-30M-PUR / 30m (98'5") / 902-51843 | CI L4MW/RJ45G-GS-5M-PUR / 5m (16'4") / 902-51788 | CI L4MW/RJ45G-GS-30M-PUR / 30m (98'5") / 902-51844 |

QR-Code for more information

### 4. Brackets for V10, V20, V50: Mounting hinges

Part number / Description / Article number

| Mounting hinge with 3 axes: |
|---|
| MG 3A / Standard type / 543-11024 |
| MG 3A-MST12 / For fixing to 12mm rod / 543-11034 |

QR-Code for more information

### 5. Display and configuration devices:

Part number / Description / Article number

| Panel PC 10.4": |
|---|
| PV-AW10IoT10.4TX / Front panel mount / 533-01031 |
| PV-AW10IoT10.4TX-V / VESA mount / 533-01032 |

QR-Code for more information

### 6. Optical accessories: protective casing and polarizer glasses

Part number / Description / Article number

| Removable protective casing: | Polarising filter panels: |
|---|---|
| LPC Vxx / Standard type / 651-01001 | LPF Vxx S1 / 100% coverage / 651-01003 |
| LPC Vxx-ESD / Anti-static coating / 651-01010 | LPF Vxx S2 / 50% coverage / 651-01004 |

QR-Code for more information

# Accessories

## Illumination, cables for illumination, robotics

### **7. Illumination:** Ring light, spot illumination, connection adapter for illumination

Part number / Light color - Description / Article number

| Ring light: | | Spot illumination: | Connection adapter: |
|---|---|---|---|
| LFR 115 WD-24-2L12 / white diffuse light / 525-51150 | LFR 115 WK-24-2L12 / white clear light / 525-51153 | LS 55 x 46 WK-24-A13 2L12 / white light / 532-51101 | LA 45 V-24-2L12 / Male connector / 525-01001 |
| LFR 115 RD-24-2L12 / red diffuse light / 525-51151 | LFR 115 RK-24-2L12 / red clear light / 525-51154 | LS 55 x 46 RK-24-A13 2L12 / red light / 532-51102 | LA 45 VT-24-2L12 / Female connector / 525-01002 |
| LFR 115 ID-24-2L12 / infrared diffuse light / 525-51152 | LFR 115 IK-24-2L12 / infrared clear light / 525-51155 | LS 55 x 46 IRK-24-A13 2L12 / infrared light / 532-51103 | |

QR-Code for more information

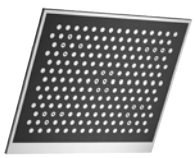
### **8. Illumination:** Cables for illumination

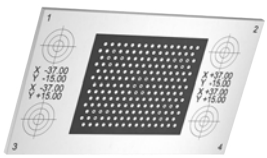
Part number / Length / Article number

| Straight Connector: | | Angled Connector: |
|---|---|---|
| CB L12FS/L12FS-0.35M-GG-PUR / 0.35m (1'15") / 902-51841 | CB L12FS/L12FS-10M-GG-PUR / 10m (32'8") / 902-51854 | CB L12FS/L12FS-0.35M-WW-PUR / 0.35m (16'4") / 902-51842 |
| CB L12FS/L12FS-0.5M-GG-PUR / 0.5m (1'64") / 902-51806 | CB L12FS/L12FS-15M-GG-PUR / 15m (49'21") / 902-51855 | CB L12FS/L12FS-0.5M-WW-PUR / 0.5m (1'64") / 902-51808 |
| CB L12FS/L12FS-2M-GG-PUR / 2m (6'56") / 902-51807 | CB L4MG-10M-PUR / 10m (32'8") / 902-51756 | CB L12FS/L12FS-2M-WW-PUR / 2m (6'56") / 902-51809 |

QR-Code for more information

### **9. Robotics:** Calibration plates and target marks






Part number / Article number

| Standard: | X01 | Others: | Target Mark: |
|---|---|---|---|
| ZCP 50-13x15 / 533-11030 | ZCP 50-13x15-X01 / 533-11037 | ZCP 100-13x15-X02 / 533-11035 | ZTM 100-D2-RF-4x3.3 / 533-11045 |
| ZCP 100-13x15 / 533-11031 | ZCP 100-13x15-X01 / 533-11038 | ZCP 50-13x15-X03 / 533-11042 | ZTM 38-D2-RF-2x3.3 / 533-11044 |
| ZCP 200-13x15 / 533-11032 | ZCP 200-13x15-X01 / 533-11039 | ZCP 100-13x15-X03 / 533-11041 | ZTM 58.5-G1-RF-2x4.3 / 533-11043 |
| ZCP 500-13x15 / 533-11033 | ZCP 500-13x15-X01 / 533-11040 | ZCP 100-ECC200 / 533-11036 | |

QR-Code for more information

## 10. Optical accessories: Lenses, intermediate rings, red filter, infrared filter

Part number / Description / Article number

| C-Mount lenses: | | Intermediate ring: | Filter: |
|---|---|---|---|
| LOC-08-HD-30.5x0,5 / 8 mm lens / 526-51535 | LOC-35-HD-27x0,5 / 35 mm lens / 526-51539 | LR 5 / 5mm ring / 543-11011 | LOF-BP-R635-30,5x0,5 / Red BP filter / 533-01015 |
| LOC-12-HD-27x0,5 / 12 mm lens / 526-51536 | LOC-50-HD-27x0,5 / 50 mm lens / 526-51540 | ETS / Ring set / 527-51143 | LOF-LP-IR850- 30,5x0,5 / Infrared BP filter / 533-01010 |
| LOC-16-HD-27x0,5 / 16 mm lens / 526-51537 | LOC-75-HD-34x0,5 / 75 mm lens / 526-51541 | | LOF-PF-30,5 x 0,5 / Polarizing filter / 526-51531 |
| LOC-25-HD-27x0,5 / 25 mm lens / 526-51538 | | | |

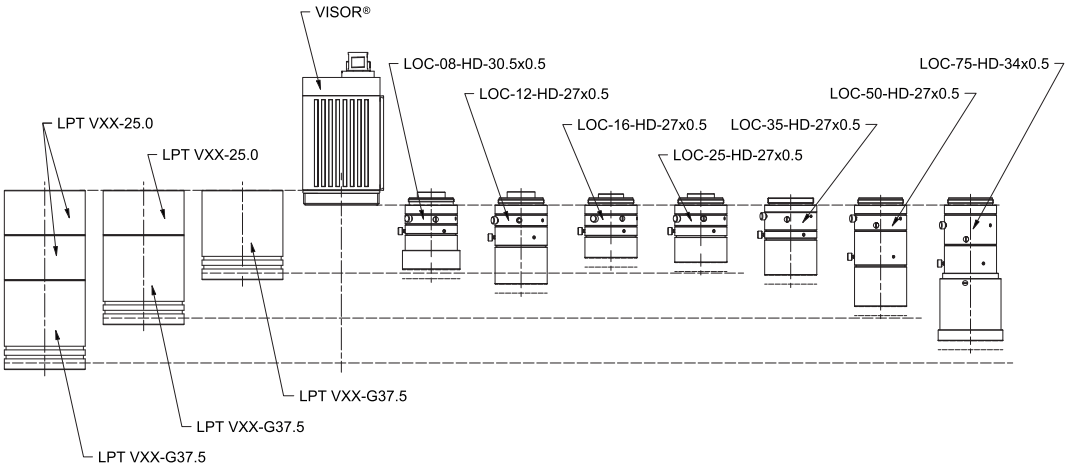
QR-Code for more information

## 11. Optical accessories: C-Mount protective casing

Part number / Description / Article number

| C-Mount protective casing: | Protective tube extension: |
|---|---|
| LPT Vxx-G37.5 / Clear / 651-01006 | LPT Vxx-25.0 / 651-01007 |
| LPT Vxx-G37.5-BP-R630 / Cover with Red BP filter / 651-01008 | |
| LPT Vxx-G37.5-BP-I860 / Cover with Infrared BP filter / 651-01009 | |

QR-Code for more information



# Technical data

## Optical data

| | |
|---|---|
| **Number of pixels, chip size** | VISOR®-V10 ...: 800 (H) x 600 (V)<br>VISOR®-V20 ...: 1440 (H) x 1080 (V)<br>VISOR®-V50...:2560 (H) x 1936 (V) |
| **Technology** | CMOS (mono / color) |
| **Lighting (integrated)** | 8 LEDs (except C-Mount) (white, red, infrared, ultraviolet) |
| **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,<br>6 selectable inputs/outputs[3] |

[1] Max. ripple < 5 $V_{SS}$ [3] dependent on model

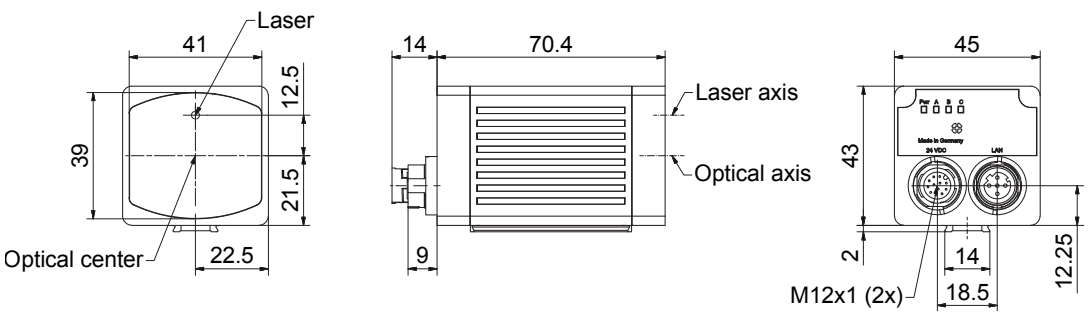
## Mechanical data

| | |
|---|---|
| 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

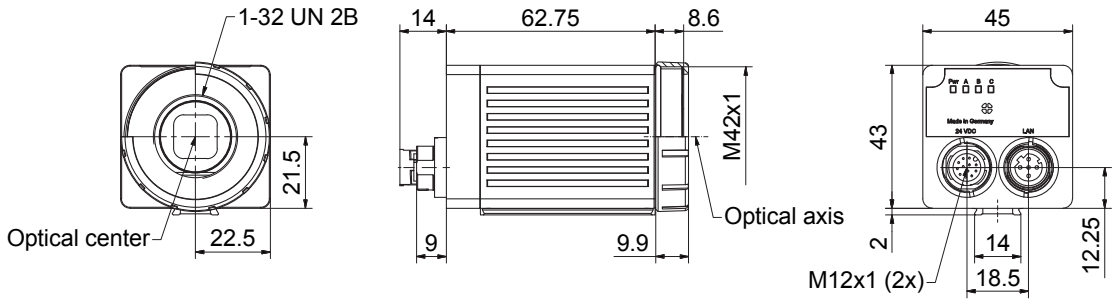
[2] 80 % air humidity, non-condensing

## Vision sensor VISOR® with integrated optics & lighting



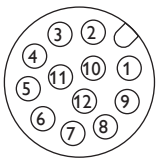

153-13554

## Vision sensor VISOR® c-mount




153-13555

## I/O Mapping 24 V DC connection




| PIN | Color [3] | Signal |
|---|---|---|
| 1 | BN | + $U_B$ (24VD C) |
| 2 | BU | GND |
| 3 | WH | IN (external trigger) |
| 4 | GN | READY (ready for next external trigger) |
| 5 [1] | PK | IN/OUT (encoder B+) |
| 6 | YE | IN/OUT, (external illumination south) [4] |
| 7 | BK | IN/OUT, (external illumination west) [4], LED B [2] |
| 8 | GY | IN/OUT, (external illumination north) [4], LED C [2] |
| 9 | RD | IN/OUT, (external illumination, external illumination east) [4] |
| 10 [1] | VT | IN (encoder A+) |
| 11 | GY/PK | VALID (indicator for valid results) |
| 12 | RD/BU | IN/OUT (ejector), LED A [2] |

[1] Not available on all Standard models
[2] All indicator LEDs are set without consideration of any delay times used
[3] Colors match the SensoPart power cables. If other cables are used, there might be differences.
[4] Only if Multishot is active

# We are SensoPart



**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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