SENSOPART

Everything in sight

Vision systems for industrial automation

Object sensors | Code readers | Colour sensors | Solar sensors | Eyesight | Accessories

Visionary.

Vision sensors see more.

Digital image processing has developed into an indispensable tool for industrial automation over recent years. Modern vision systems provide a much better, faster and cheaper solution for complex inspection tasks that could previously only be accomplished by the human eye. In many cases, nothing is possible without this visionary system on the conveyor belt, whether it be for the detection of production differences, quality or colour deviations, component or subassembly tracking or just a general improvement of production processes.

Image processing in the shape of a sensor – and for the price of a sensor.

In contrast to conventional image processing solutions, SensoPart's Vision sensors and Vision systems prove a convincing choice with their robust, heavy-duty version and an excellent price-performance ratio. They are therefore not just comparable with conventional, switching sensors when it comes to handling but also with regard to purchasing, installation and operating costs. Thanks to straightforward configuration software, your vision solution is quickly ready for use – image processing has never been easier.

Which part is good, which is faulty?
A vision sensor has a faster and better vision than the human eye, does not tire and costs less.

Everything at a glance:
A vision sensor can check several object characteristics at the same time and thus replace several switching sensors.

CONTENTS

For every situation.

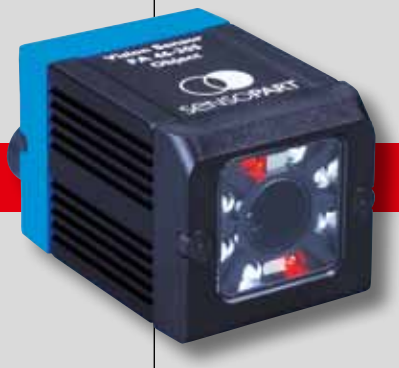
Vision solutions for large and small application tasks.

SensoPart's range of vision solutions covers the entire scope of industrial image processing, from plug and play solutions for standard applications (Vision sensors) to the freely-configurable Eyesight vision for particularly complex automation tasks.

Camera + Software = Vision! At the heart of our vision sensors and systems is a high-performance camera in a compact, hermetically sealed sensor housing with integrated signal processing: LED lightning, data interfaces and digital outputs, enhanced by an easily-operated configuration software perfectly adapted to the hardware. This combination results, for example, in an object sensor, a code reader or a colour sensor. Particularly user-friendly: the user interface is identical for all sensor versions.

Most of the inspection tasks which occur in practice can be solved with one of our pre-configured vision sensors. And for particularly complex applications, Eyesight offers a flexible vision system with which you can achieve the most remarkable automation requirements.

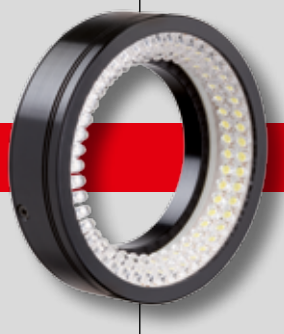
Vision camera FA 45/46



- *Continuous cast aluminium housing (64 x 45 x 45 mm, IP 65/67)*
- *CCD sensor (black/white or colour, 640 x 480 pixels)*
- *Digital signal processor*
- *Integrated white light, red light or IR LEDs for illuminating the measurement object*
- *Standard M12 sensor connector*
- *Serial data interface (RS 422, Ethernet)*
- *Integrated lens (focal width 6 or 12 mm)*
- *C-Mount version for interchangeable lenses without internal lighting*

Further product information and technical data can be found on pages 22–24.

Vision accessories



- *External lighting: e. g. surface light, ring light, light strips etc.*
- *C-Mount lens, intermediate rings, outer casing*
- *Mounting accessories: e. g. dovetail, mounting brackets, mounting plates*
- *Interface modules: e. g. profibus adapter, I/O extension*

Further product information and technical data can be found on pages 20/21 and from page 25 onwards.

VISION SENSORS FOR STANDARD APPLICATIONS

Object sensors

Detection of object characteristics regardless of position

e. g. for

- *Presence/position check*
- *Completeness check*
- *Part detection/differentiation*
- *Part sorting, rejection check*
- *Pick and place*

Code readers

Reading printed or directly marked data matrix and bar codes

e. g. for

- *Product labelling/identification*
- *Product tracking*
- *Quality assurance*
- *Detection of standardised quality parameters*

Colour sensors

Detection of colours and colour intensities

e. g.

- *Coloured objects and markings*
- *Luminous components such as e. g. LEDs or displays*
- *"Non-colours" (white, black, grey)*

VISION SENSORS FOR INDUSTRIAL AND SPECIAL APPLICATIONS

Solar sensors

Inspection of solar cells of any shape and size

- *Position detection*
- *Crack detection*
- *Automatic, highly-accurate contour detection (subpixel resolution)*
- *Detection of imperfections on straight and curved contours*
- *Cropping function for larger defects*

VISION-SYSTEMS

Basic Eyesight

The "all-in-one" solution for the creation of individual automation applications

Eyesight enables simple, graphical programming of complex inspection tasks, which e. g. require the evaluation of features from different vision applications or a complex logical conjunction of individual inspection results. Eyesight can be universally used for applications in the following sectors

- *Measurement*
- *Inspection*
- *Location*
- *Counting*
- *Comparison*

Advanced Eyesight

Combines the complete range of functions from Basic Eyesight with many useful special functions

With its additional tools for colour evaluation, improved image pre-processing and more precise detection, the Advanced Eyesight vision system offers a performance scope which leaves nothing to be desired. Its extended range of functions include:

- *Selection of colour channel or colour evaluation*
- *Brightness correction*
- *Filter functions*

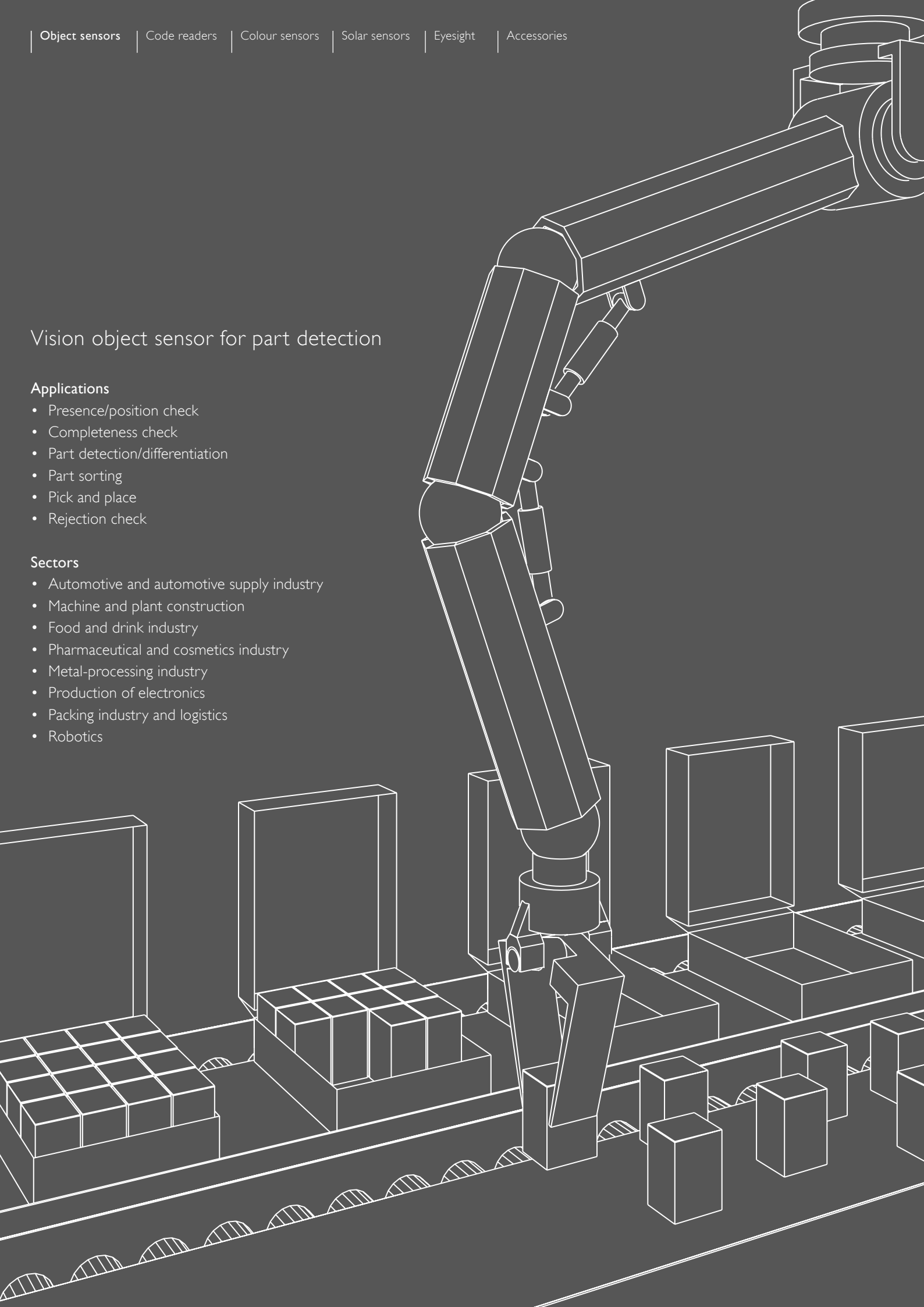
Vision object sensor for part detection

Applications

- Presence/position check
- Completeness check
- Part detection/differentiation
- Part sorting
- Pick and place
- Rejection check

Sectors

- Automotive and automotive supply industry
- Machine and plant construction
- Food and drink industry
- Pharmaceutical and cosmetics industry
- Metal-processing industry
- Production of electronics
- Packing industry and logistics
- Robotics



The master of the situation.

The Vision object sensor detects the right part in the wrong place – and vice-versa.

Objects with complex shapes and details which even sometimes appear in an unexpected position – conventional switching sensors cannot cope with such detection tasks. Not so with SensoPart's Vision object sensor: It always keeps track of everything, instantaneously detects faulty parts, parts in the wrong place, at the wrong angle or in the wrong order or a combination of all of these. Thanks to its highly-accurate detection of position and angle of rotation, our Vision object sensor is one of the best of its class.

Four detectors plus position detection: A total of four detectors are available for inspection tasks and intepretation: pattern recognition, contour detection, grey level and contrast detection. The high-end version of the Vision object sensor, FA 46-305 also offers position tracking: it is thus now also possible to reliably detect those features which do not appear with repeated accuracy in the taught position. All intepretation is carried out relative to the actual position and angle of the part without having to define an independent characteristic for each possible position. This high-capacity tool also enables you to solve demanding pick and place applications!

VISION OBJECT SENSOR HIGHLIGHTS

- High-capacity part detection and tracking
- Highly-accurate position detection (X/Y position and rotation)
- Extended logic functions (multi-stage, combined and formula mode)
- 3 configurable result outputs
- EtherNet/IP and DHCP support
- Straightforward configuration software with user guide and online help
- Viewer software with restricted user rights

Is the glue dot present?
Early detection through presence check – here with an example of seals for the beverage packaging industry – long before final quality inspection. Costly rejection can thus be avoided.

Position and positional tolerance measurement:
The sensor "learns" the contours and their direction from an image and reacts reliably to deviations. It cannot be not mislead even when the screw lies crosswise.

Nozzle present or not?
Shrinkwrapped too deep – or not deep enough? During the production of blood bags, the Vision object sensor's contour detector keeps track of all the essential details.

Well served.

Image processing can be this simple.

Not only does the Vision object sensor from SensoPart offer excellent performance data but it also has a polished operating concept: thanks to comfortable and easily comprehensible configuration software, definition of complex inspection tasks can be carried out quickly and simply – you are always master of the situation even without detailed knowledge of image processing. You can define and test your inspection tasks ("jobs") and required evaluation ("detectors") in just a few intuitive set-up steps. Extensive logic functions enable the direct assignment of complex inspection results to one of three result outputs (or even 32 signal outputs via the I/O extension accessory). The integrated image recorder which enables error analysis and simulations is also very useful.

Everything in sight with the "Viewer": Once configuration has been completed, the Vision object sensor is autonomous – ie. operates without PC connection – in your production plant. Data can of course be called up at any time during running mode: unique Viewer software with restricted user rights is available for this purpose – inadvertent changes to the configuration are thus reliably avoided. Professional image processing can be this simple!

Step by step guide

1. Job: Select a job or create a new one

2. Position tracking: Define a position detector (optional).

3. Detectors: Define the evaluations required.

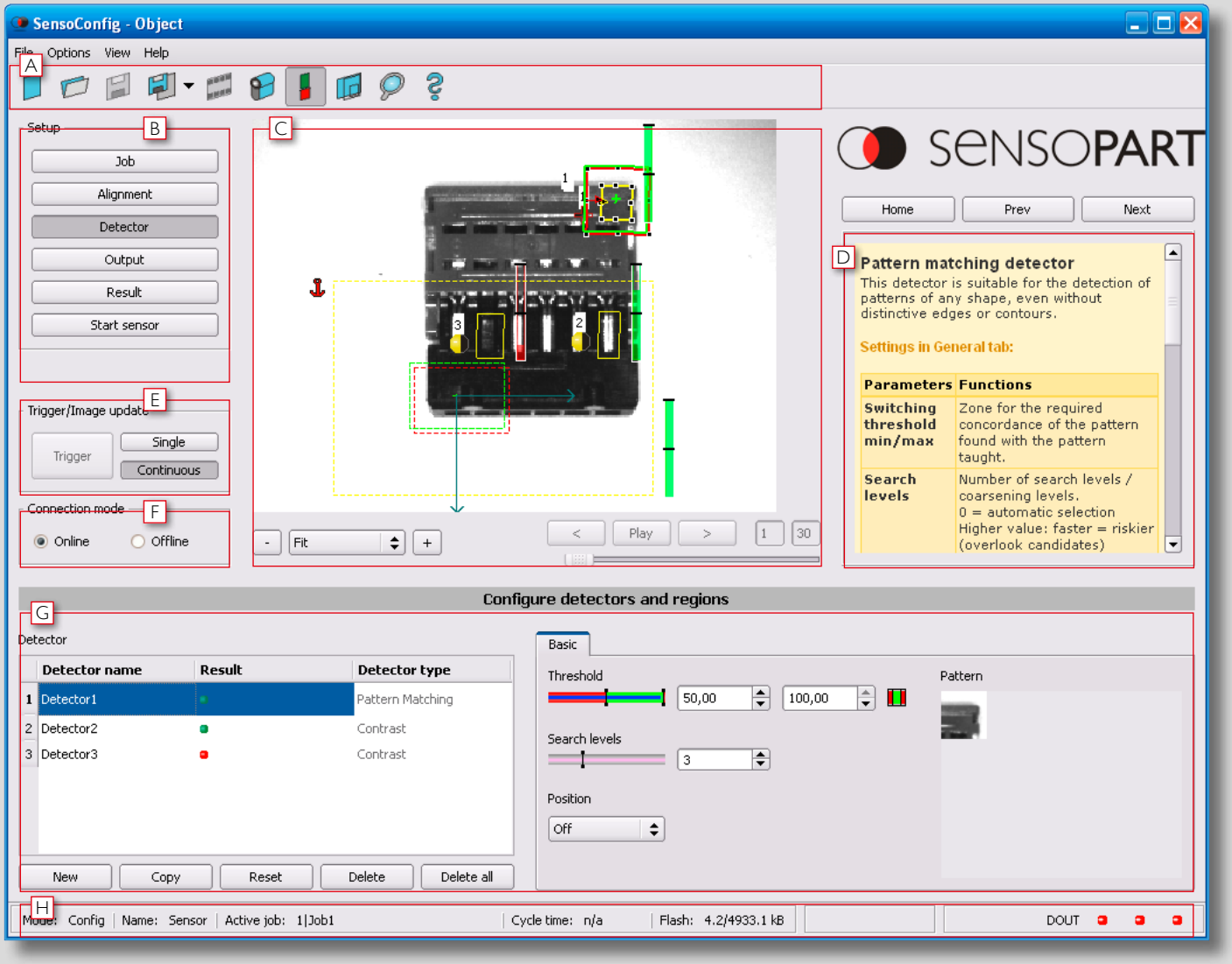
4. Output: Allocate the inspection results to the signal outputs.

5. Result: Test your configuration.

6. Start Sensor: Carry out your job on the sensor.

The right sensor for every position: Versions of the Vision object sensor

Features/Sensors	FA 46-301	FA 46-305
Functions		
Number of jobs | detectors	1 | any	any | any
Logic	one level	multi-level
Position tracking	–	✓
Pattern recognition	✓	✓
Contour	✓ (exact rotational pos.)	✓ (exact rotational pos.)
Grey level	✓	✓
Contrast	✓	✓
Interfaces		
Inputs | outputs	2 | 4	2 | 4
Result outputs	up to 3	up to 3
I/O extension | ext. encoder	– | –	✓ | ✓
RS422	–	✓
Ethernet	✓ (no data)	✓
Profibus	–	Gateway
Ethernet/IP	–	✓
Lenses		
integrated 6mm | 12 mm	✓ | ✓	✓ | ✓
C-Mount	–	✓
Operation/Visualisation		
Operating concept with user guide and online help	✓	✓
Graded user rights	✓	✓
Viewer software	✓	✓



The user interface at a glance

A **Menu bar:** Quick access to the most important functions

B **Setup navigation:** Reliable guide through the configuration process

C **Image window:** Live image of object with graphical display of inspection zones and results

D **Context sensitive online help:** Precise information on every operating step

E **Trigger function:** Triggered operation or free run, single image or serial connection

F **Online/offline mode:** Mode with connected sensor or simulation with stored images

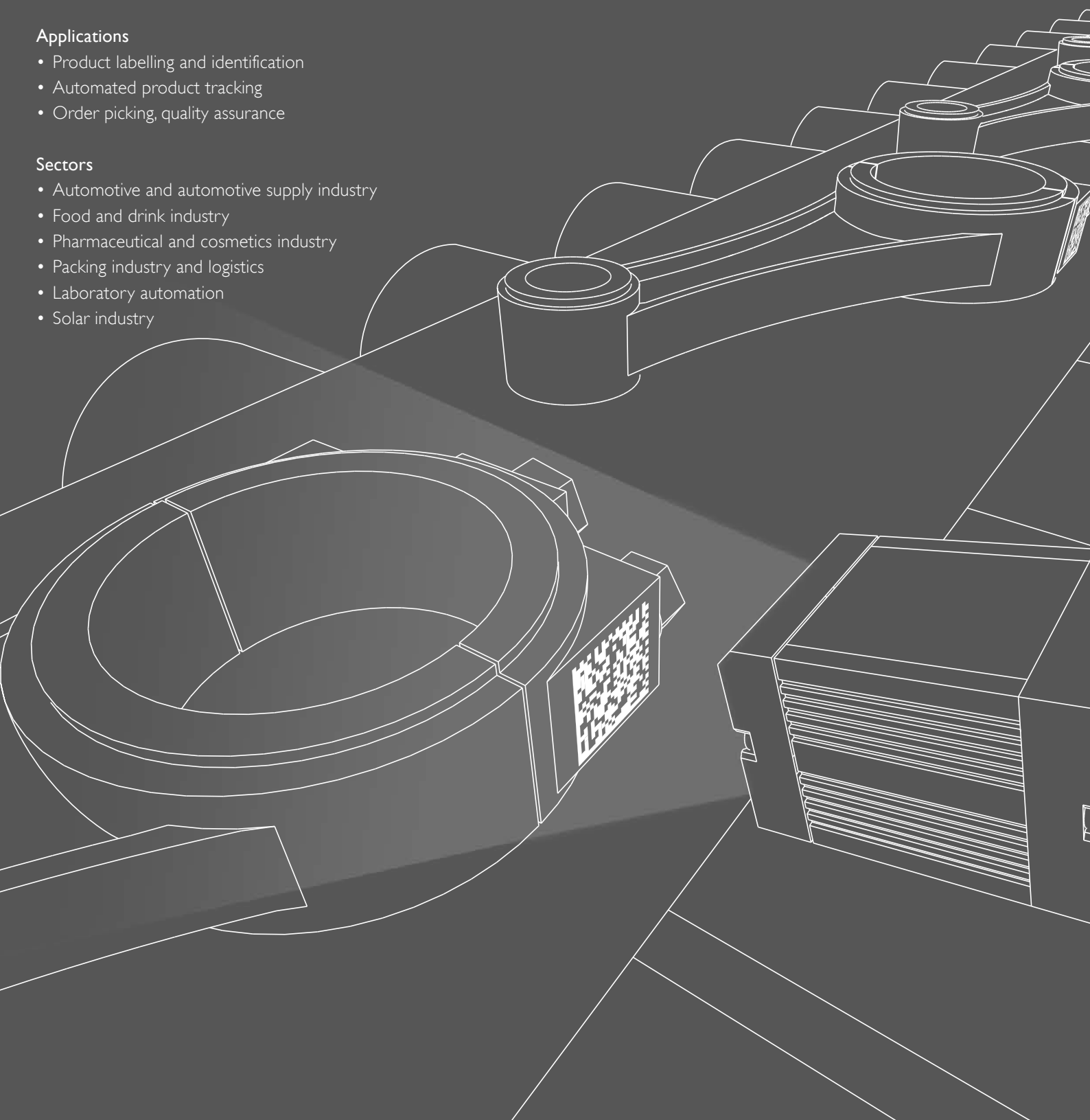
G **Configuration window:** Parameter input for every navigation step

H **Status bar:** Latest information on active job and output status

Vision code reader for product identification

Applications
- Product labelling and identification
- Automated product tracking
- Order picking, quality assurance

Sectors
- Automotive and automotive supply industry
- Food and drink industry
- Pharmaceutical and cosmetics industry
- Packing industry and logistics
- Laboratory automation
- Solar industry



Scanning wizard.

The Vision code reader for printed, punched and laser-etched codes.

Identification of products, components or packaging from printed or directly marked – punched or laser-etched – codes is common practice in many sectors of industry today. The Vision code reader from SensoPart immediately detects which part is in front of it: it can easily read numerous types of barcodes as well as printed and directly marked data matrix codes according to ECC 200 standard, and this on any base (metal, plastic, paper, glass). The sensor can even routinely decipher askew or warped codes or codes on convex, reflective or transparent surfaces.

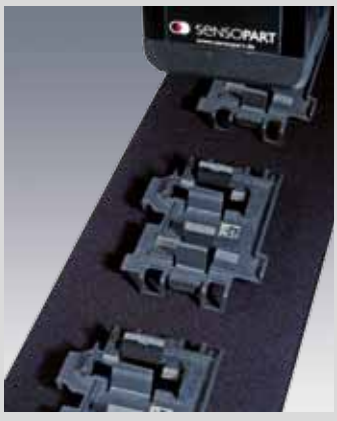
Integrated early warning system: The Vision code reader assesses the quality of your printed or directly marked data matrix codes using standardised ISO and AIM quality parameters. This enables you to introduce early correctional measures and thus avoid rejects due to illegible codes. Whether the application involves code evaluation or code assessment, you can always rely on your Vision code reader's scanning skills!

VISION CODE READER HIGHLIGHTS

- Reliably reads barcodes as well as printed and directly marked data matrix codes, also reads several codes simultaneously and mixed 1D-/2D codes
- Additional object detection for features outside the code
- Evaluation of quality parameters according to ISO/IEC 15415 and AIM DPM 2006
- Flexible definition of serial output data (header, trailer, net data)
- String comparison with report via the digital signal output
- EtherNet/IP and DHCP support
- Hand-held scanners also avaliable

A lot of information in a small space: *Up to 2334 ASCII characters (7 bit) or 3116 figures can be encoded in a ECC 200 data matrix code.*

Child's play: *Not all codes are as easy to read as on this item. The Vision code reader is however not mislead by dirty, smeared, warped or partially-damaged codes.*



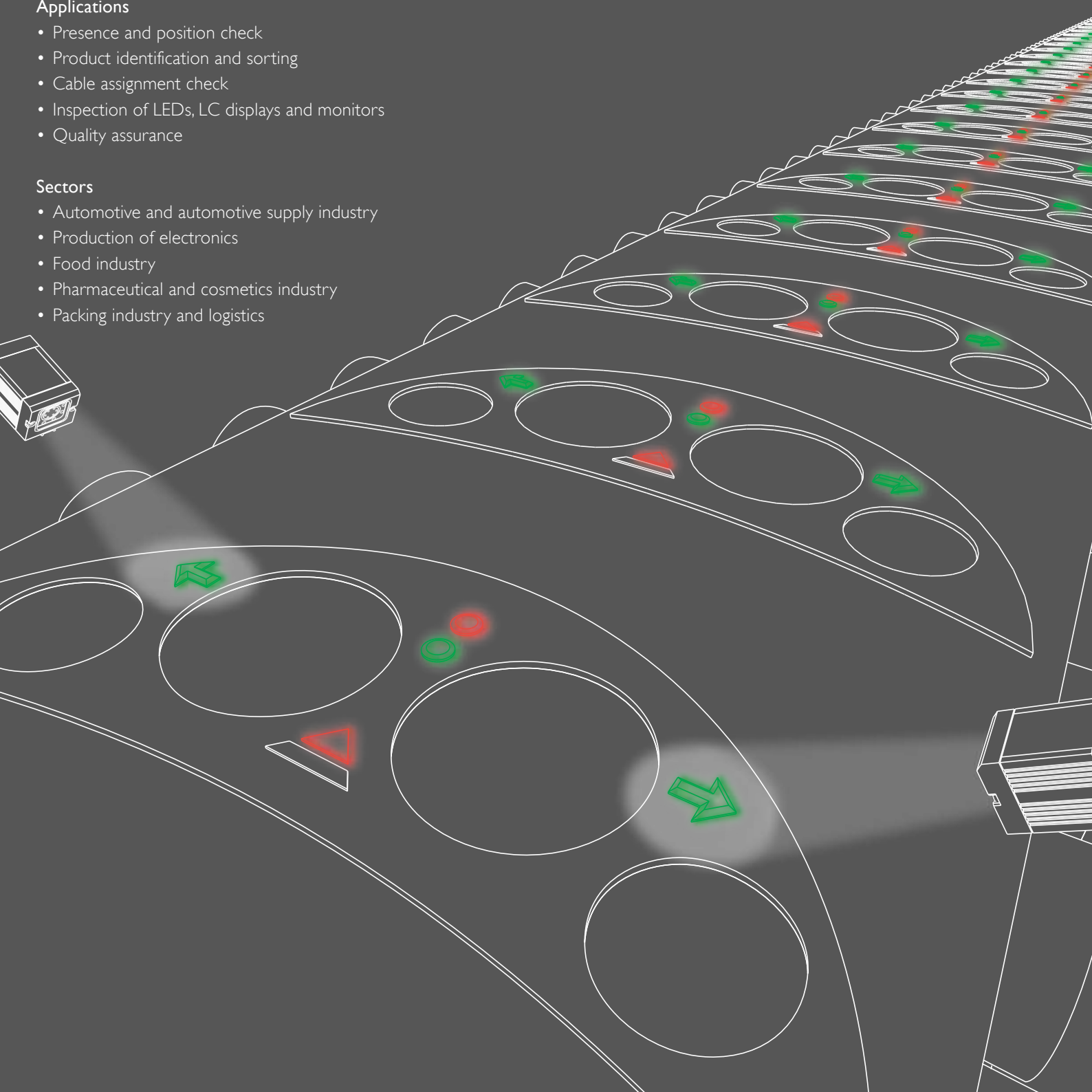
Difficult background: *Directly marked ECC codes are marked on a range of different base materials. The Vision code reader reads quickly and reliably whatever the background or printing procedure.*

Difficult to decipher? *In contrast to printed labels, ECC 200 codes which are laser-etched on glass, are particularly difficult to read due to poor contrast. The Vision code reader proves an accomplished code cracker in such cases.*

Vision sensor for colour detection

Applications
- Presence and position check
- Product identification and sorting
- Cable assignment check
- Inspection of LEDs, LC displays and monitors
- Quality assurance

Sectors
- Automotive and automotive supply industry
- Production of electronics
- Food industry
- Pharmaceutical and cosmetics industry
- Packing industry and logistics



So very colourful.

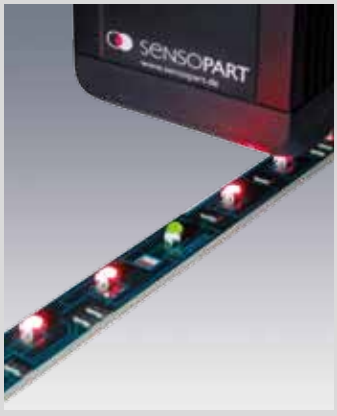
The Vision colour sensor specialises in every type of colour.

Colour is an important characteristic when detecting and distinguishing objects in the production process. Whether it is coloured markings in quality assurance, coloured imprints and labels, LEDs or display elements, assignment of cable harnesses or the degree of browning of baked goods – industry is much more colourful than you think. And not every colour is the same ...

Luminous or "non-colour"? Conventional colour sensors have to pass when dealing with luminous objects or the "non-colours" white, grey and black. The Vision colour sensor from SensoPart knows no such limitations – it not only "sees" objects of any shape and colour but on top of that also supplies additional information on colour intensity and the position of the object sought. There is no question about it: where conventional sensors only see grey on grey, SensoPart Vision sensors are full of colour!

VISION COLOUR SENSOR HIGHLIGHTS

- High-capacity detection of colour and colour intensity
- Detection of active (i. e. luminous) components
- Detection of "non-colours" (white, grey, black)
- Simple set-up with easy to use configuration software
- High detection accuracy even with very slight differences in colour shade



How it lights up:
Conventional colour sensors cannot detect active colours. Only the Vision colour sensor can see whether the third LED in the fifth row is really green and does not light up red and whether the colour intensity meets the specification.

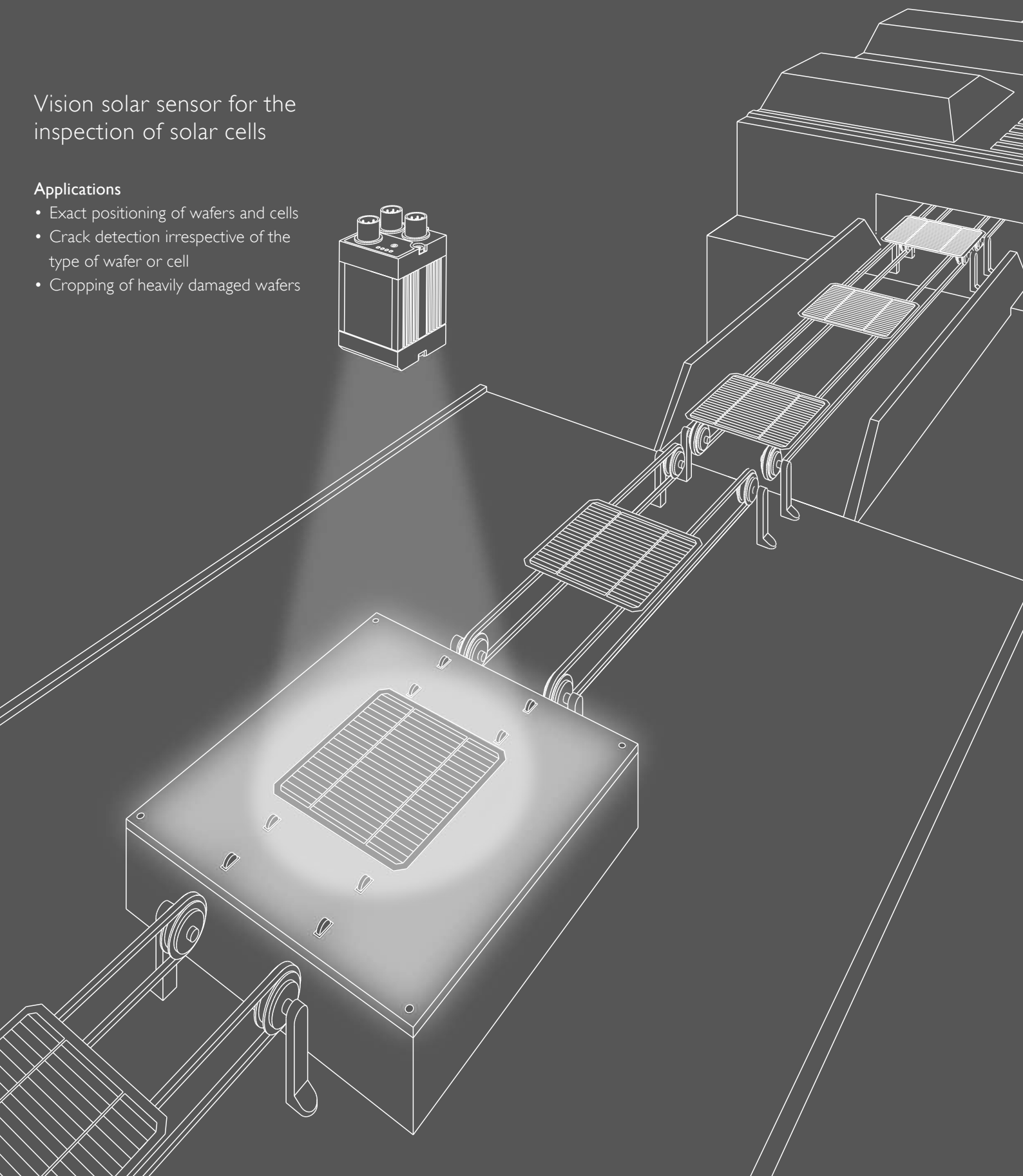
Is the O ring present?
Does it fit perfectly, in the right place? Evaluation of colour characteristics enables a simple presence and position check using the Vision colour sensor.

Correct assignment?
Is the right cable in the allocated place on the connector? The Vision colour sensor identifies, sorts and checks the taught colours and also detects lack of colour.

Vision solar sensor for the inspection of solar cells

Applications

- Exact positioning of wafers and cells
- Crack detection irrespective of the type of wafer or cell
- Cropping of heavily damaged wafers



Sunny boy.

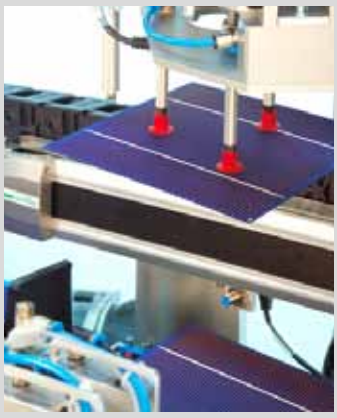
The Vision solar sensor has a trained eye for solar cells.

The solar industry is booming – solar cells have now become industrial mass-produced products. This involves a continuously increasing cost pressure – a sound, process-concurrent quality control of sensitive silicon wafers is therefore a must. The new Vision solar sensor from SensoPart is particularly effective: It enables early detection of wafer cracks and defects and thus avoids the unnecessary cost of machine downtimes.

Plug and Play: Use of the Vision solar sensor is simple and uncomplicated in comparison with a conventional image processing solution. The relevant functions for wafer and cell inspection, from the detection of the size and shape of the wafer to the location of defects and the setting of processing speed and inspection accuracy, are already pre-configured so that the sensor is ready for operation in just a few mouse clicks. It is fast, costs little and functions perfectly. Sunny times are ahead!

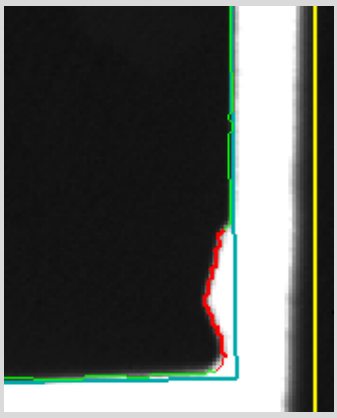
VISION SOLAR SENSOR HIGHLIGHTS

- Automatic detection of wafer and cell geometry, with chamfer (monocrystalline wafer) and without chamfer (polycrystalline wafer)
- Reliable detection of imperfections on straight and curved contours
- Suitable for proximity mode and reflector mode applications
- Flexible setting of inspection criteria: e. g. tolerances for wafer size, position, rotation, size and number of authorised contour defects
- Easy improvement of the sensor with regard to evaluation speed and inspection accuracy (subpixel process)
- Freely adjustable cropping function for larger defects, e. g. 6“ by 5“
- Distortion correction



Unavoidable risk of cracks:
Silicon wafers are only a few tenths of a millimetre thick and very brittle, which means that damage during the production process can never be completely excluded. This is no problem, provided it is detected early on!

Essential features in view:
The Vision solar sensor operates precisely and reliably even in fast cycle processes. Inspection criteria can be quickly and easily defined with the aid of the straightforward operating software.

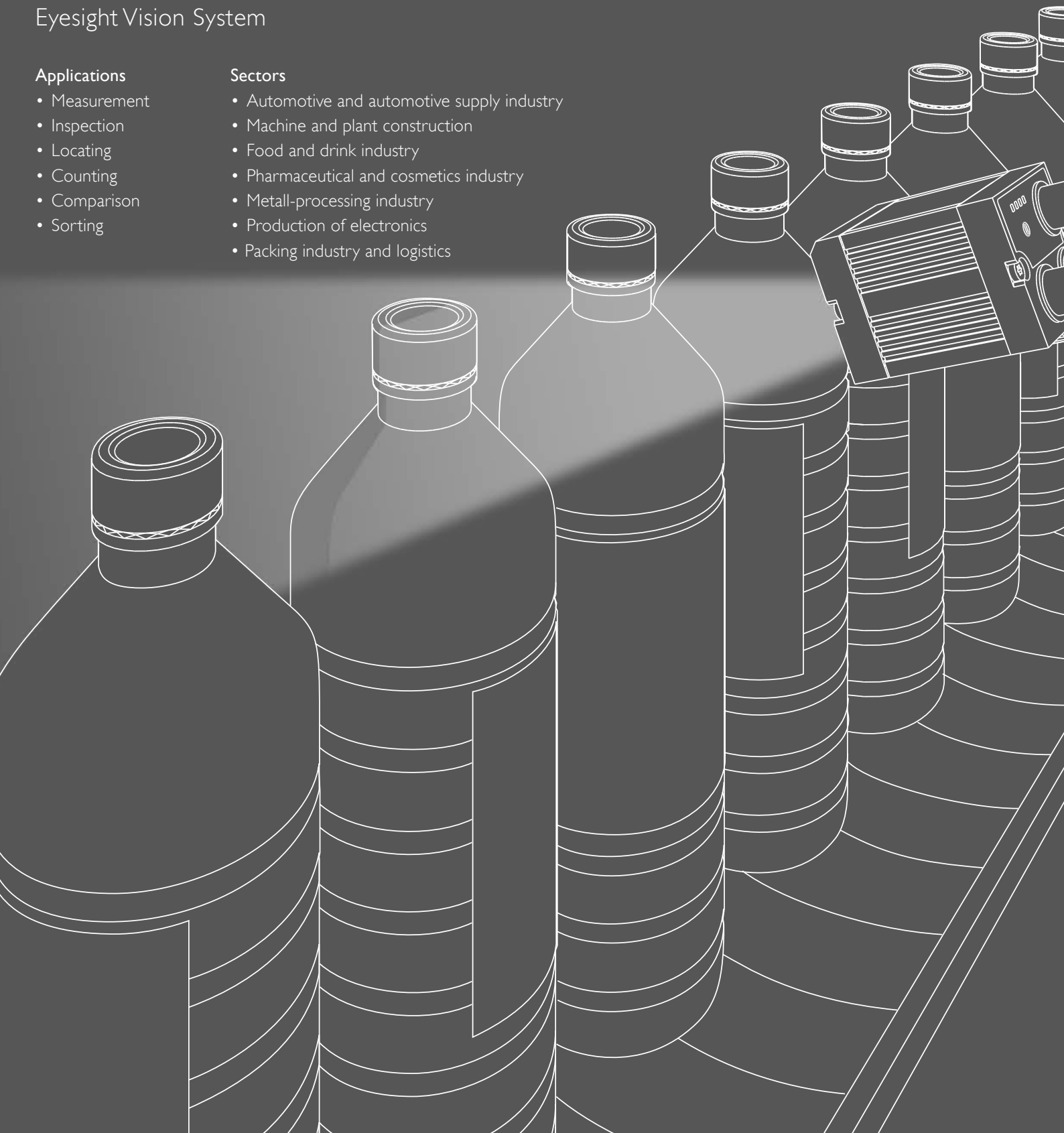


Reliable detection of defects:
The Vision solar sensor can detect minimal contour defects (2 x 2 pixels). Evaluation of subpixels enables a further increase in inspection accuracy.

Eyesight Vision System

Applications
- Measurement
- Inspection
- Locating
- Counting
- Comparison
- Sorting

Sectors
- Automotive and automotive supply industry
- Machine and plant construction
- Food and drink industry
- Pharmaceutical and cosmetics industry
- Metall-processing industry
- Production of electronics
- Packing industry and logistics



The powerful all-in-one system

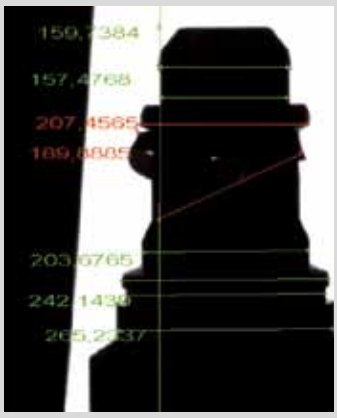
Everything is possible with Eyesight.

Most image processing applications can be quickly and easily solved with pre-configured vision sensors. However, their range of functions does not always stretch to particularly demanding or specific tasks – but SensoPart has the solution once again: the freely-programmable Eyesight vision system offers comprehensive configuration possibilities so that even very complex automation applications can be achieved. Complex applications do not have to be complicated: graphical programming using drag & drop makes it easy to create your own applications.

With or without icing on the cake? You have the choice of two configuration levels: Basic Eyesight contains all the main routines for object measurement, position detection and tracking as well as for pattern recognition. Advanced Eyesight offers additional tools such as curvature point, contour check/contour trace, colour selection/colour evaluation, brightness adjustment/distortion correction and various filter functions. Basic and Advanced Eyesight achieve what can only otherwise be accomplished with full-blown image processing systems, with much less effort – and at an unbeatable low price.

EYESIGHT HIGHLIGHTS

- Complete image processing package with robust and flexible hardware
- Programming via drag and drop of function icons
- Complex, iterative connection of individual inspection functions
- Visualisation of image and result with EyeView or EyeMultiView
- Script interpreter for programming your own functions
- Image processing can be simulated on the PC without the camera
- Comprehensive range of integrated and external lighting and lenses



Respecting dimensions:
Dimensional accuracy of an object – e.g a turned or pressed part – is an important quality characteristic and can provide indirect information on its consistency, wear or abrasion. This thus avoids rejections in the subsequent processes.

Providing orientation:
Correct alignment of an object is an essential prerequisite for downstream processes, e.g. for the positioning and tracking of a gripper. Colours, shapes and contours are used to check correct orientation.

Avoiding errors:
A range of different characterisitics can be checked in an instant with Eyesight – here for example the postion and colour of the lid, the fill level and presence of the use-by date. It pays off as overlooked errors can later prove to be costly.

Made easy.

Image processing tasks are this easy with Eyesight.

Image/Camera

- Image capture
- Camera settings

Colour

- Select colour channel
- Colour evaluation
- Colour filter

Pre-processing

- Calibration and position tracking
- Brightness adjustment
- Remove background
- Filter functions

Input/Output

- Check input
- Set output
- Inifile access

Input/Output

- Text
- Serial data transfer
- LAN data transfer (text line)
- Image transfer

Measurement

- Image information
- Area test
- Point list
- Point determination
- Straight line determination
- Circle calculation
- Distance calculation
- Straight line
- Cross-section calculation

Measurement

- Measure gap width
- Calliper (hor./vert.)
- Calliper (any orientation)
- Angle determination
- Curvature point

Programme control

- Stop watch
- Process control and loop options
- Execute subprogramme
- Access to variables
- Evaluation

Pattern detection

- Count objects
- Contour check
- Contour trace

Pattern detection

- Correlation
- New: Smart Match (optional)

Detection

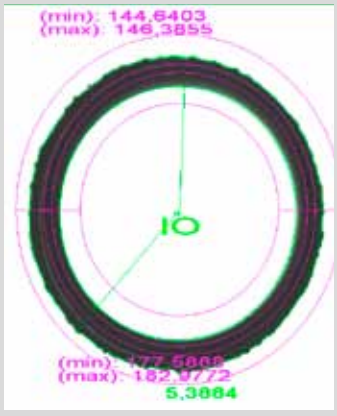
- Probe points
- Probe points (circular probe)
- Edge counter (straight line)
- Edge detection (in projection)
- Circular counter

Access to library

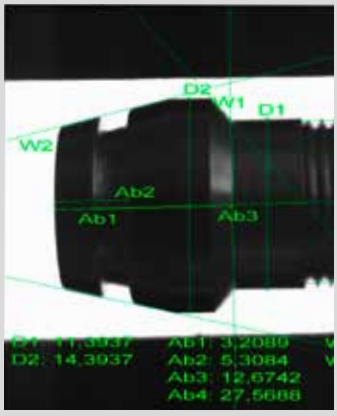
- Script Interpreter

Basic Version

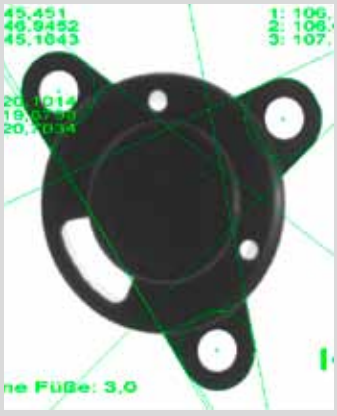
Advanced Version



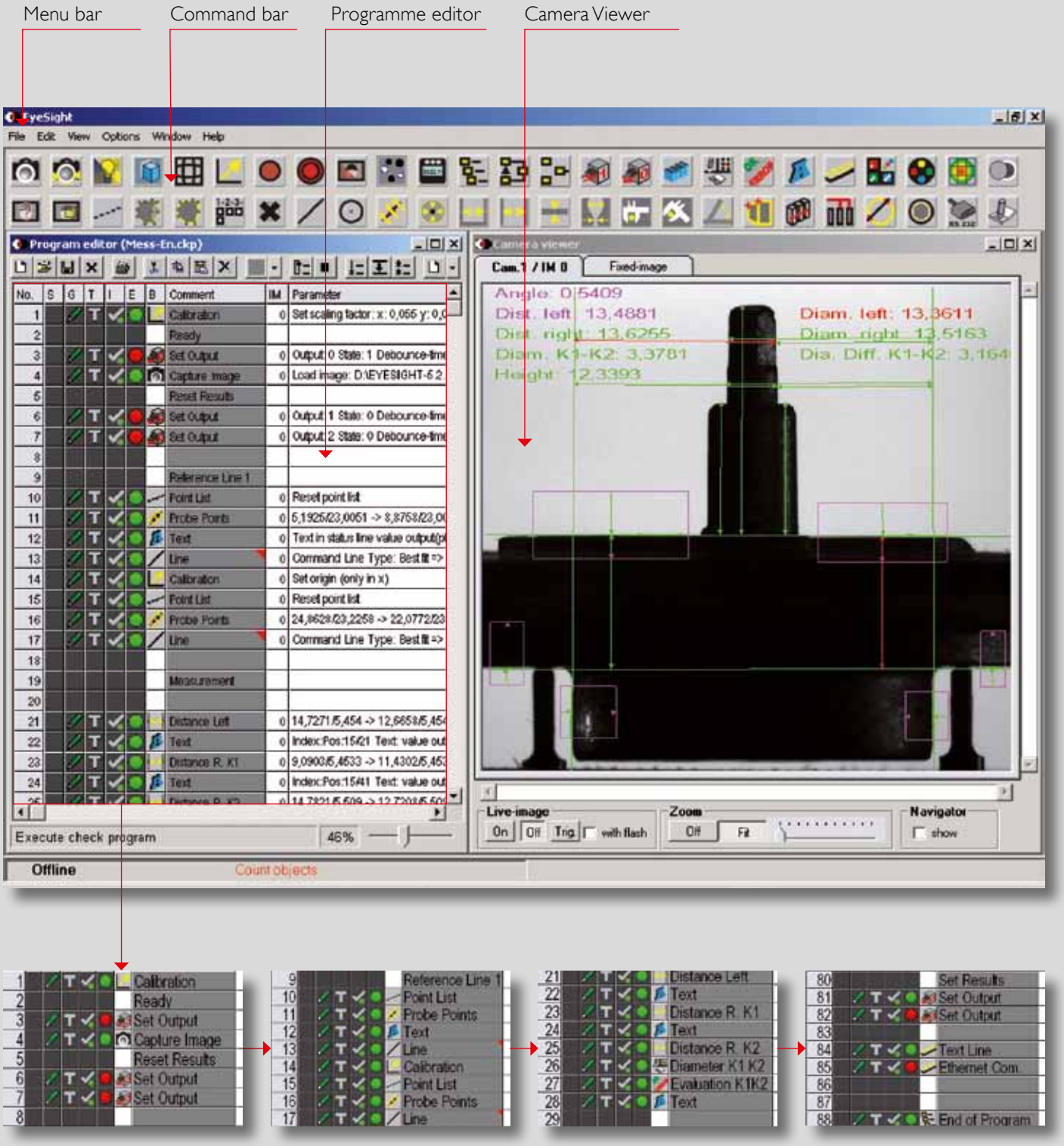
Circle calculation:
This tool can be used to measure round objects or segments of a circle and thus easily detect deformations. An example would be checking for overfilling or underfilling in the plastics process.



Angle determination:
Dimensional accuracy of components can be checked using the available measuring tools. The angle tool is used to determine and assess e.g. angles on components. The thread is also checked for completeness and dimensions are checked with the aid of the distance tools.



Distance calculation:
Distance tools can be used to measure and assess any distances on the component. Radii, angles and drill holes can also be checked in an inspection programme.



Step by step guide

Step 1

Image capture

- *Load calibration of field of view*
- *Reset outputs*
- *Capture triggered image*

Step 2

Referencing

- *Determine object position*
- *Define object reference lines*
- *Display position*

Step 3

Part inspection

- *Measure distances/diameter*
- *Calculation of difference values*
- *Define reference/actual values*
- *Graphical output of specific measured values*

Step 4

Output of results

- *Set outputs according to result logic*
- *Transfer data to the main computer via Ethernet*
- *Quit programme*

Vision sensor and system accessories

Applications

- Lighting
- Lenses and lens accessories
- Mounting accessories
- Connection and interface cables
- Interface modules

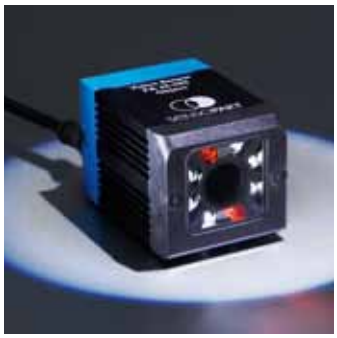
Light & Co.

Everything else you need for image processing.

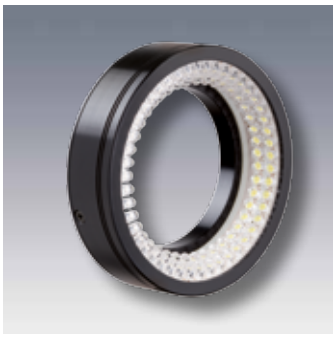
Good lighting is essential for image processing as what is lost during image capture, cannot be restored by even the best evaluation. All of our Vision systems are therefore equipped with high-capacity, integrated lighting which is more than sufficient for most applications. Critical lighting situations – e.g. strong incidence of extraneous light, reflective objects or objects with strongly defined contours – can however require an additional lighting source. SensoPart offers a comprehensive choice of surface, ring or diffuse lights to show every application in its best light.

Integrated lens or C-Mount? The lens integrated in your Vision sensor is also perfectly suited to most applications. However, a C-Mount version with separate lens is also available should it suit the application, e. g. due to very large measuring distances. SensoPart's entire accessory range also covers all eventualities, from a mounting bracket, interface cable to I/O extension. Our customers must want for nothing!

A few basics about the right lighting

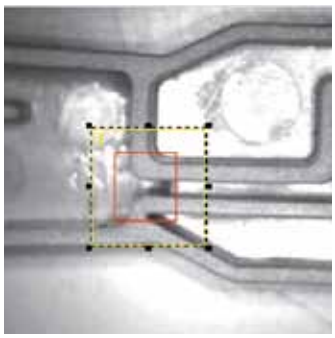


White light or red light?
White light is universally used as it covers the entire light spectrum and achieves good contrast with objects which have different surface properties and colour. Red light or infrared light on the other hand are recommended for specific accentuation or suppression of coloured object features or for elimination of interfering effects of external light.

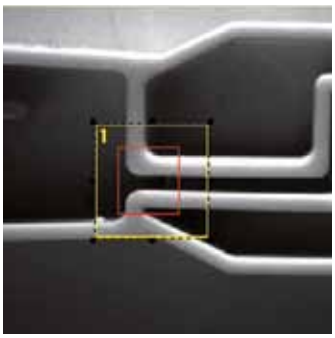


Surface or ring light?
Each design has its specific advantages. Surface lights are, for example, used for reflector mode applications, where the object to be detected must be illuminated from behind – outer contours are accentuated in this manner. Ring lights enable very symmetrical front lighting, diffuse lights are recommended e.g. for strongly reflective surfaces.

With bright field
Edges and background are not clearly distinguishable.



With dark field
Edges are clearly accentuated through dark field lighting.

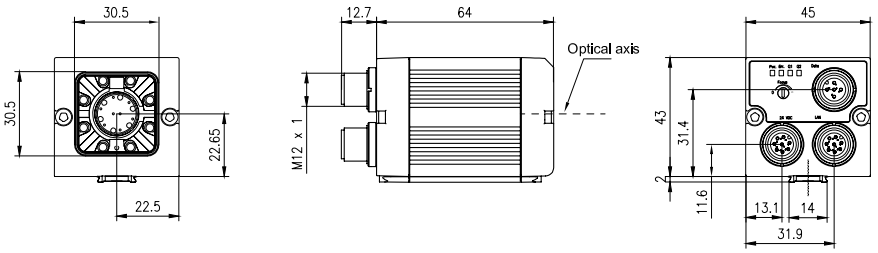


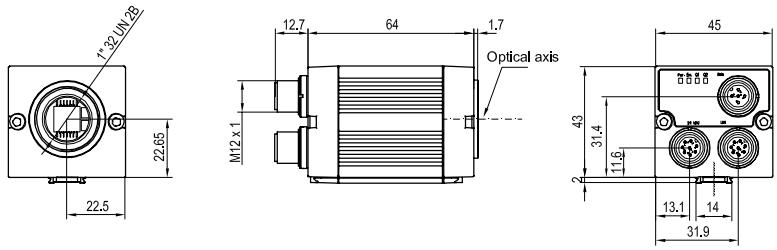
Bright field or dark field?
Suitable lighting enables the accentuation of sought for characteristics and the suppression of interference. If an object is illuminated from the same direction as the sensor (bright field), light or reflective features stand out well from the background; if the light is at an angle to the sensor (dark field), the structures on the illuminated object are accentuated.

Technical data and order information

Vision Sensors

Vision Cameras FA 45/FA 46





Electrical data	
Typ. cycle time object detection	50 to 100 ms (1 pattern recognition)
Typ. cycle time code reading	100 ms (1 evaluation)
Typ. cycle time colour detection	50 to 100 ms (1 evaluation)
Operating voltage	24 VDC +/– 10 % (absolute max. values 18 – 30 V)
Ripple	< 5 V ss
Power consumption (without I/O)	max. 200 mA
Inputs INI/IN2	High 10 to 24 V (+10 %), Low 0 to 3V
Trigger input	Rising edge, 10 V... Ub
Outputs OUT 1 ... 4	PNP (N.O., pull-up-MOSFET)
Output current (per output)	200 mA (max. 9.6 W)
Short circuit protection (all outputs)	yes
Inverse polarity protection	yes
Interfaces	Ethernet (LAN), RS422
Protection class	2 (50 V)
Rise-time delay	approx. 6 sec. after power on
Optical data	
No. of pixels, sensor technology	640 (H) x 480 (V), CCD (b/w or colour)
Integrated meas. lighting	White light or red light LED (not with C-Mount version)
Focal width of integrated lens	6 or 12 mm with adjustable focal position, alternatively C-Mount connection
Min. measuring distance	20 mm with integrated lens; depends on lens with C-Mount lenses
Min. field of view X*Y in mm	18 x 14 (f = 6 mm), 8 x 6 (f = 12 mm)
Depth of field	approx. +/–5 % of measuring distance
Mechanical data	
Length x width x height	64 x 45 x 45 mm
Weight	approx. 170 g
Ambient operating temperature	–0 °C to 50 °C (80 % air humidity, non-condensing)
Storage temperature	–20 °C to 50 °C (80 % air humidity, non-condensing)
Protection	IP 65/67
Connections	Device connector M12 8 pin, Ethernet M12 8 pin, process M12 5 pin
Casing material	Aluminium, plastic
Vibration/Shock	EN 60947-5-2

Part designation	Particularity	Part no.	Image chip	Lighting	Lens	Interfaces
Object detection						
FA 46-305-WCC-OBO6ES6	Any no. of jobs and detectors	522-91151	CCD-Mono	White light	f=6 mm	RS422/Ethernet
FA 46-305-WCC-OBO12ES6	Any no. of jobs and detectors	522-91152	CCD-Mono	White light	f=12 mm	RS422/Ethernet
FA 46-305-RCC-OBO6ES6	Any no. of jobs and detectors	522-91153	CCD-Mono	Red light	f=6 mm	RS422/Ethernet
FA 46-305-RCC-OBO12ES6	Any no. of jobs and detectors	522-91154	CCD-Mono	Red light	f=12 mm	RS422/Ethernet
FA 46-305-ICC-OBO6ES6	Any no. of jobs and detectors	522-91175	CCD-Mono	Infrared light	f=6 mm	RS422/Ethernet
FA 46-305-ICC-OBO12ES6	Any no. of jobs and detectors	522-91176	CCD-Mono	Infrared light	f=12 mm	RS422/Ethernet
FA 46-305-CC-OBOCSES6	Any no. of jobs and detectors	522-91155	CCD-Mono	Not integrated	C-Mount	RS422/Ethernet
FA 46-301-WCC-OBO6LS5	Max. 1 job, any no. of detectors	522-91171	CCD-Mono	White light	f=6 mm	Ethernet
FA 46-301-WCC-OBO12LS5	Max. 1 job, any no. of detectors	522-91172	CCD-Mono	White light	f=12 mm	Ethernet
FA 46-301-RCC-OBO12LS5	Max. 1 job, any no. of detectors	522-91174	CCD-Mono	Red light	f=12 mm	Ethernet
FA 46-301-RCC-OBO6LS5	Max. 1 job, any no. of detectors	522-91173	CCD-Mono	Red light	f=6 mm	Ethernet
Code reading						
FA 45-300-WCC-CRO6HS6	32 configurations	522-91111	CCD-Mono	White light	f=6 mm	RS422/Ethernet
FA 45-300-WCC-CRO12HS6	32 configurations	522-91112	CCD-Mono	White light	f=12 mm	RS422/Ethernet
FA 45-300-RCC-CRO6HS6	32 configurations	522-91114	CCD-Mono	Red light	f=6 mm	RS422/Ethernet
FA 45-300-RCC-CRO12HS6	32 configurations	522-91115	CCD-Mono	Red light	f=12 mm	RS422/Ethernet
FA 45-300-CC-CROCSHS6	32 configurations	522-91113	CCD-Mono	Not integrated	C-Mount	RS422/Ethernet
FA 45-300-WCC-CRO6ES6	32 config., quality parameters	522-91146	CCD-Mono	White light	f=6 mm	RS422/Ethernet
FA 45-300-WCC-CRO12ES6	32 config., quality parameters	522-91147	CCD-Mono	White light	f=12 mm	RS422/Ethernet
FA 45-300-RCC-CRO6ES6	32 config., quality parameters	522-91149	CCD-Mono	Red light	f=6 mm	RS422/Ethernet
FA 45-300-RCC-CRO12ES6	32 config., quality parameters	522-91150	CCD-Mono	Red light	f=12 mm	RS422/Ethernet
FA 45-300-CC-CROCSES6	32 config., quality parameters	522-91148	CCD-Mono	Not integrated	C-Mount	RS422/Ethernet
Colour detection						
FA 45-300-WCCC-COO6HS4	32 configurations	522-91034	CCD-Color	White light	f=6 mm	RS422/Ethernet
FA 45-300-WCCC-COO12HS4	32 configurations	522-91035	CCD-Color	White light	f=12 mm	RS422/Ethernet
FA 45-300-CCC-COOCSHS4	32 configurations	522-91036	CCD-Color	Not integrated	C-Mount	RS422/Ethernet
Solar sensor						
FA46-305-WCC-SOO6ES6	Inspection of solar cells	522-91166	CCD-Mono	White light	f=6 mm	RS422/Ethernet
FA46-305-WCC-SOO12ES6	Inspection of solar cells	522-91167	CCD-Mono	White light	f=12 mm	RS422/Ethernet
FA46-305-RCC-SOO6ES6	Inspection of solar cells	522-91168	CCD-Mono	Red light	f=6 mm	RS422/Ethernet
FA46-305-RCC-SOO12ES6	Inspection of solar cells	522-91169	CCD-Mono	Red light	f=12 mm	RS422/Ethernet
FA46-305-CC-SOOCSES6	Inspection of solar cells	522-91170	CCD-Mono	Not integrated	C-Mount	RS422/Ethernet

Part designation Code reader hand-held scanner

Part no.	Part desig.	Codes	Resolution	Distance
534-91000	DS 6707-SR	1D and 2D bar codes, printed codes	640 x 480	2,5 – 35 cm
534-91001	DS 3407-DP	1D and 2D bar codes, direct part marked codes (DPM)	640 x 480	2,5 – 35 cm
534-91002	DS 3478-DP	1D and 2D bar codes, direct part marked codes (DPM)	640 x 480	2,5 – 35 cm
534-91003	DS 6707-DP	1D and 2D bar codes, direct part marked codes (DPM)	640 x 480	2,5 – 35 cm

Technical data and order information

Vision systems and accessories

Part designation FA 45 Eyesight	Part no.	Image chip	Software	Lighting	Objektiv
FA 45-300 RCC-EBO6HS6	522-91139	CCD-Mono	Basic	Red light	f = 6 mm
FA 45-300 RCC-EBO12HS6	522-91140	CCD-Mono	Basic	Red light	f=12 mm
FA 45-300 WCC-EBO6HS6	522-91133	CCD-Mono	Basic	White light	f = 6 mm
FA 45-300 WCC-EBO12HS6	522-91134	CCD-Mono	Basic	White light	f=12 mm
FA 45-300 CC-EBOCSHS6	522-91135	CCD-Mono	Basic	not integrated	C-Mount
FA 45-300 RCC-EAO6HS6	522-91141	CCD-Mono	Advanced	Red light	f = 6 mm
FA 45-300 RCC-EAO12HS6	522-91142	CCD-Mono	Advanced	Red light	f=12 mm
FA 45-300 WCC-EAO6HS6	522-91136	CCD-Mono	Advanced	White light	f = 6 mm
FA 45-300 WCCC-EAO6HS6	522-91143	CCD-Color	Advanced	White light	f = 6 mm
FA 45-300 WCC-EAO12HS6	522-91137	CCD-Mono	Advanced	White light	f=12 mm
FA 45-300 WCCC-EAO12HS6	522-91144	CCD-Color	Advanced	White light	f=12 mm
FA 45-300 CC-EAOCSHS6	522-91138	CCD-Mono	Advanced	not integrated	C-Mount
FA 45-300 CCC-EAOCSHS6	522-91145	CCD-Color	Advanced	not integrated	C-Mount

Part designation FA 50 Eyesight	Part no.	Image chip (size)	Resolution (pixels)	Images/ sec.	Adjustable exposure times	Image output
FA 50-750-CC-EBCSHS6	521-91002	1/3" CCD	1024×768	16	46.7 µs – 2 s	via Ethernet
FA 50-750-CCC-EBCSHS6	521-91003	1/3" CCD colour version	1024×768	16	46.7 µs – 2 s	via Ethernet
FA 50-300-CCC-EBCSHV6	521-91004	1/3" CCD	640×480	63	5 µs – 8 s	SVGA
FA 50-450-CC-EBCSHV6	521-91005	1/2" CCD	768×582	55	5 µs – 7,4 s	SVGA
FA 50-750-CC-EBCSHX6	521-91006	1/3" CCD	1024×768	20	5 µs – 7,4 s	SXGA
FA 50-13M-CC-EBCSHX6	521-91007	1/2" CCD	1280×1024	14	5 µs – 17,6 s	SXGA

Identical technical data for all FA 50 types	
Lens connection	C-Mount
Processor/processing power	TI/400 MHz
Inputs/outputs (24 V)	4/4
Interfaces	RS232 and Ethernet (100 Mbit)
Software	Advanced
Ambient operating temperature	–0 °C to 50 °C (80 % air humidity, non-condensing)
Storage temperature	–0 °C to 50 °C (80 % air humidity, non-condensing)

Switch and interface modules

Profibus adapter

I/O Box

RS422/RS232 converter

RS422/USB converter

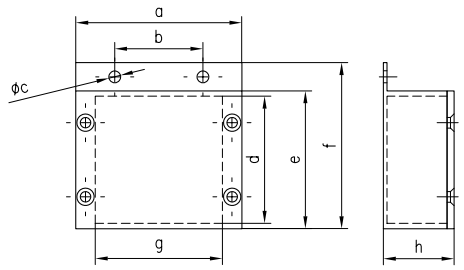
Test box for FA 45

Part no.	Part designation	Description
902-51735	Profibus plug adapter	**Profibus interface** Anybus communicator 4
533-01008	T-AS7T-12ET34PRD	**I/O Box** (32 outputs, 8 inputs, 2 ejector contacts) with additional encoder input (e. g. for the time-delayed enabling of switching outputs and ejector contacts)
533-11017	K2-ADE-TB	**RS232 interface** interface converter RS232 - RS485/422
901-05097	CUSB-RS232-2m	**USB interface** interface cable 2 m incl. CD-ROM USB-RS232
543-11012	ST 45	**Test box for Vision sensors**

Surface light for backlight illumination

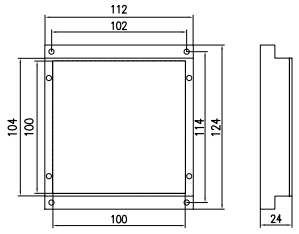
Part no.	Part designation	Description	Fig.
532-510184	LF 36 WD-24-KFL5	Surface light, diffuse, 36 mm, white	1
532-51019	LF 51 WD-24-KFL5	Surface light, diffuse, 51 mm, white	2
532-51020	LF 100 WD-24-KFL5	Surface light, diffuse, 100 mm, white	3
532-51024	LF 200 WD-24-KFL5	Surface light, diffuse, 200 mm, white	4
532-51021	LF 36 RD-24-KFL5	Surface light, diffuse, 36 mm, red	1
532-51022	LF 51 RD-24-KFL5	Surface light, diffuse, 51 mm, red	2
532-51023	LF 100 RD-24-KFL5	Surface light, diffuse, 100 mm, red	3
532-51025	LF 200 RD-24-KFL5	Surface light, diffuse, 200 mm, red	4

1



a	=	47	mm
b	=	25	mm
c	=	3,4	mm
d	=	36	mm
e	=	40	mm
f	=	47	mm
g	=	36	mm
h	=	15	mm

3



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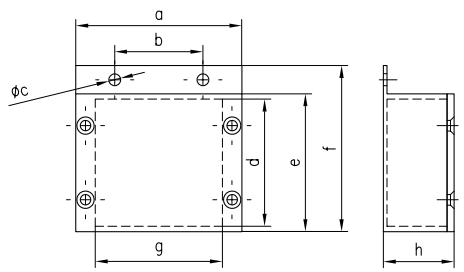
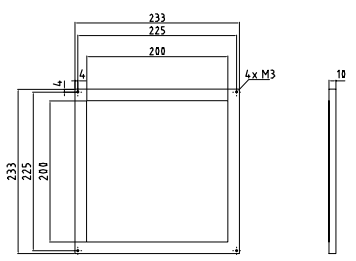


a	=	62	mm
b	=	40	mm
c	=	3,4	mm
d	=	50	mm
e	=	54	mm
f	=	62	mm
g	=	50	mm
h	=	15	mm

4



Flat area light with very bright, homogeneous surface illumination.

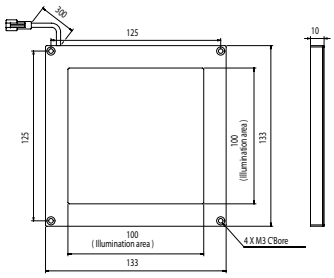
Technical data and order information

Vision accessories

Surface light for backlight illumination

Part no.	Part designation	Description	Fig.
532-51040	LF 100 A RD-24-KFL5	Surface light, 100 mm, red, diffuse	1
532-51041	LF 60 A RD-24-KFL5	Surface light, 60 mm, red, diffuse	2
532-51042	LF 100 A WD-24-KFL5-65	Surface light, 100 mm, white, diffuse, IP 65	3

1



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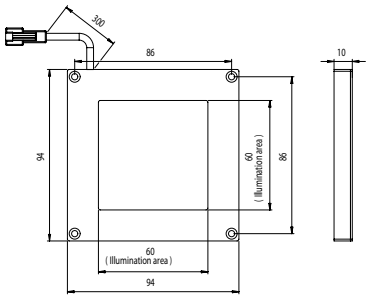

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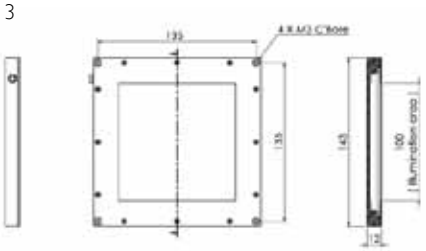
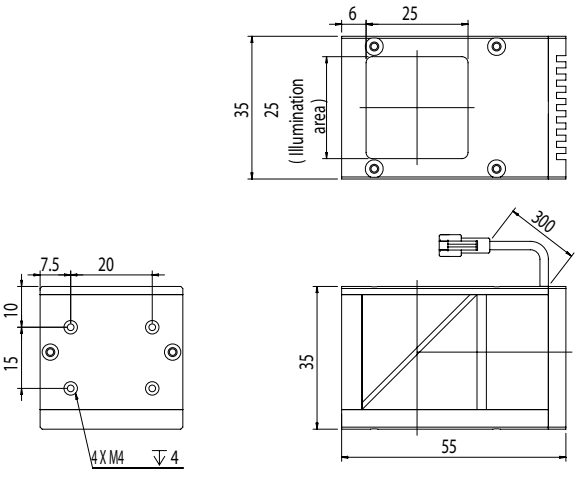


Flat LED surface light for diffuse illumination.

Coaxial lights bright field

Part no.	Part designation	Description	Fig.
532-51043	LK 25 R-24-KFL5	Coaxial light, 25 mm, red	1
532-51044	LK 46 R-24-KFL5	Coaxial light, 46 mm, red	2

1



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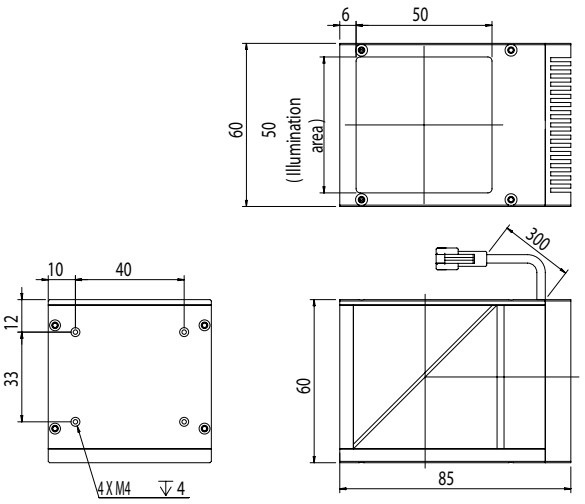
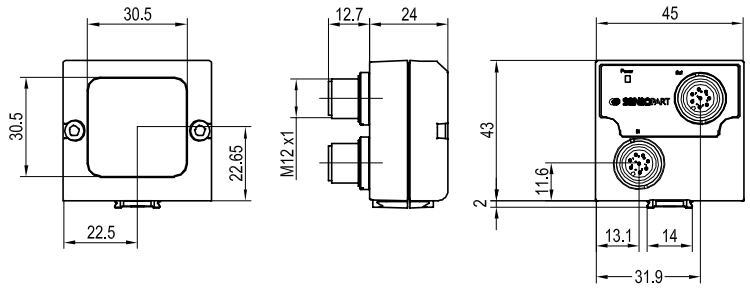


Coaxial light for the homogeneous illumination of reflecting objects.

Surface light for front lighting

Part no.	Part designation	Description
525-51136	LF 45 W	Surface light FA 45 white
525-51137	LF 45 IR	Surface light FA 45 infrared
525-51144	LF 45 R	Surface light FA 45 red

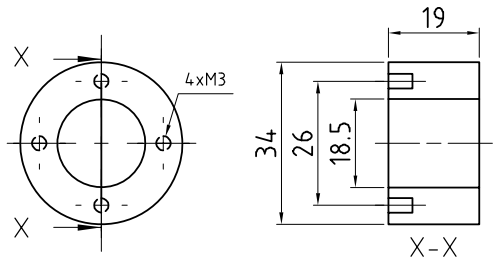


Economical LED surface light for objects, in IP 65/67 sealed housing.

Ring light

Part no.	Part designation	Description	Mount. bracket	Fig.
532-51000	LR 32 W-24-KFL5	Ring light, 32 mm, white	543-11016	1
532-51001	LR 56 W-24-KFL5	Ring light, 56 mm, white	543-11019	2
532-51002	LR 70 W-24-KFL5	Ring light, 70 mm, white	543-11017	3
532-51003	LR 32 R-24-KFL5	Ring light, 32 mm, red	543-11016	1
532-51004	LR 56 R-24-KFL5	Ring light, 56 mm, red	543-11019	2
532-51005	LR 70 R-24-KFL5	Ring light, 70 mm, red	543-11017	3
525-51139	LFR 45 WD	Ring light, two rows, white	543-11015	4
525-51141	LFR 45 ID	Ring light, two rows, infrared	543-11015	4
525-51143	LFR 45 RD	Ring light, two rows, red	543-11015	4

1



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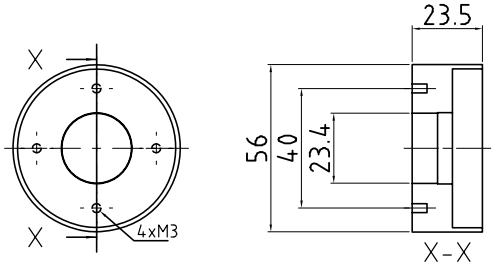

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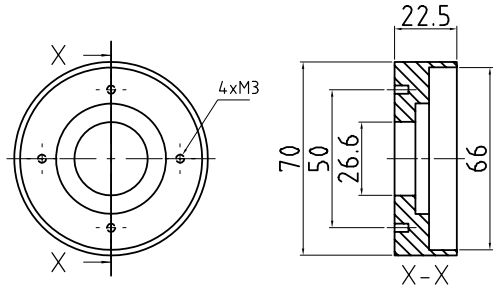

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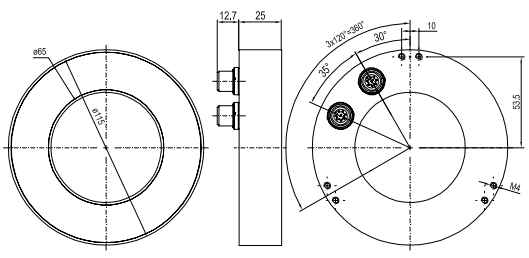


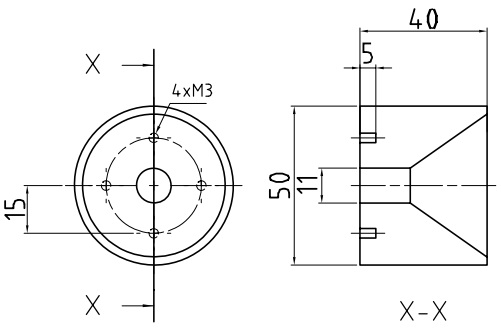
Bright LED ring light with or without diffuser panel.

Technical data and order information

Vision accessories

Ring light dome diffusion

Part no.	Part designation	Description	Mount. bracket
532-51038	LD 50 WD-24-KFL5	Ring light, dome diffusion, 50 mm, white	543-11016
532-51039	LD 50 RD-24-KFL5	Ring light, dome diffusion, 50 mm, red	543-11016

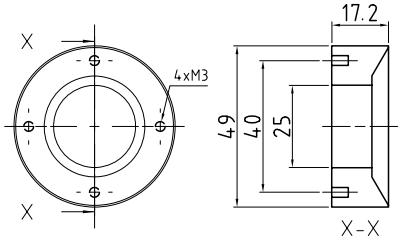


LED ring lighting with funnel-shaped diffuser panel for highly-reflective objects.

Ring light, angled

Part no.	Part designation	Description	Mount. bracket	Fig.
532-51006	LR 50 WW-24-KFL5	Ring light, angled, 50 mm, white	543-11017	1
532-51007	LR 74 WW-24-KFL5	Ring light, angled, 74 mm, white	543-11018	2
532-51008	LR 90 WW-24-KFL5	Ring light, angled, 90 mm, white	543-11018	3
532-51009	LR 132 WW-24-KFL5	Ring light, angled, 132 mm, white	543-11015	4
532-51010	LR 50 RW-24-KFL5	Ring light, angled, 50 mm, rot	543-11017	1
532-51011	LR 74 RW-24-KFL5	Ring light, angled, 74 mm, rot	543-11018	2
532-51012	LR 90 RW-24-KFL5	Ring light, angled, 90 mm, rot	543-11018	3
532-51013	LR 132 RW-24-KFL5	Ring light, angled, 132 mm, rot	543-11015	4
532-51014	LR 75 WI-24-KFL5	Ring light, indirect, 75 mm, white	543-11018	5
532-51015	LR 130 WI-24-KFL5	Ring light, indirect, 130 mm, white	543-11015	6
532-51016	LR 75 RI-24-KFL5	Ring light, indirect, 75 mm, red	543-11018	5

1



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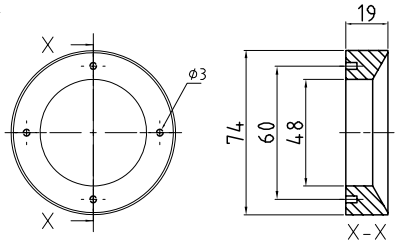

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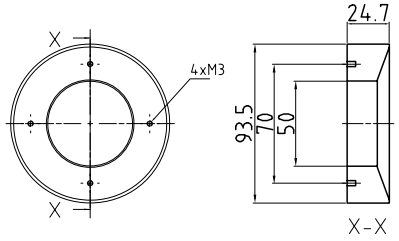

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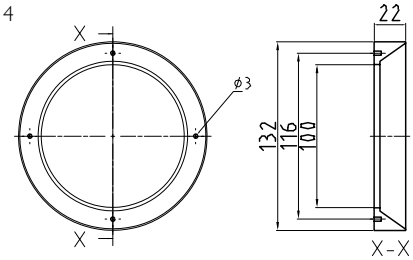

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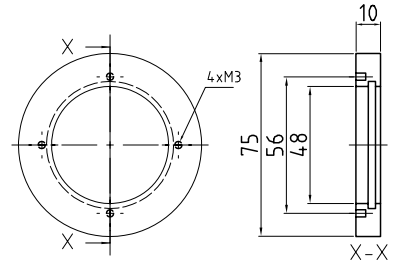

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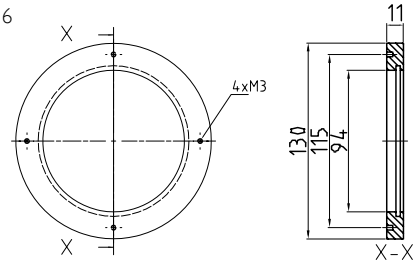
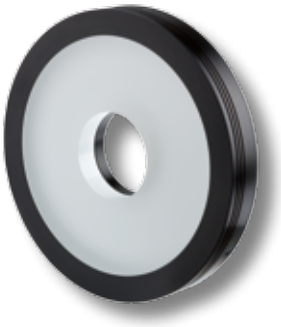


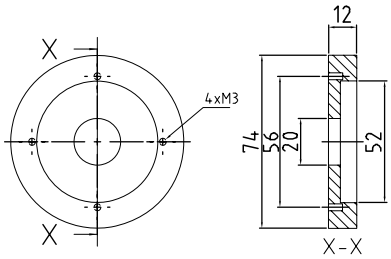
Funnel-shaped LED ring light for dark field lighting.

Ring light, indirect, diffuse



Part no.	Part designation	Description	Mount. bracket	Fig.
532-51030	LR 70 WID-24-KFL5	Ring light, indirect, diffuse, 70 mm, white	543-11019	1
532-51031	LR 100 WID-24-KFL5	Ring light, indirect, diffuse, 100 mm, white	543-11018	2
532-51032	LR 70 RID-24-KFL5	Ring light, indirect, diffuse, 70 mm, red	543-11019	1
532-51033	LR 100 RID-24-KFL5	Ring light, indirect, diffuse, 100 mm, red	543-11018	2
532-51034	LR 70 WD-24-KFL5	Ring light, diffuse, 70 mm, white	543-11019	3
532-51035	LR 100 WD-24-KFL5	Ring light, diffuse, 100 mm, white	543-11015	4
532-51036	LR 70 RD-24-KFL5	Ring light, diffuse, 70 mm, red	543-11019	3
532-51037	LR 100 RD-24-KFL5	Ring light, diffuse, 100 mm, red	543-11015	4

1



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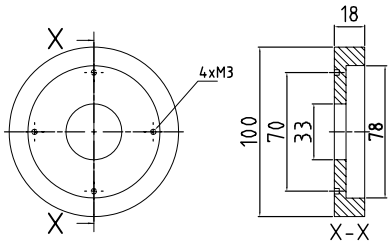

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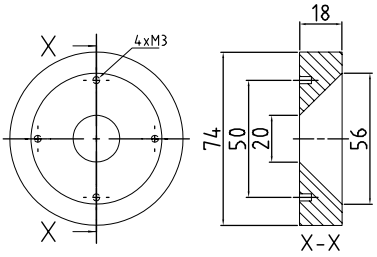

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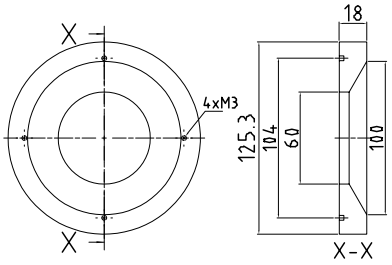
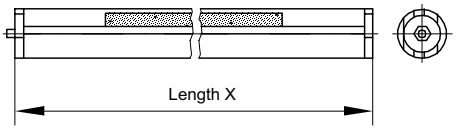


Flat beam LED ring light for dark field lighting.

LZS neon tubes

Part no.	Part desig.	Lamp	Dimensions (mm)	Power supply	Protection	Fig.
525-51122	LZS 08230-50	D16x200/D60 X=350	Ø60 x 350	230 V AC	IP 50	1
525-51123	LZS 13230-50	D16x360/D60 X=580	Ø60 x 580	230 V AC	IP 50	1
525-51126	LZS 18230-67	D26x420/D70 X=940	Ø70 x 940	230 V AC	IP 67	1
525-51124	LZS 18024-54	D26x420/45x108 X=635	635 x 45 x 108	24 V DC	IP 54	2
525-51125	LZS 18230-54	D26x420/45x108 X=635	635 x 45 x 108	230 V AC	IP 54	2
525-51127	LZS 36024-54	D26x1000/45x108 X=1245	1245 x 45 x 108	24 V DC	IP 54	2

1



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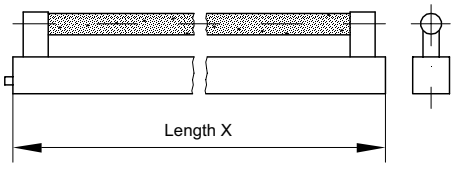


High-frequency neon tubes for illuminating large areas.

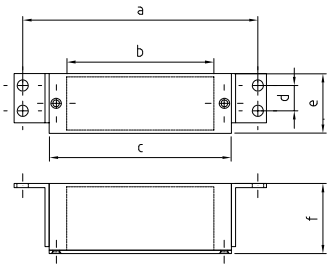
Technical data and order information

Vision accessories

Light strip diffuse

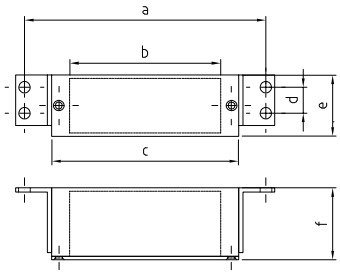
Part no.	Part designation	Description	Figure
532-51026	LB 44 WD-24-KFL5	Light strip, diffuse, 44 mm, white	1
532-51027	LB 86 WD-24-KFL5	Light strip, diffuse, 86 mm, white	2
532-51028	LB 44 RD-24-KFL5	Light strip, diffuse, 44 mm, red	1
532-51029	LB 86 RD-24-KFL5	Light strip, diffuse, 86 mm, red	2

1



a	=	67	mm
b	=	42	mm
c	=	52	mm
d	=	7	mm
e	=	17	mm
f	=	20	mm

2

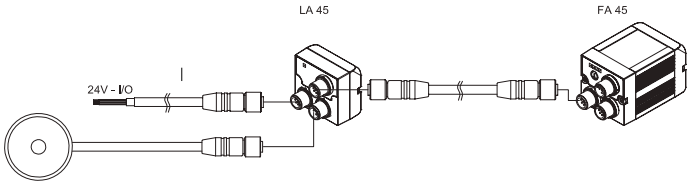


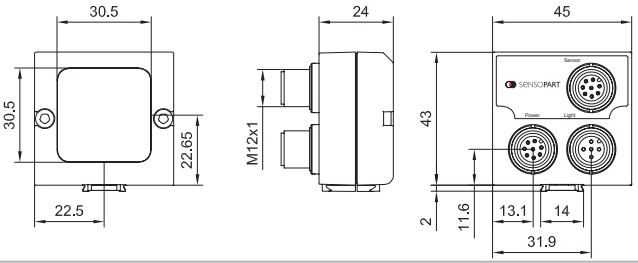
a	=	109	mm
b	=	84	mm
c	=	95	mm
d	=	7	mm
e	=	17	mm
f	=	20	mm

Bar-shaped light strip with diffuser panel for indirect lighting.

Connection adapter for Vision Sensor FA 45 / FA 46

Part no.	Part designation	Description
525-01000	LA 45 V-24-3L	Connection adapter with amplifier for LED lighting, light strip, diffuse, 86 mm, white

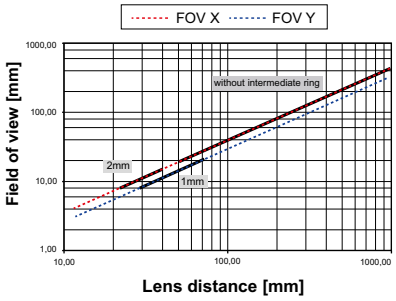
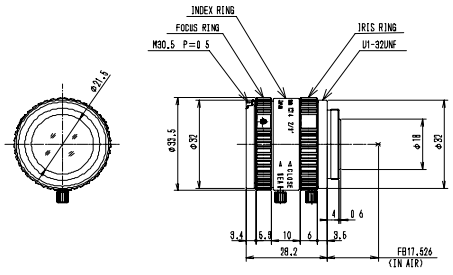
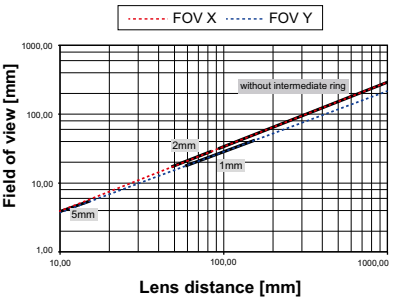
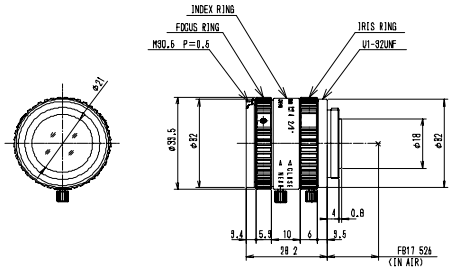
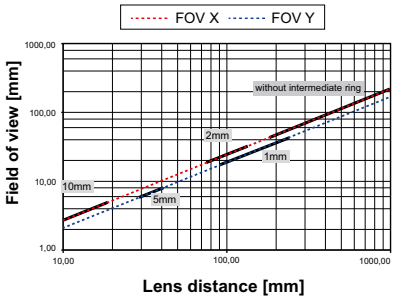
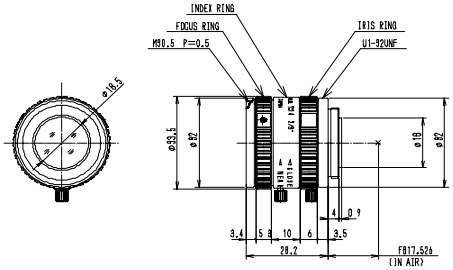
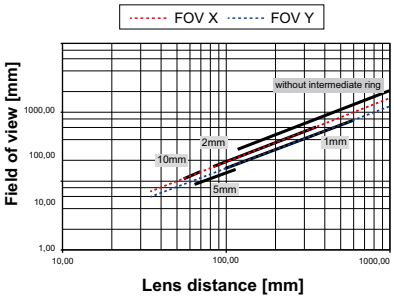
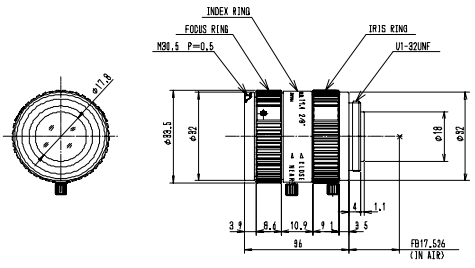
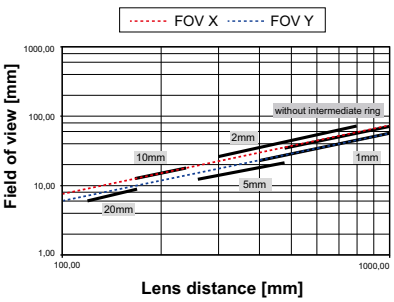
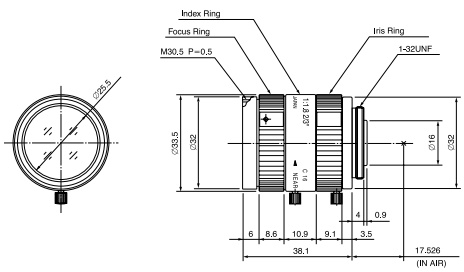




Distributor and amplifier for chronologically synchronous lighting.

C-Mount lenses for FA 45 / FA 46

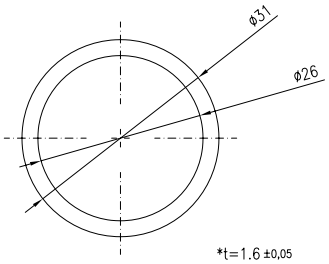
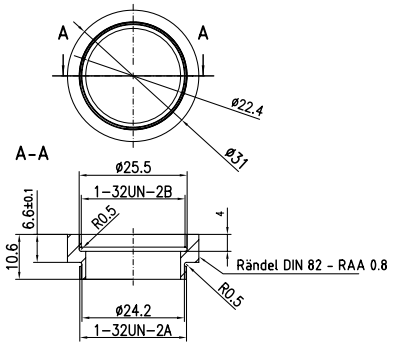
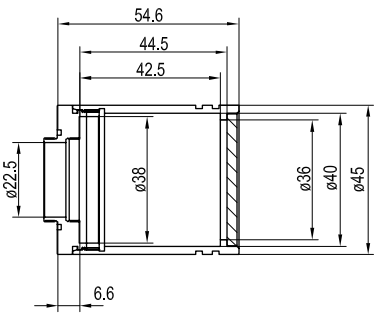
Part no.	Part designation	Description
526-51513	C-Mount lens 8 mm	LO C 8
526-51514	C-Mount lens 12 mm	LO C 12
526-51515	C-Mount lens 16 mm	LO C 16
526-51516	C-Mount lens 25 mm	LO C 25
526-51113	C-Mount lens 50 mm	LO C 50

C-Mount lenses	Field of view (FOV) and intermediate rings required	
LO C 8		
LO C 12		
LO C 16		
LO C 25		
LO C 50		

Technical data and order information

Vision accessories

Technical data lenses					
	LO C 8	**LO C 12**	**LO C 16**	**LO C 25**	**LO C 50**
Focal length	8 mm	12 mm	16 mm	25 mm	50 mm
Iris	manual	manual	manual	manual	manual
Focus	manual	manual	manual	manual	manual
Lens connection	C-Mount	C-Mount	C-Mount	C-Mount	C-Mount
Filter thread	30.5/0.5	30.5/0.5	30.5/0.5	30.5/0.5	30.5/0.5
Diameter	33.5 mm	33.5 mm	33.5 mm	33.5 mm	33.5 mm
Length	28.2 mm	28.2 mm	28.2 mm	36.0 mm	38.1 mm
Weight	70 g	65 g	65 g	75 g	90 g
Temperature range	–20 °C to +50 °C	–20 °C to +50 °C	–20 °C to +50 °C	–20 °C to +50 °C	–20 °C to +50 °C

Lens accessories				
		**Part no.** 543-11009	**Part designation** Intermediate ring 1.6 mm	**Description** LR 1,6
		**Part no.** 543-11010	**Part designation** Intermediate ring 6.6 mm	**Description** LR 6,6
		**Part no.** 527-51130	**Part designation** C-Mount outer casing, 6.6 mm flange	**Description** IP65 protection LPT 45 CM 6.6

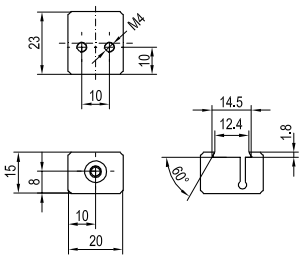
Intermediate rings and outer casing for C-Mount lenses.

Mounting accessories Sensor		
Part no.	Part desig.	Description
543-11000	MK 45	Mounting clamp dovetail
543-11001	MA 45	Mounting bracket short
543-11013	MA 45 L	Mounting bracket long
543-11002	MB 45	Rod mounting block
543-11005	MST 45-20	Mounting rod 20 cm

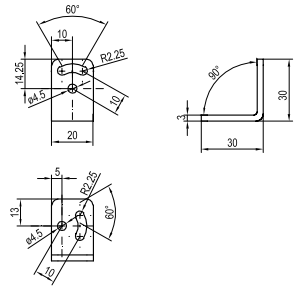
Mounting accessories Sensor		
Part no.	Part desig.	Description
543-11006	MST 45-30	Mounting rod 30 cm
543-11007	MST 45-40	Mounting rod 40 cm
543-11008	MG 45	Mounting hinge
543-11004	MZ 45	Mounting link
543-11003	MP 45	Mounting plate

Mounting accessories sensor

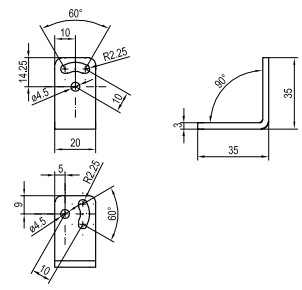
MK 45



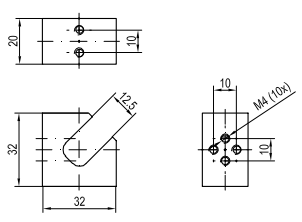
MA 45



MA 45 L

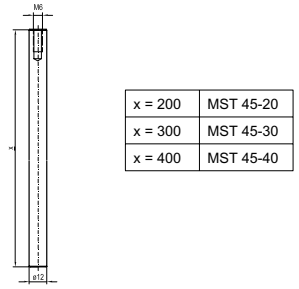


MB 45



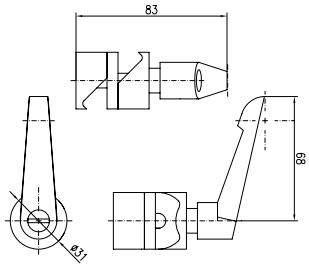
Mounting accessories sensor

MST 45-xx

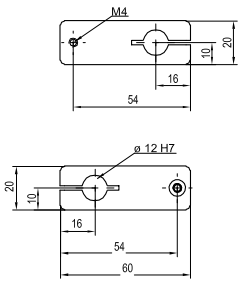


x = 200	MST 45-20
x = 300	MST 45-30
x = 400	MST 45-40

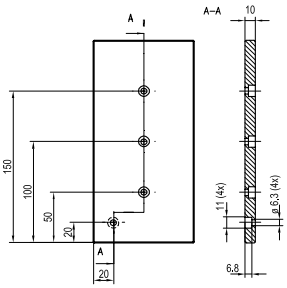
MG 45



MZ 45



MP 45

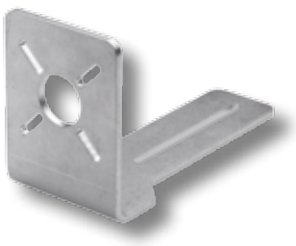


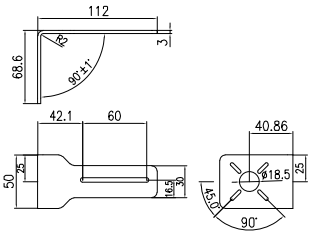
Technical data and order information

Vision accessories

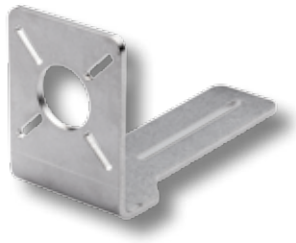
Mounting accessories lighting

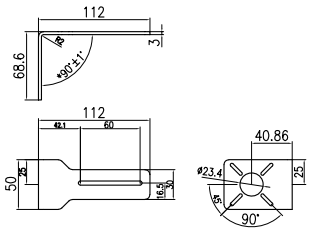
MA LR-18/112



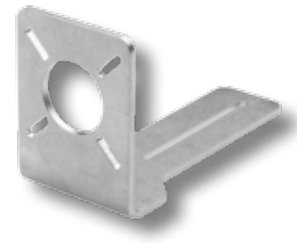


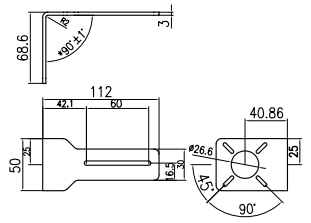
MA LR-23/112





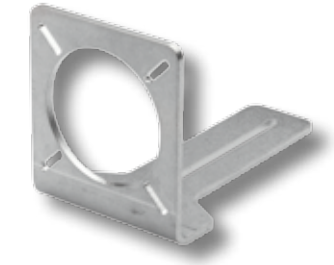
MA LR-26/112

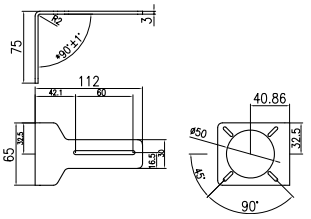




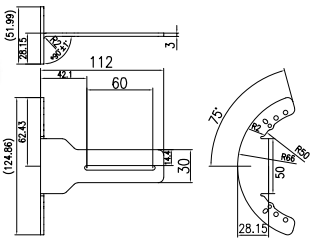
Mounting accessories lighting

MA LR-50/112





MA LR-100/112



Mounting brackets for ring lights

Part no.	Part designation	Description	Suitable for
543-11019	MA LR-23/112	Mounting bracket, ring light, diameter 23 mm	LR 56 x-24-KFL5 LR 70 xD-24-KFL5 LR 70 xID-24-KFL5
543-11017	MA LR-26/112	Mounting bracket, ring light, diameter 26 mm	LR 50 xW-24-KFL5 LR 70 x-24-KFL5 LR 32 x-24-KFL5 LD 50 xD-24-KFL5
543-11018	MA LR-50/112	Mounting bracket, ring light, diameter 50 mm	LR 74 xW-24-KFL5 LR 75 xI-24-KFL5 LR 90 xW-24-KFL5 LR 100 xID-24-KFL5
543-11015	MA LR-100/112	Mounting bracket, ring light, diameter 100 mm	LR 100 xD-24-KFL5 LR 130 xI-24-KFL5 LR 132 xW-24-KFL5 LFR 45 x

Connection, interface and lighting cables

Connection cable, straight

Connection cable, 90°

Ethernet cross-over cable

Ethernet cable

Interface cable

Interface cable

Lighting cable

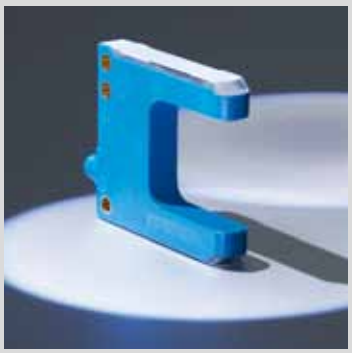
Lighting cable

Part no.	Part designation	Description
902-51708	C L8FSK-2m-G-PUR	Connection cable, 2 m, straight connector, shielded
902-51709	C L8FSK-5m-G-PUR	Connection cable, 5 m, straight connector, shielded
902-51710	C L8FSK-10m-G-PUR	Connection cable, 10 m, straight connector, shielded
902-51711	C L8FSK-2m-W-PUR	Connection cable, 2 m, 90° connector, shielded
902-51712	C L8FSK-5m-W-PUR	Connection cable, 5 m, 90° connector, shielded
902-51713	C L8FSK-10m-W-PUR	Connection cable, 10 m, 90° connector, shielded
902-51715	CI L8FSK/RJ45S-3m-GG-PVC	Ethernet cable, 3 m, M12, 8 pin/RJ45, shielded, patch
902-51736	CI L8FSK/RJ45S-3m-GG-PVC-G	Ethernet cable, 3 m, M12, 8 pin/RJ45, shielded, cross-over
902-51695	CI RJ45S 1m K	Ethernet cross-over cable, 1 m, RJ45, shielded
902-51696	CI L5FK-3m-G-PUR	Interface cable, 3 m, straight connector
902-51697	CI L5FK-xm-G-PUR	Interface cable, x m, straight connector (max. 25 m)
902-51698	CI L5FK-3m-W-PUR	Interface cable, 3 m, 90° connector
902-51699	CI L5FK-xm-W-PUR	Interface cable, x m, 90° connector (max. 25 m)
902-51757	CI L5FK-D9MS-3m-G-PUR	Interface cable for I/O extension, 3 m, straight connector
902-51758	CI L5FK-D9MS-3m-W-PUR	Interface cable for I/O extension, 3 m, 90° connector
902-51759	CI L5FK-D9MS-5m-G-PUR	Interface cable for I/O extension, 5 m, straight connector
902-51760	CI L5FK-D9MS-5m-W-PUR	Interface cable for I/O extension, 5 m, 90° connector
902-51694	AA-RJ45	Ethernet connector RJ45, shielded
902-51761	CI L4MGK/RJ45G-S-3m-PUR	Ethernet cable, 3 m, M12, straight connector, 4 pin, D coded/RJ45, shielded (patch)
902-51762	CI L4MGK/RJ45G-SG-3m-PUR	Ethernet cable, 3 m, M12, straight connector, 4 pin, D coded/RJ45, shielded (cross-over)
902-51763	CI L4MGK/RJ45G-S-5m-PUR	Ethernet cable, 5 m, M12, straight connector, 4 pin, D coded/RJ45, shielded (patch)
902-51764	CI L4MGK/RJ45G-SG-5m-PUR	Ethernet cable, 5 m, M12, straight connector, 4 pin, D coded/RJ45, shielded(cross-over)
902-51765	CI L4MGK/RJ45G-S-10m-PUR	Ethernet cable, 10 m, M12, straight connector, 4 pin, D coded/RJ45, shielded (patch)
902-51766	CI L4MGK/RJ45G-SG-10m-PUR	Ethernet cable, 10 m, M12, straight connector, 4 pin, D coded/RJ45, shielded (cross-over)
902-51773	CI L8MGK/L4MGK-S-0,2m-PVC	Ethernet adapter cable, M12, 8 pin, male, M12, 4 pin, D coded, male, 0.2 m, straight connector, patch, shielded
902-51751	CI L4FGK/L8FGK-S-0,2m-PVC	Ethernet adapter cable, M12, 4 pin D coded, female / M12, 8 pin, female, 0.2 m, straight connector, patch, shielded
902-51717	CB L8FSK/L8FSK-0,5m-GG-PUR	Lighting cable 2 x M12/8 pin, 0.5 m, straight connector, shielded
902-51718	CB L8FSK/L8FSK-0,5m-WW-PUR	Lighting cable 2 x M12/8 pin, 0.5 m, 90° connector, shielded
902-51719	CB L8FSK/L8FSK-2m-GG-PUR	Lighting cable 2 x M12/8 pin, 2 m, straight connector, shielded
902-51756	CB L4 MG 10m PUR	Lighting cable 1 x M12/4 pin, 10 m, for the direct connection of all lighting units except LF 45 and LFR 45

We look ahead.

Yesterday, today and in the future.

SENSOPART



Since SensoPart was founded in 1994, we have constantly focussed on the future. Our motto has always been: We gauge ourselves not by what is possible today, but by our ideas for what can be achieved in the future. Many ground-breaking ideas from that time have since become successful products, which are now indispensible in modern automation technology – endorsed by the numerous prizes for innovation which we have received over recent years. Today, SensoPart is the technological leader in many areas of industrial sensor technology. And we still have many ideas for the future.

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