MACHINE VISION

PROFILE AND VISION SENSORS

di-soric

INDUSTRY 4.0 – MACHINE VISION IS A BASIC BUILDING BLOCK OF SMART PRODUCTION

FLEXIBLE PRODUCTION SYSTEMS

The efficient manufacture of small lot sizes up to individual production is made possible through flexible production systems that can be easily adapted to changing requirements or those that ideally are able to adapt themselves.

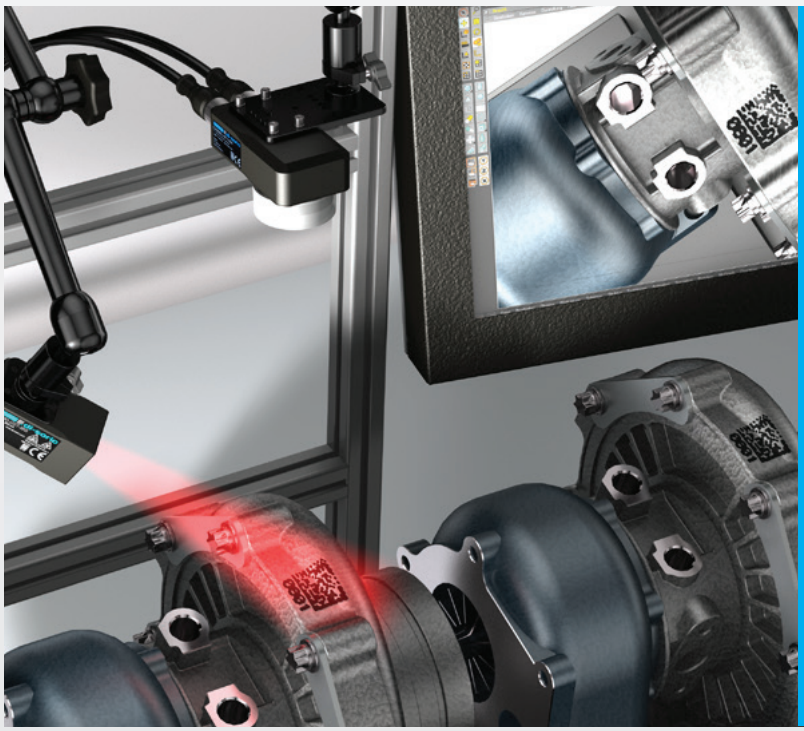
This flexibility is achieved through the automated exchange of information between the individual production components, which make data for the optimization of the entire process available to the process control. This includes, for example, sensors networked via IO-Link or Vision and Profile sensors or ID Readers integrated via Profinet.

Through individual marking (coding), the product itself becomes an information carrier and is thus part of the production – in a quality-inspected and traceable manner.

OPTIMAL APPLICATION SOLUTIONS WITH THE DI-SORIC MACHINE VISION SENSORS

Working distance, depth of field on the inspection object, resolution of the inspection object and the size of the field of view play a decisive role in a successful solution. Our Machine Vision Sensors offer you the necessary flexibility to meet these requirements.

Additionally, di-soric offers you an extensive portfolio of lighting for diverse lighting scenarios which contribute to the feasibility and stability of your solutions.



APPLICATION REQUIREMENTS FOR THE SELECTION OF THE OPTIMAL SENSOR

- Component size
- Working distance
- Resolution
- Ambient light
- Type of inspection
- Cycle time
- Communication interface

VISION AND PROFILE SENSORS
FROM THE QUALITY INSPECTION TO TRACK AND TRACE

A flexible, automated quality inspection contributes decisively to the overall efficiency of a production process: It directly indicates quality fluctuations and ensures that only products manufactured within the defined parameters are further processed or packaged.

CS-60
VISION SENSOR
Page 4

- High-quality, precise 2D image of the field of view
- Simple localization, detection, counting and measuring of structures in the image
- High-performance reading of ID codes (printed, directly marked (DPM))
- Transfer of results and image via various interfaces

PS-30
PROFILE SENSOR
Page 12

- Secure comparison of the taught reference profile with the live profile of the inspection object
- Accurate position transfer in mm through calibration of the sensor
- Distinction accuracy of 0.5 mm
- Data and status reporting via IO-Link

OUR FLEXIBLE ONE
THE CS-60 VISION SENSOR

ALSO FOR MORE CHALLENGING APPLICATIONS.

The CS-60 Vision Sensor impresses with its powerful, upgradeable scope of software, clever and robust illumination concept, its M12 interchangeable lenses, and extensive optics accessories. Thanks to high-performance image processing tools and the quickly configurable nVision-i software, optimal performance and smooth startup are guaranteed.

Comprehensive focal lengths through M12 interchangeable lenses

for satisfying all common application requirements in the industrial vision sensor area

Integrated high power LED illumination in red and white

Illumination can be switched in the software for optimal startup at high speed and at a large working distance.

High-performance image-processing tools and a user-friendly, intuitive software interface

ensure simple and seamless integration

Image correction and calibration

for improving image quality and conversion of pixel values to real values (mm)

Upgrade function

The modules “Measurement” and “1D and 2D code reading” can be acquired separately or together as a software expansion to the standard module (Localization, Detection, Counting) with a simple license model.

More on page 7

Reliable and fast: The ID Read tools for all common 1D and 2D code types

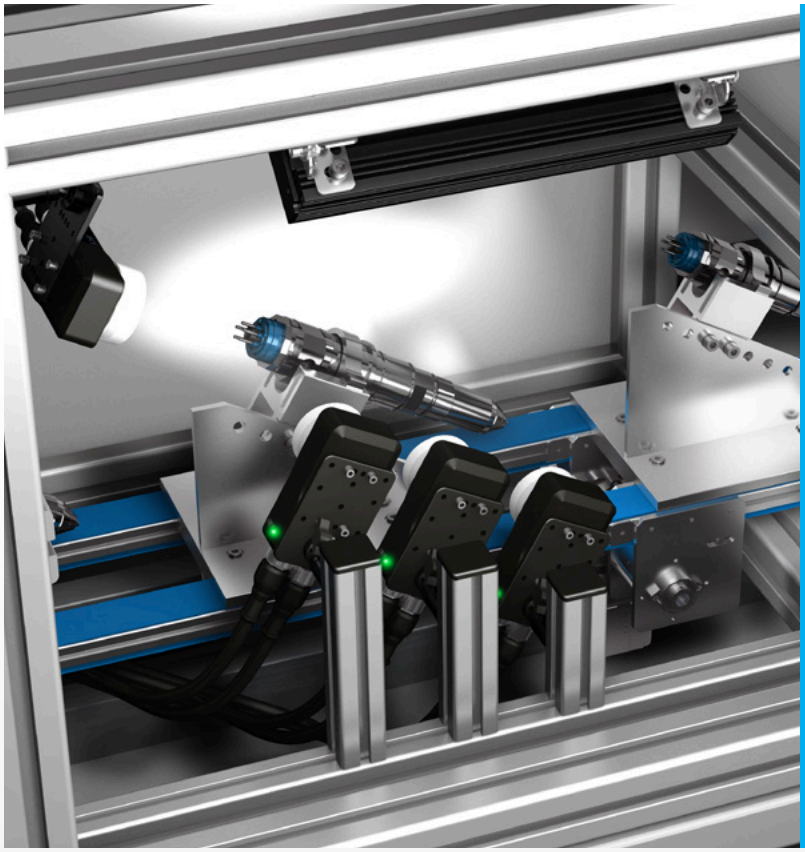
(Optional upgrade)

Supports industry protocols

Digital I/O, TCP/IP, Profinet, HTTP, FTP/SFTP and ReST-API are supported

Robust, compact housing with protection class IP67

For use in wash-active factory environments without attaching additional protective equipment



Quality inspection of components

A product is checked for the required quality before packaging. Different product characteristics and image field sizes make the highest demands on the flexibility of the Vision Sensor and on illumination.
For an optimal inspection image, the direct bright field illumination, integrated in the CS-60, with various filter attachments and indirect through-light with the BE-B barlight come into use.

Completeness inspection with the transfer of position to parts handling

The product quality and position is checked by the CS-60 at the interface to the next process step. Through its adaptation options relating to working distance and image field (changing lenses), as well as the internal high power illumination, the CS-60 delivers the depth of field required for the representation of the entire product characteristics in the inspection image. The robot is thus enabled to grasp safely.

CS-60 VISION SENSOR – NVISION-I SOFTWARE

SAVE TIME

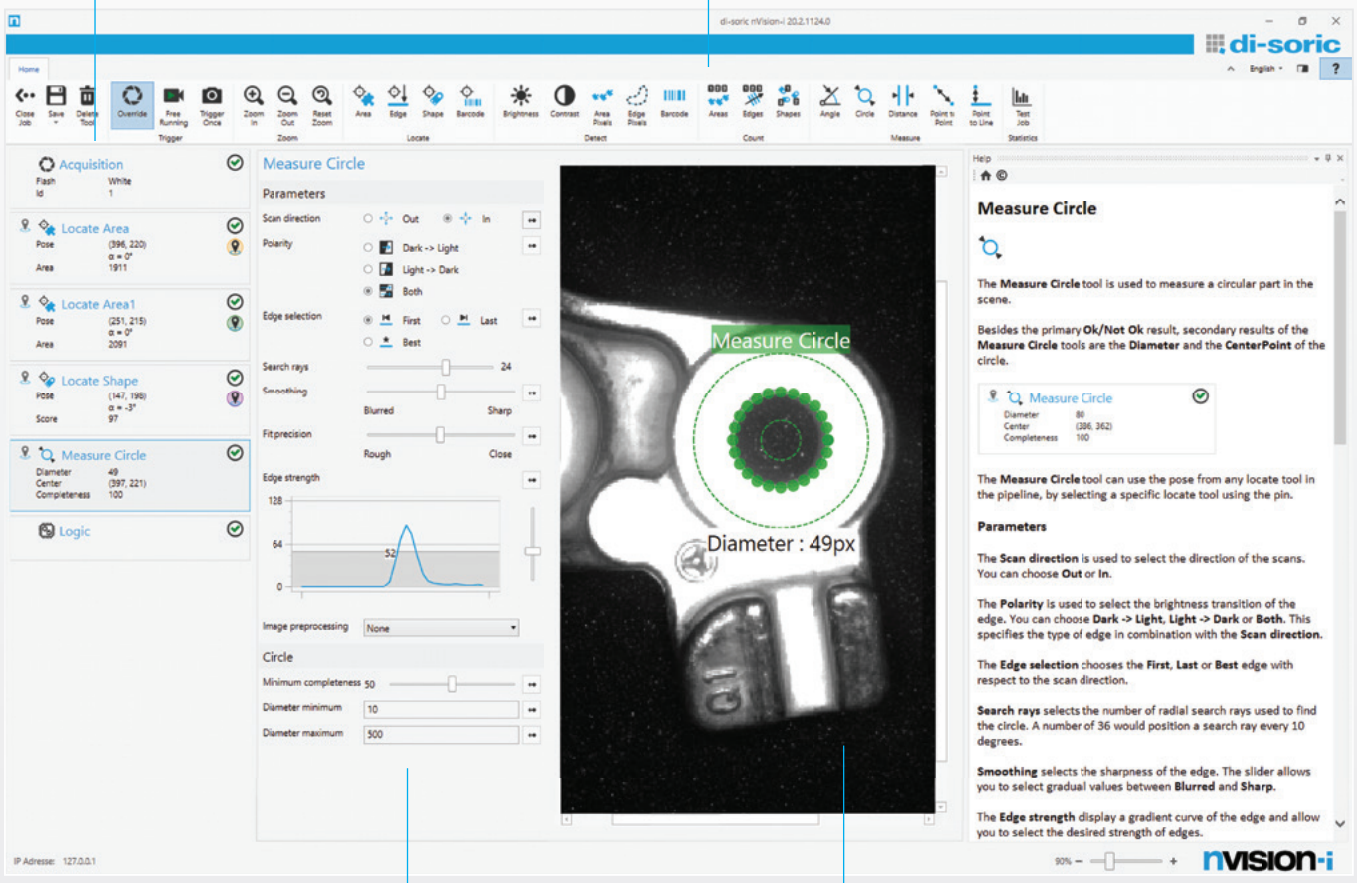
Not just because of the interface which is clear, intuitive and simple to operate, but also because of the high-performance tools, which are consistently optimized at the highest quality and with the highest level of performance.
The visualization of the pipeline and linking of individual tasks in the Logic tool make the greatest degree of flexibility and high speed in the realization of the application possible.

Pipeline & status checks

- Inspection tools can be inserted here and moved via drag & drop
- Measured values and inspection results/status are shown here

Navigation bar & inspection tools

- Intuitive and user-friendly navigation menu
- Contextual help can be displayed as needed
- Menu guidance available in 4 languages (German, English, French, Chinese)



Configuration

- Parameters for search criteria can be set simply and directly
- Threshold values for the evaluation criteria can be entered easily

Display & drawing tools

- Image viewing for the control and analysis during operation
- Context-sensitive description of the tools on the right side to ensure optimal tool use with their complete functionality

YOU ONLY PAY FOR WHAT YOU NEED

With the option of adding additional tools at anytime - but not until you need them. The second option is a customization to the software for tailored solutions:
Desired functionality and operation with a look & feel in your own design.

CS-60 – Standard Tool Set
Localization - Detection - Counting

Measurement module

Reading 1D/2D Codes module

Complete modules:	Complete modules:	Complete modules:
Localization	Localization	Localization
Detection	Detection	Detection
Counting	Counting	Counting
–	Measuring	Measuring
Reading 1D/2D Codes	Reading 1D/2D Codes	–

The standard model of the CS-60 with the tool set Localization, Detection and Counting can be expanded with additional functions such as Measuring and Reading of 1D & 2D Codes after purchasing the device via simple licensing.

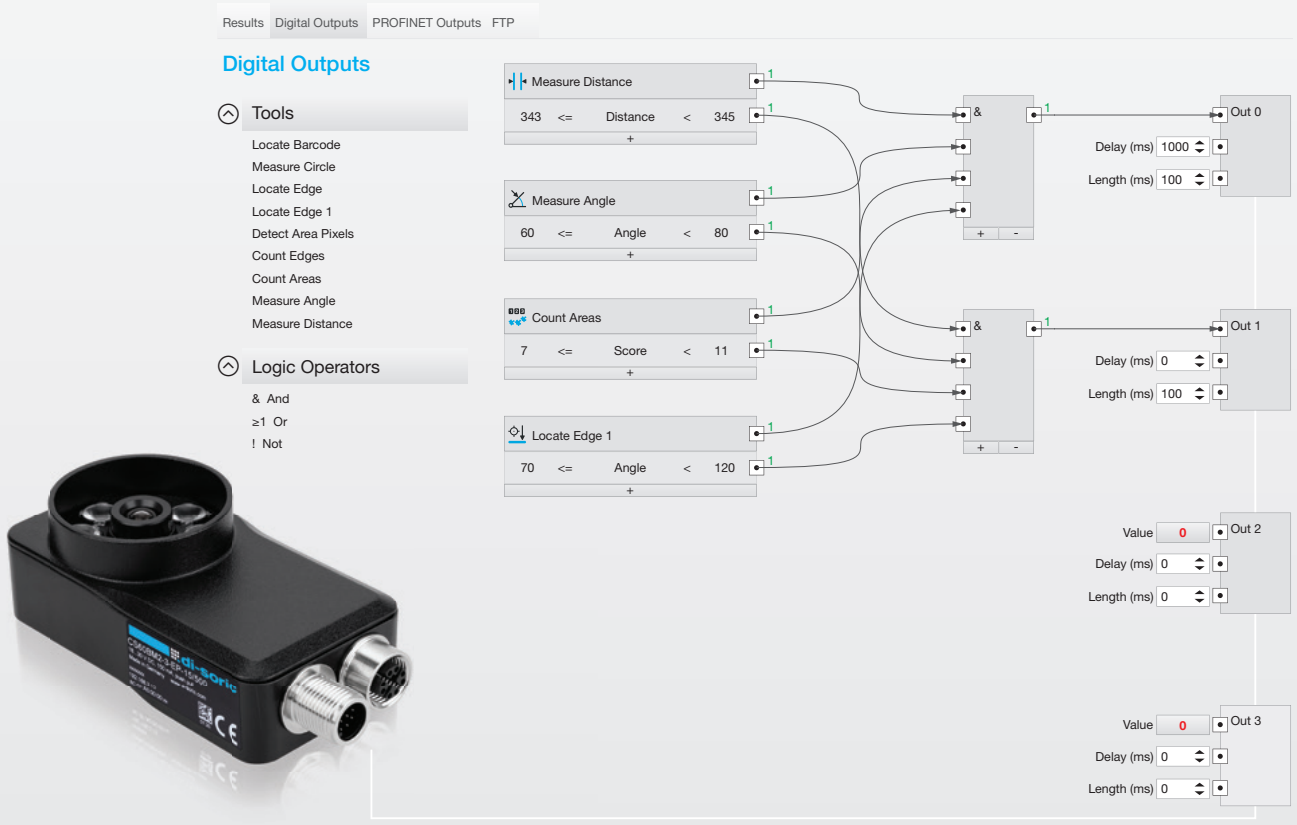
Sending in the device serial number is all that it takes to purchase an upgrade license.

This license is entered via the user interface and the expanded functionality of the software is enabled and available immediately.

It is therefore no longer necessary to replace the vision sensor due to changing application requirements.

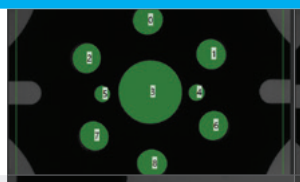
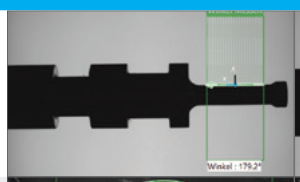
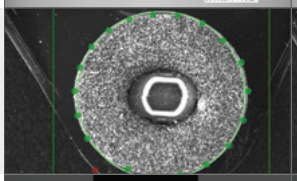
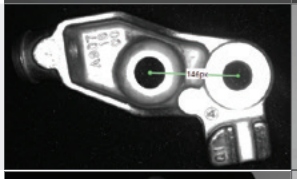
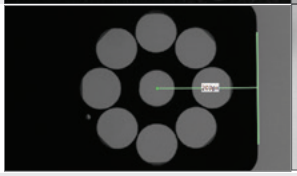
THE LOGIC TOOL
THE LINKING OF RESULTS TO OUTPUTS

Through the free linking of the results of several tools into an overall result directly in the Vision Sensor you get a high-performance – without PLC load.
Another advantage is the high degree of flexibility: the measured values or results can be addressed at any point on the Profinet field bus.



FAST AND SIMPLE
THE IMAGE PROCESSING TOOLS

Via comprehensive image processing tools, both the verification of the quality and completeness of parts is possible as well as their localization and the transmission of determined positions by way of various communication interfaces. Demanding tasks, such as quality inspections of highly reflective objects and applications in changing ambient lighting situations or at high speeds are reliably performed.

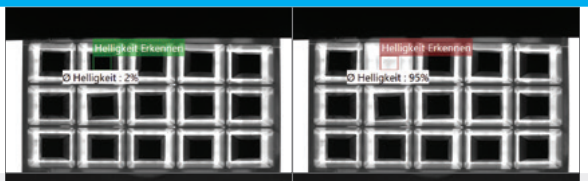
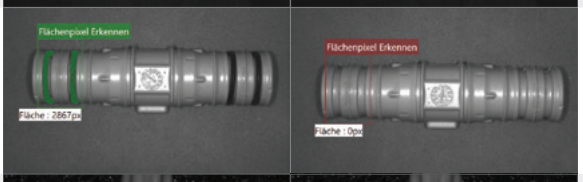
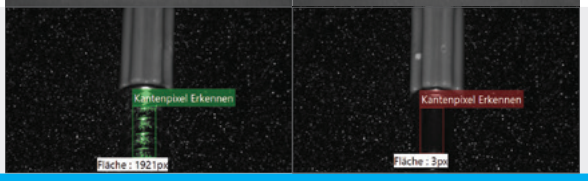
COUNTING of areas, edges and shapes			✓
AREAS	Determines the number of contiguous dark or bright regions		
EDGES	Determines the number of edges along a line/search beam		
SHAPES	Identifies and counts objects whose contour matches the learned contour		
MEASUREMENT of angles, diameters, distances and spacings in mm and pixels			+
ANGLE	Determines the angle of an edge		
CIRCLE	Determines the diameter and circularity		
DISTANCE	The slider determines the distance between 2 edges		
POINT-TO-POINT	Measures the distance between 2 contour patterns, 2 circles or mixed points		
POINT-TO-LINE	Measures the distance between a point (from blob, contour pattern, circle or edge) and a line/edge		

✓ Available + Available after upgrade

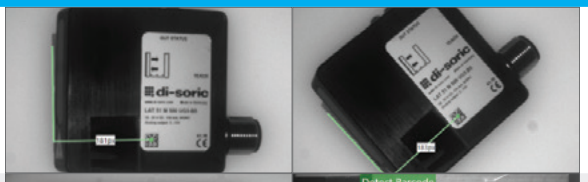
LOCALIZATION of areas, edges and shapes

AREA	The tool “Localize area” is used in order to localize a part in a scene using Blob analysis	
EDGE	Finds an edge within the defined search field and serves as a guide for subsequent tools	
SHAPE	Compares learned patterns within the defined working area and also serves as position correction for subsequent tools	

DETECTION OF THE presence/absence of a feature based on pixel values and contrast

BRIGHTNESS	Detects the average brightness as a function of the threshold range within a defined area in the image	
CONTRAST	Detects the contrast as a function of the threshold range within a defined area in the image	
AREA PIXELS	Detects the number of pixels as a function of the threshold range within a defined area in the image	
EDGE PIXELS	Detects the number of edge pixels as a function of the threshold range within a defined area in the image	

LOCALIZE AND READ 1D and 2D codes

LOCALIZATION	Finds a code within the defined search field and serves as a guide for subsequent tools. Efficient for label fit check	
READ	Decodes all codes and can evaluate the content using different criteria (regular expressions)	
COUNTING	Enables multiple recognition of different codes	

Available Available after upgrade

TECHNICAL DATA
CS-60

	CS60-BM28-EP15/300	CS60-BM28-EP15/300ID	CS60-BM28-EP15/400	CS60-BM28-EP15/400ID	CS60-BM38-EP15/300	CS60-BM38-EP15/300ID	CS60-BM38-EP15/400	CS60-BM38-EP15/400ID
Standard Tools								
▪ Localization	■	■	■	■	■	■	■	■
▪ Part recognition	■	■	■	■	■	■	■	■
▪ Counting	■	■	■	■	■	■	■	■
▪ Measuring			■	■			■	■
▪ Read code		■		■		■		■
Upgrade options:								
▪ Measurement module	■	■			■	■		
▪ Reading 1D& 2D Codes module	■		■		■		■	
▪ Customization module	■	■	■	■	■	■	■	■

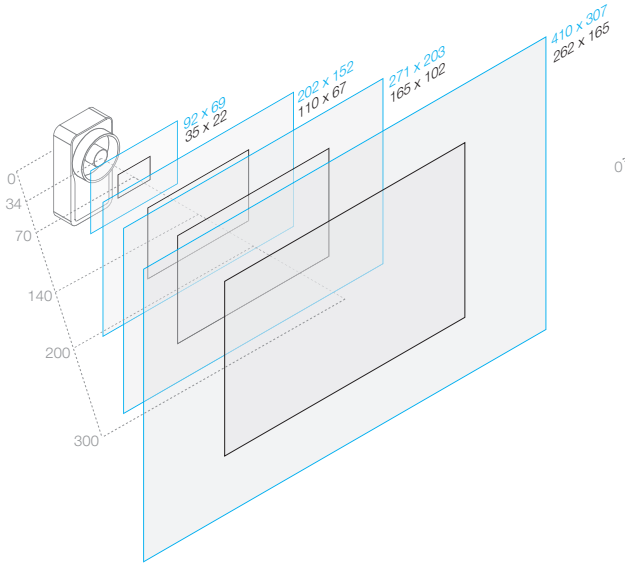
CMOS type	EV76C541	IMX 273
Optical format	1/4"	1/2.9"
Resolution	736 (H) x 480(V)	1440 (H) x 1080 (V)
Pixel size (µm)	4.5 x 4.5	3.45 x 3.45
Shutter	global	global
Max. image frequency (fps)	30	30

Scope of delivery	CS-60 Vision Sensor, lens O-S1-S-080-40, lens cover CS60-Window
Housing dimensions H / W / D	85 / 45 / 34 mm
Service voltage	18 to 30VDC
Working distance	1 Vision Sensor with S-mount - 4 lenses: 50 – 1500 mm
Focal length	Variable - S-mount: 3.6, 8, 16, 25 mm
Internal lighting	Switchable integrated illumination: High Power red, High Power white
Storage / number of jobs	16 GB / to 255
Focusing	Variable focus with aperture 4 and 8
Interfaces & protocols	Digital I/O, TCP/IP, Profinet
Digital inputs / outputs	2 + 1 external trigger / 4 + 1 ready signal
Image storage	Via FTP / manually in the software
Protection class	IP67

FIELDS OF VIEW
CS-60

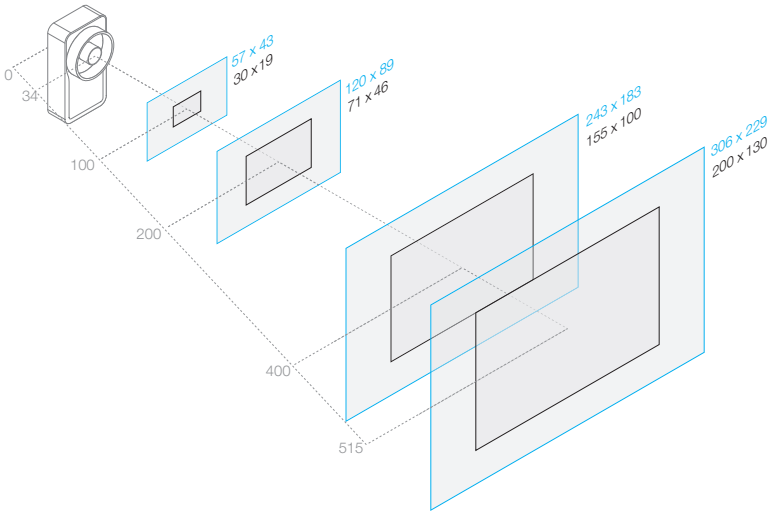
The following table shows the representation of fields of view with the available lenses at various working distances for the CS-60 with 736 x 480 pixels (0.3 MP) and 1440 x 1080 pixels (1.58 MP). Working distance: Back edge sensor to worktop.
Depth of sensor: 34 mm.

Field of view, 3.6 mm lens [1]



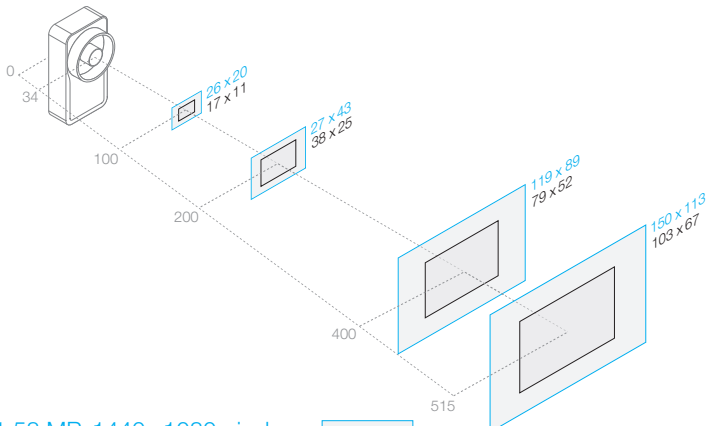
1.58 MP, 1440 x 1080 pixels
0.3 MP, 736 x 480 pixels
Working distance -----
All specifications in mm

Field of view, 8 mm lens



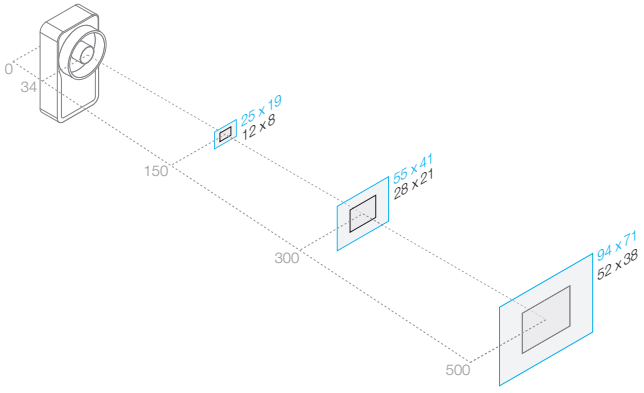
[1] At 3.6 mm, FOV limited at 1.58 MP if lens cover is used. No IP67 protection with complete FOV.

Field of view, 16 mm lens



1.58 MP, 1440 x 1080 pixels
0.3 MP, 736 x 480 pixels
Working distance -----
All specifications in mm

Field of view, 25 mm lens [2]



[2] Below 250 mm, the lens cover can no longer be used and thus no longer ensures IP67 protection.

PS-30
PROFILE SENSOR

PS-30 PROFILE SENSOR – UNCOMPLICATED AND FLEXIBLE FOR PRECISE MEASUREMENTS AND INSPECTION TASKS

The optoelectronic PS-30 Profile Sensor is ready to use in just a few steps and captures profiles of various objects per laser line scan. Up to 10 target profiles simplify the inspection and measurement of changing objects on the same production line.
The PS-30 checks not only for the presence of an object, it also determines whether the actually intended component is used and correctly attached. Improve your product quality and increase your production efficiency with the PS-30 Profile Sensor.

Minimize costs and installation effort

Can be used out-of-the-box:
Quick start-up with teach buttons and a display on the sensor

Ambient light immunity:
no shielding or external illumination necessary

Distance- and color-independent measurement:
High tolerance with object positioning

Higher production efficiency

Up to 10 target profiles for simplified inspection of changing objects on the same production line can be stored

Sustained decrease in the rejection rate

Simplified error analysis via IO-Link

Improvement of your product quality

Ensuring correct and complete assembly and processing

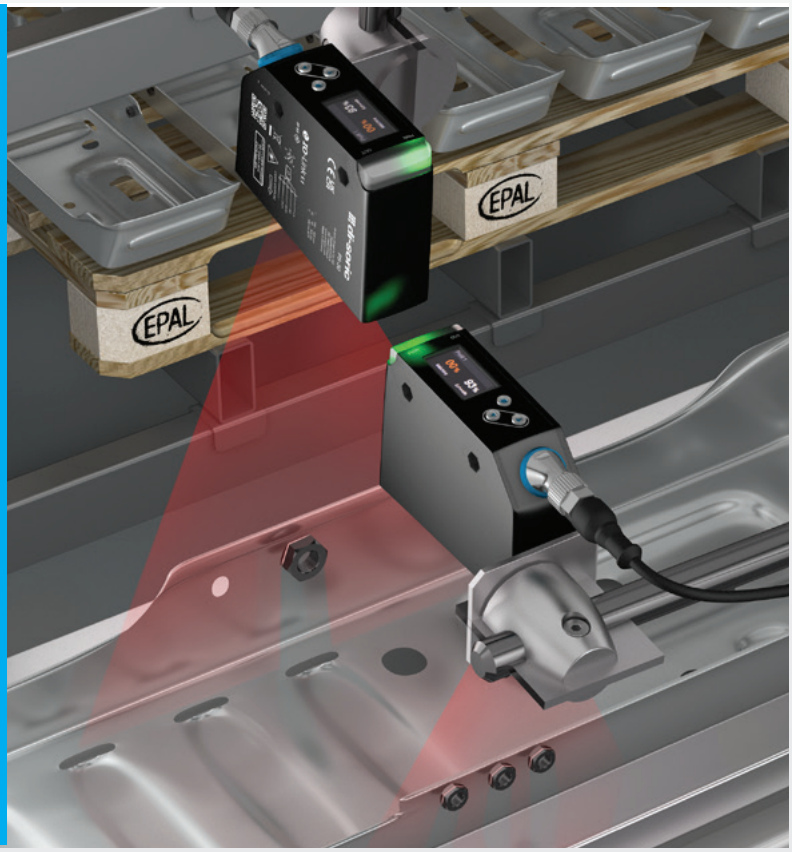
IO-Link IP65

Inspect reference distance and position between bearing and shaft

A journal and a bearing ring must be subjected to a type verification and position determination prior to final assembly. With simple learning of the desired journal profile, both can be determined with the PS-30.

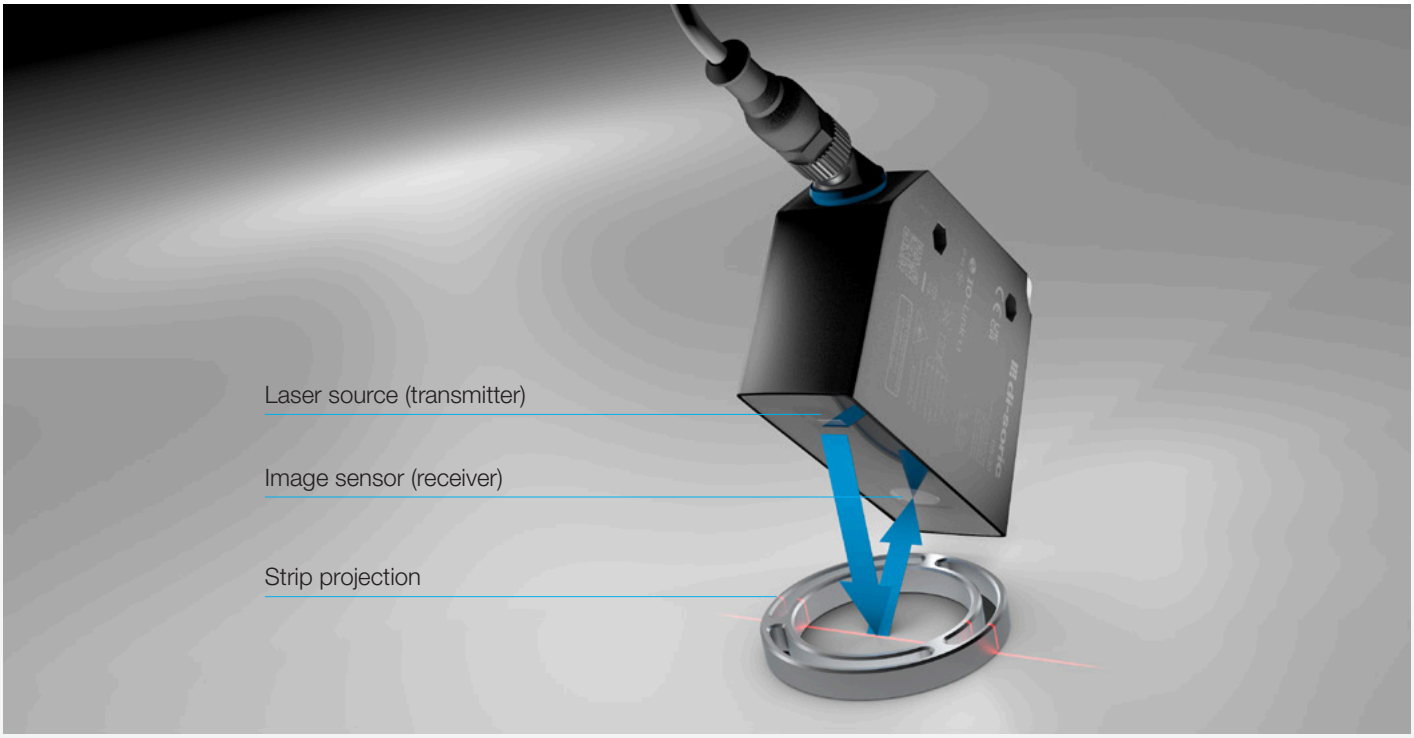
Welding nuts inspection

The nuts welded on to the profile carrier need to be checked for presence and position. The PS-30 detects not only the presence of nuts, but also compares the position in the x and z directions with a previously learned pattern. The results are transmitted numerically via IO-Link or the digital IO interface as an OK/ not-OK result.

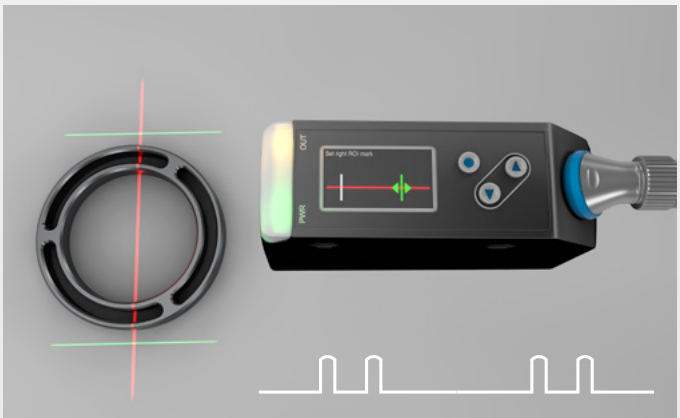


INLINE QUALITY INSPECTION
WITH THE PS-30

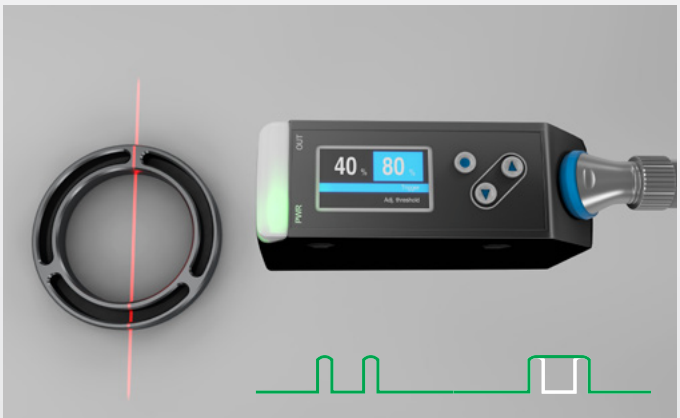
The PS-30 will meet your difficult challenges. By means of the light section method, it reliably detects the profile of objects and determines differences from 0.5 mm. Through the comparison of the actual height profile with the predefined height profile, a correct assembly, use, orientation and processing of the component can be checked.



The inspection region can be delimited to relevant sections thanks to the region-of-interest function (ROI). Two green markers visualize the selected ROI on the laser line. By means of the ROI function, minimal gap deviations (e.g. in the case of unplugged plug connection) are also detected in addition to the presence or absence of the smallest components.



ROI markers on the component to be learned with reference profile



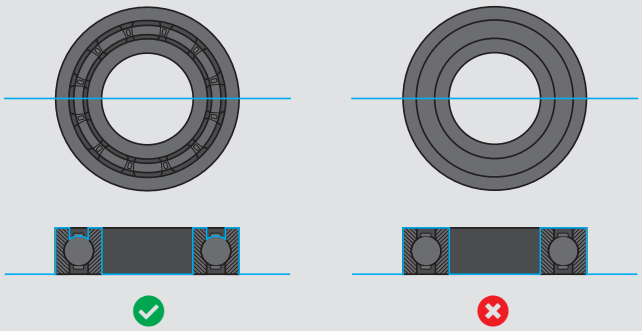
Non-conforming component (white: Reference profile, green: Live profile)

SORTING AND ORIENTATION

The PS-30 differentiates parts which can barely be distinguished from one another. The correct position of the objects is checked in the continuous process. Bad parts can thus be safely detected and sorted out.

Your advantages

- Detect error sources early on and eliminate them
- Minimize rejection rate in the long term
- Prevent consequential damage due to installed bad parts

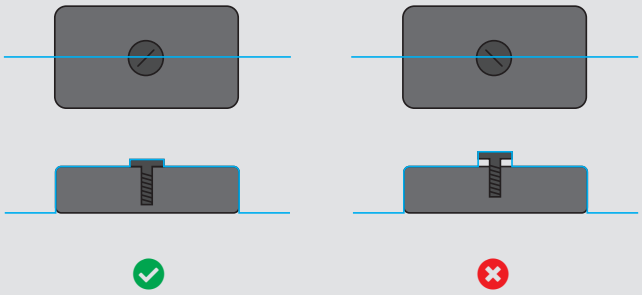


COMPLETE AND CORRECT ASSEMBLY

The correct and complete assembly of, for example, seal rings or screw-in depth of screws is reliably checked by the PS-30 Profile Sensor.

Your advantages

- Detect incomplete components and add on if necessary
- Readjust or sort out incorrectly assembled components
- Prevent leaks or instabilities

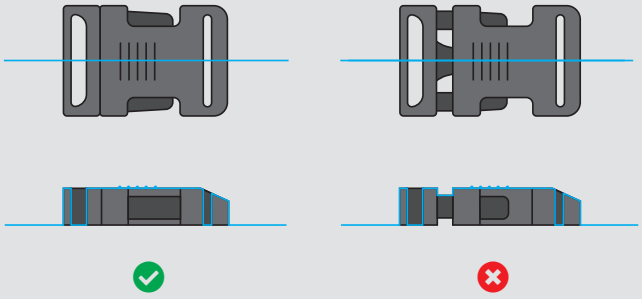


GAP CHECKING

The PS-30 checks whether seals are fastened through a focused contour comparison for the relevant profile section.

Your advantages

- Detect and rework incorrectly assembled components

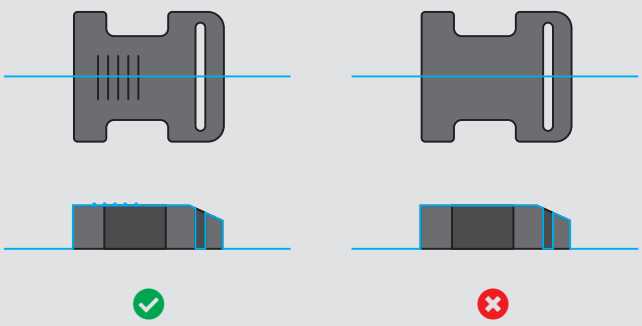


PROCESSING CHECKING

Using the contour, the PS-30 distinguishes processed and unprocessed parts.

Your advantages

- Surface structure makes possible conclusions concerning possible errors in the system (e.g. unprocessed workpieces due to a machine error)



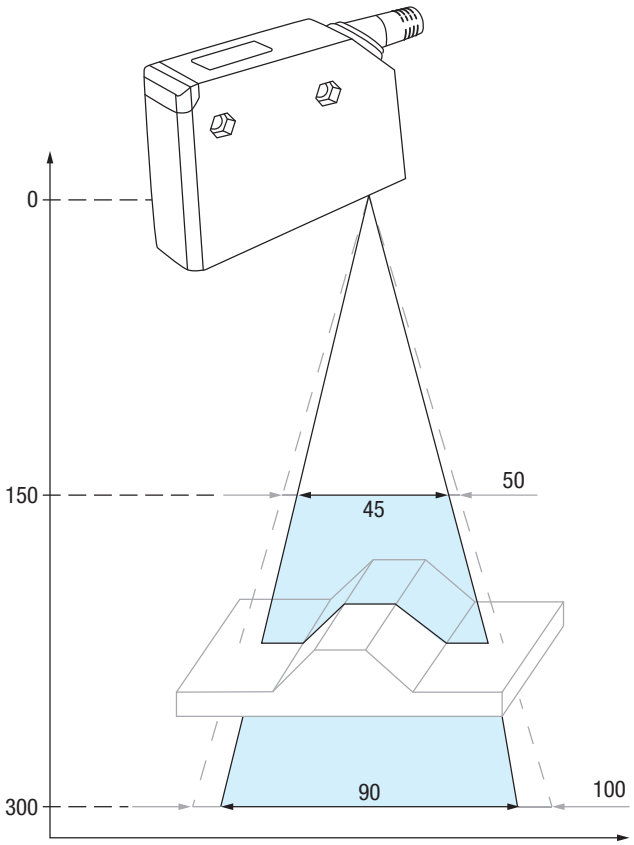
TECHNICAL DATA
PS-30

PS-30

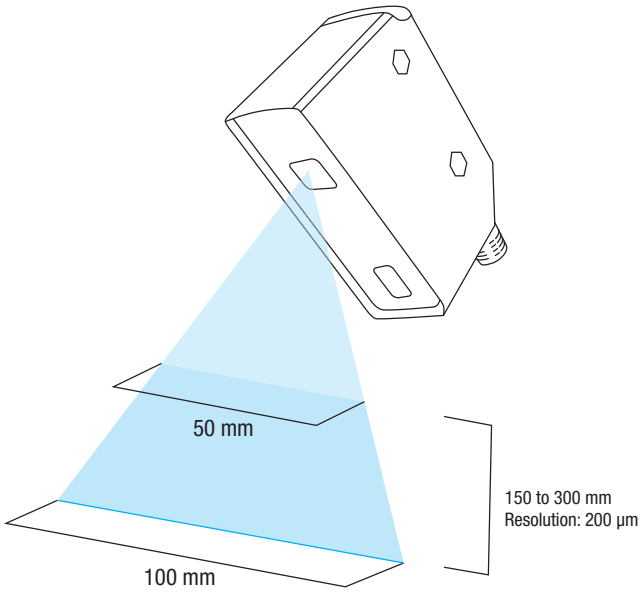
Reference parameters	+20°C, 24 VDC
Power consumption	< 200 mA
Housing dimensions H / W / D	88 / 65 / 28.5 mm
Housing material	Die-cast zinc (black)
Weight	535 g
Protection class	III, operation on protective low voltage
Storable profiles	10
Number of inputs/outputs	1 (digital) / 2 (digital)
Switching output	pnp/npn, 100 mA, NO/NC parameterizable
Interface	IO-Link V1.1, COM3
Profiles	Smart Sensor: Process Data Variable, Device Identification, Device Diagnosis
Light source	Laser
Light color	Red
Wavelength	650 nm
Laser class	1 (IEC 60825-1)
Ambient light immunity	20 kLx
Measuring range	150 to 300 mm
Measured value resolution	X-axis 0.25 mm, Z-axis 0.2 mm
Measuring frequency	5 Hz
Protection type	IP65
Connection	Connector, M12, 5-pin

MEASURING RANGE
PS-30

Working and lateral detection region



Scanning field of laser (transmitter)



Field of view image sensor (receiver)

ACCESSORIES
MACHINE VISION

CUSTOMIZED ACCESSORIES

It is not only the quality of the sensors that plays a major role in the process-reliable detection of parts and objects. The accessories are also very important. They can ensure flexible, stable mounting, secure signal transmission and much more.

LIGHTS FOR VISION SENSORS

There are applications that require the illumination of objects. di-soric has an extensive portfolio of lights for industrial image processing and identification that satisfy these requirements. Further information can be found in the brochure “Vision ID Lights” or on our website www.di-soric.com.

ID READER
FIXED-MOUNTED AND HANDHELD

IDENTIFICATION SOLUTIONS

In a smart factory, production logistics is another important factor. Identification solutions are required for the detection and localization of parts, product carriers, products, packaging, etc. from incoming goods to final shipping. di-soric offers fixed-mounted or mobile code readers for reading 1D and 2D codes in its portfolio.

YOU WANT MORE?

Further information can be found in our brochure “Vision.ID Lighting Systems” and “ID Reader Fixed mounted and Handheld” and on our website: www.di-soric.com

Would like to speak directly with one of our employees?

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