MACHINE VISION

VISION SENSORS

di-soric

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

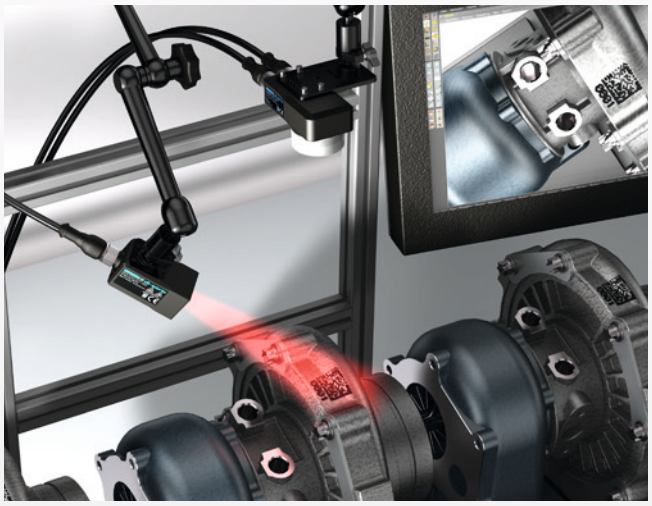
FLEXIBLE PRODUCTION SYSTEMS

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.

Automated exchange of information

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 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.



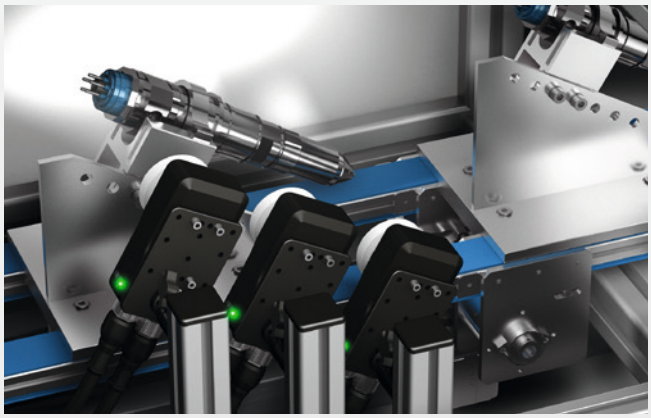
Optimal application solutions with the di-soric Machine Vision sensors

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 selectionof the optimal sensor

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



VISION 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

Accessories: S-Mount
Interchangeable lenses

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.

User-friendly, intuitive software and high-performance image-processing tools

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 „Measure“, „ID“ and „ID Pro“ modules can be acquired separately or together as a software expansion to the standard module (localization, detection, counting) via a simple licensing model. More on page 9.

Reliable and fast: The ID Read tools

for all common 1D and 2D code types and easily recognizable, directly marked DPM codes (Optional ID Pro upgrade available)

Supported industrial protocols

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

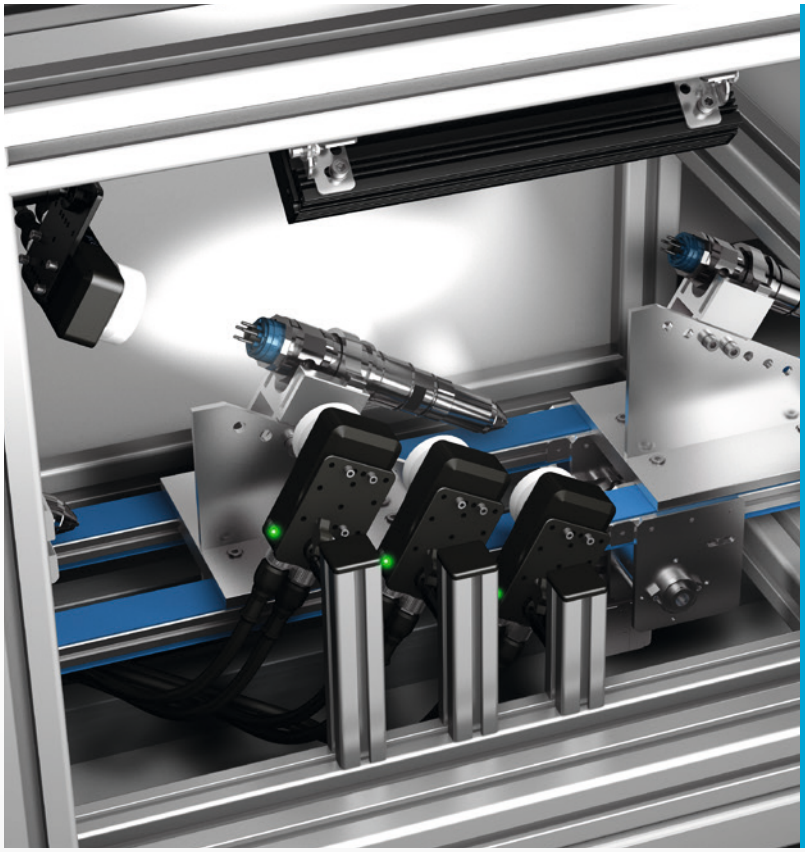
PROFINET INDUSTRIAL ETHERNET

EtherNet/IP

IP67

Robust, compact housing with 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

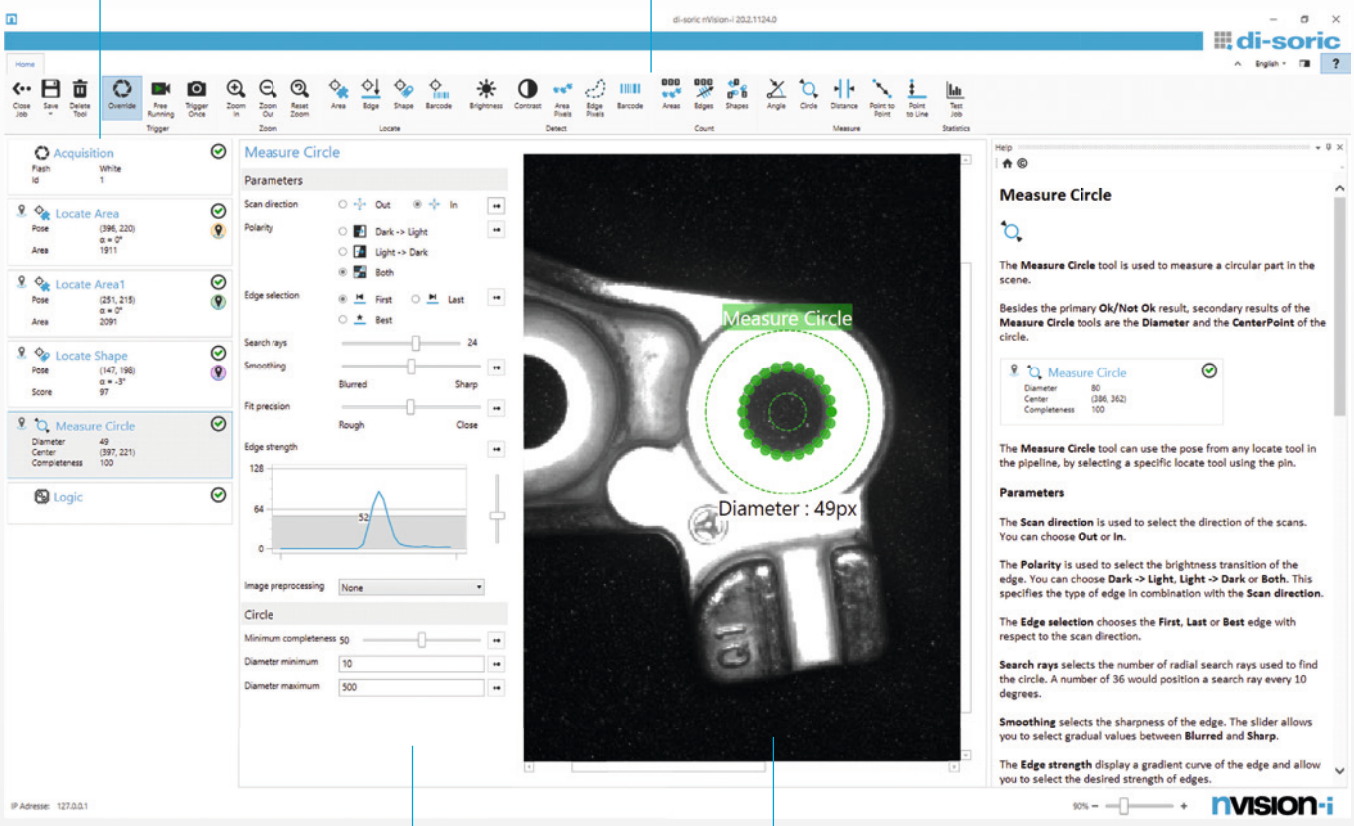
Not just because of the interface which is clear, intuitive and simple to operate, but also because of the high-performance tools, which are consistently optimized at the highest quality and with the highest level of performance.
The visualization of the pipeline and linking of individual tasks in the 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 7 languages (German, English, French, Italian, Spanish, Chinese and Korean)



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-hand side to optimize the use of the tools with their full functionality

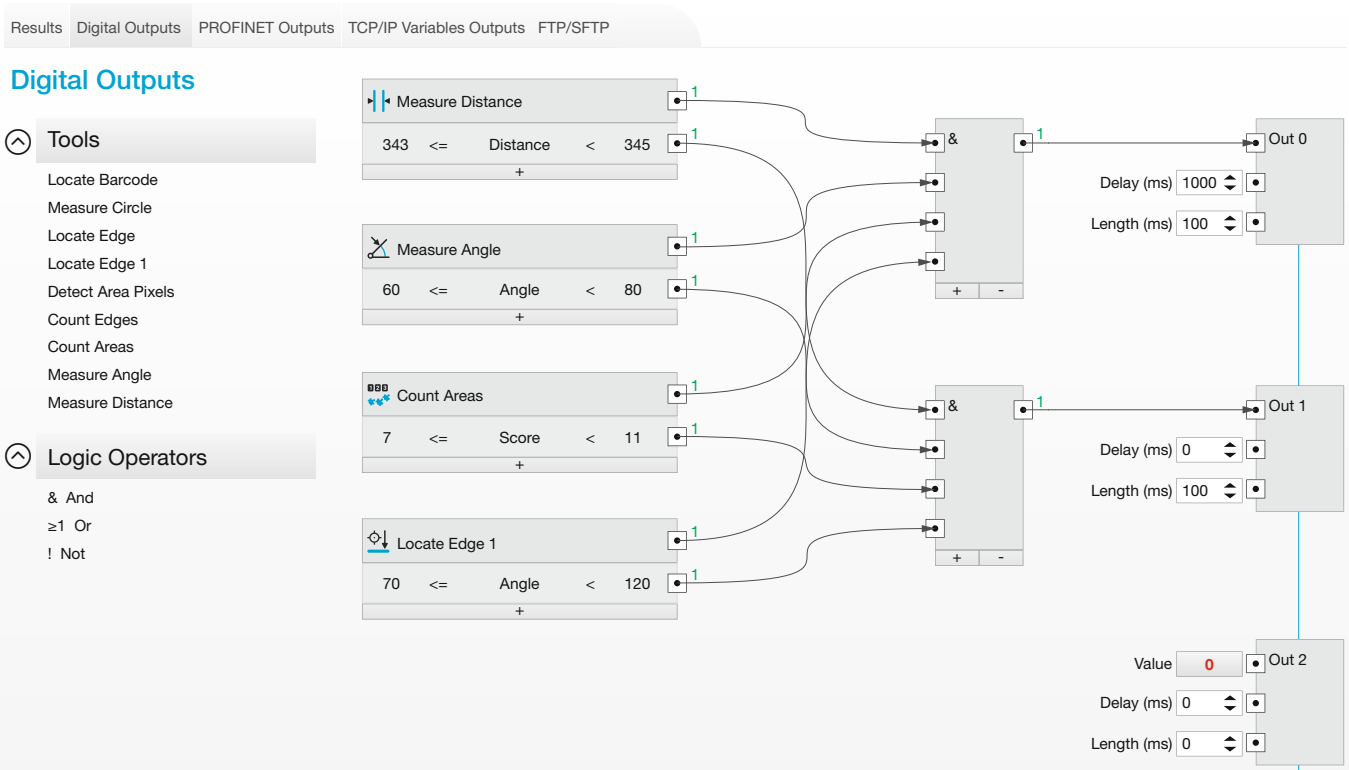
Integrated image optimization

With just 2 clicks, nVision-i can be used to easily eliminate distortions and shading at the edge of the image through calibration.

CS-60 vision sensors therefore have the ability to reliably perform all detections across the entire field of view.

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.



Quick familiarization, no training required

The graphic-oriented logic tool is based on a function block diagram (FBD), which means that even more complex functions can be clearly displayed. This in turn enables simple and easy-to-understand implementation of the behavior of the inputs and outputs.

This eliminates the need for training, as the procedure is already familiar from day-to-day PLC programming.

VISION SENSOR CS-60
NVISION-I SOFTWARE

WEB-HMI - The web interface of our vision sensors
Visualization of test results in the web browser

The display of inspection results in the web browser, which is easy to understand even for untrained employees, has become indispensable for monitoring processes. The web interface of our vision sensors impresses with a complete overview of the tools with measured values and frames directly in the image.

Pipeline & status checks

- Display of the inspection tools
- Measured values and inspection results/status are shown here

Visualization

- Intuitive filtering of the visualized inspection tools and their results in the image window via checkboxes: simply switch areas and results to be displayed on or off

Visualization in the image

- Inspection results are displayed directly in the image windowt

Result display

- Green frame and ⊘: OK
- Red frame and ⊗: Not OK

History

- Displays the inspection history with status
- Past inspections can be displayed again

Easy access via the IP address

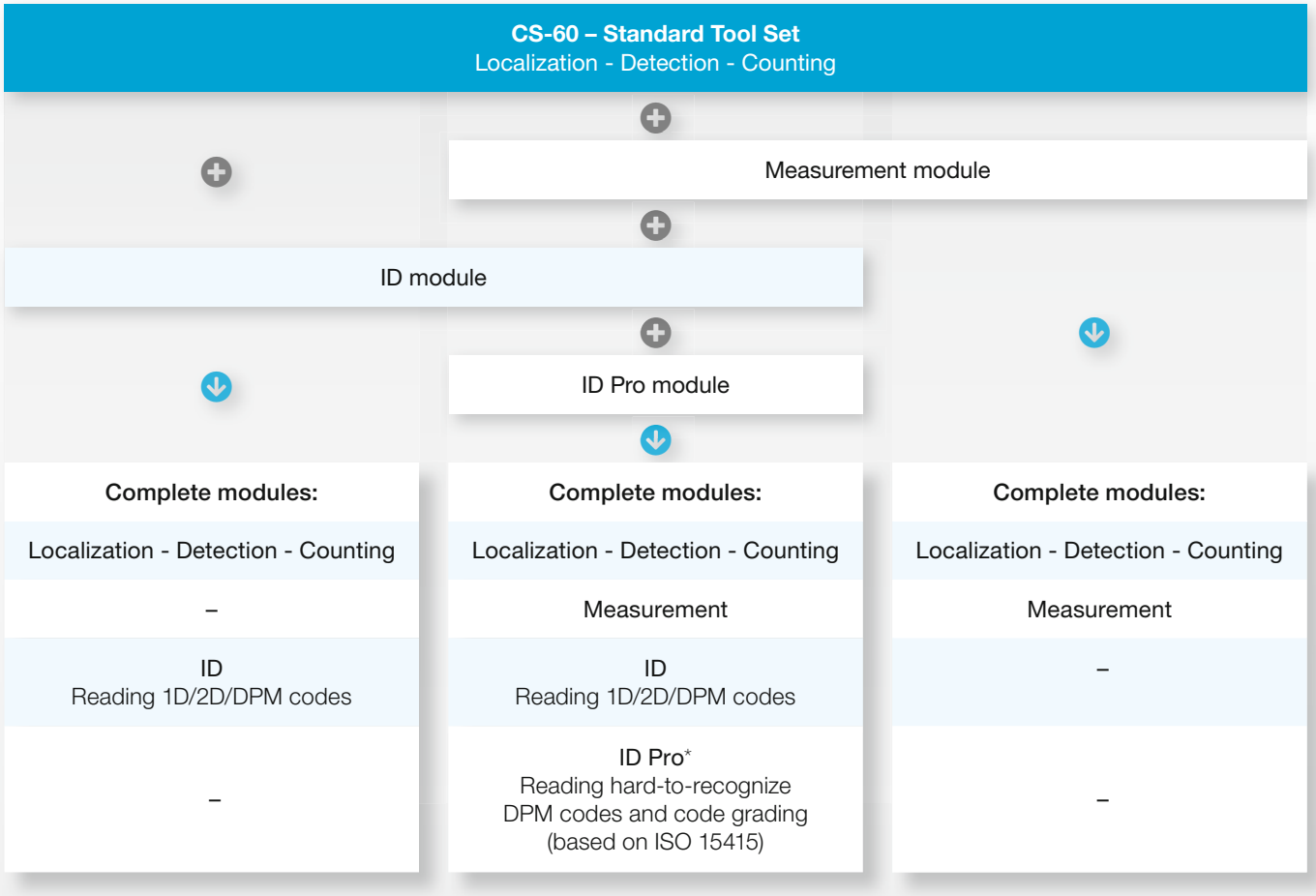
Open the web browser, enter the IP address, return – that‘s all it takes to display the image processing tools used and their results. Live view provides a direct view of the image currently captured in the field of view of the vision sensor, as well as a history of the captured images - filterable according to successful and unsuccessful inspections.

UPGRADES – you only pay for what you need with the option to add more tools at any time

The standard model of the CS-60 with the Localize, Detect and Count tool set can be expanded with additional functions such as measuring, 1D/2D and DPM code reading (ID) as well as the recognition and reading of hard-to-recognize DPM codes with code grading (ID Pro) after purchasing the device via simple licensing.

How is an upgrade carried out?

- 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.



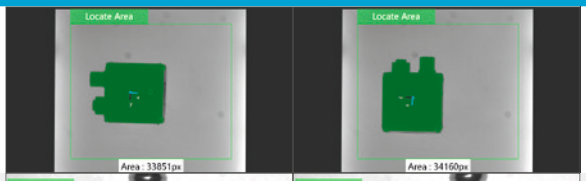
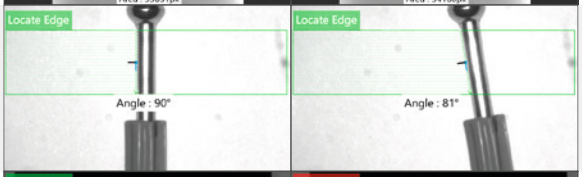
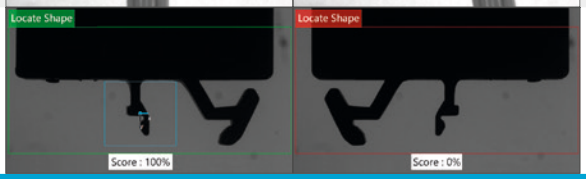
* The ID upgrade ID Pro is only possible on the basis of an existing ID license.

Individual customizations

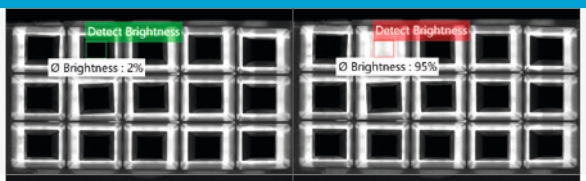
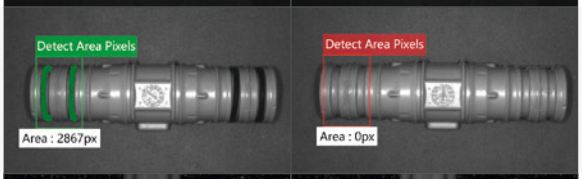
Another available option is customization: the software is adapted for you with the functionality and operation you require in the look and feel of your own corporate design.

FAST AND SIMPLE
THE IMAGE PROCESSING TOOLS

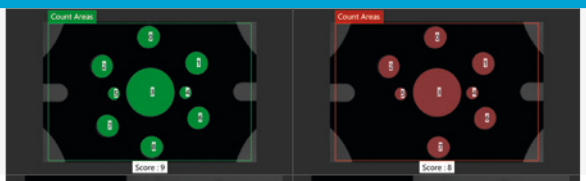
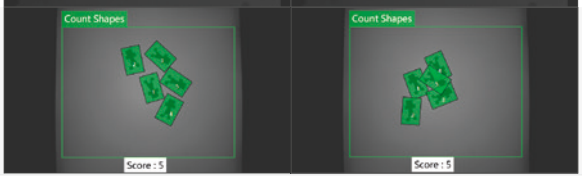
LOCALIZATION of areas, edges and shapes

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

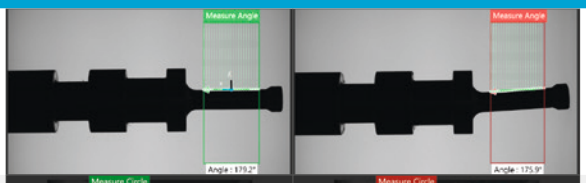
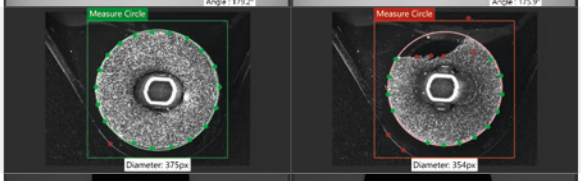
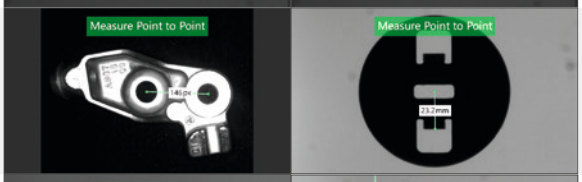
BRIGHTNESS	Detects the average brightness as a function of the threshold range within a defined area in the image	
CONTRAST	Detects the contrast as a function of the threshold range within a defined area in the image	
AREA PIXELS	Detects the number of pixels as a function of the threshold range within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

COUNTING 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	

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.

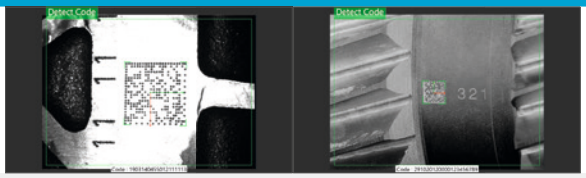
MEASUREMENT: Measurement of angles, diameters, distances and spacings in mm and pixels

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		

ID: Localize, read and count 1D, 2D and DPM codes

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

ID PRO: Read hard-to-read DPM codes on difficult surfaces

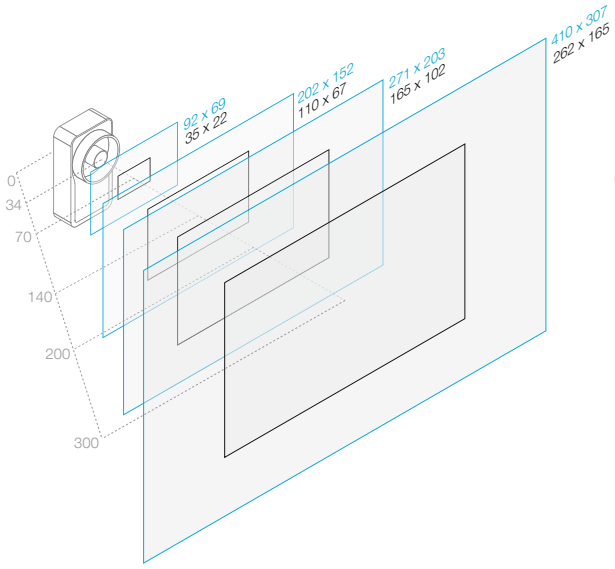
READ DPM CODES	The upgrade enables high-performance reading of hard-to-read directly marked codes on difficult surfaces and code grading		

Available Available after upgrade

FIELDS OF VIEW
CS-60

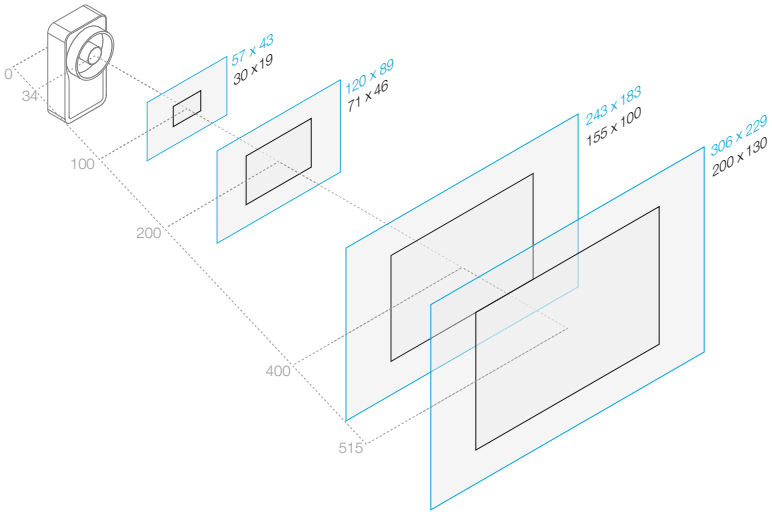
The following table shows the representation of fields of view with the available lenses at various working distances for the CS-60 with 736 x 480 pixels (0.3 MP) and 1440 x 1080 pixels (1.58 MP). Working distance: Back edge sensor to worktop.
Depth of sensor: 34 mm.

Field of view, 3.6 mm lens [1]



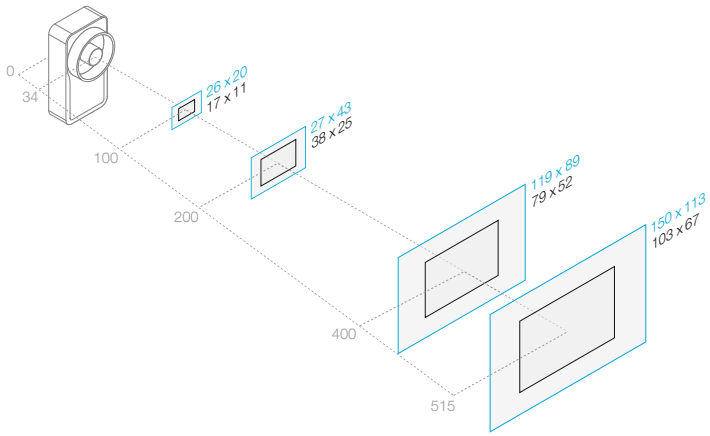
1.58 MP, 1440 x 1080 pixels
0.3 MP, 736 x 480 pixels
Working distance
All specifications in mm

Field of view, 8 mm lens



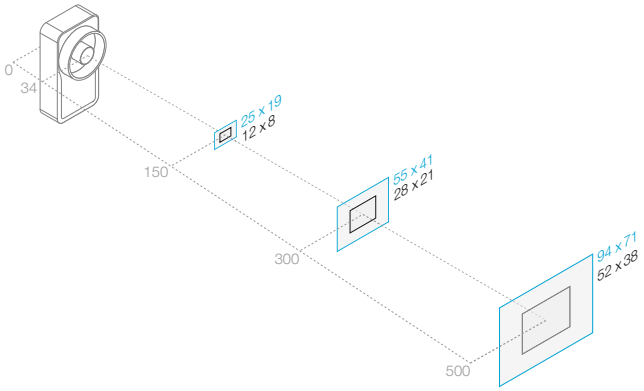
[1] At 3.6 mm, FOV limited at 1.58 MP if lens cover is used. No IP67 protection with complete FOV.

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.

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
Image processing tools								
▪ **Localization**	■	■	■	■	■	■	■	■
▪ **Part recognition**	■	■	■	■	■	■	■	■
▪ **Counting**	■	■	■	■	■	■	■	■
▪ **Measuring**			■	■			■	■
▪ **ID** (Reading 1D/2D/DPM codes)		■		■		■		■
Upgrade modules:								
▪ **Measurement**	■	■			■	■		
▪ **ID** (Reading 1D/2D/DPM codes)	■		■		■		■	
▪ **ID Pro** (ID-Upgrade*) · Read hard-to-recognize DPM codes · Code grading based on ISO 15415	■	■	■	■	■	■	■	■
▪ **Customization** · Customization of the software to requirements / corporate design	■	■	■	■	■	■	■	■

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 ... 30 VDC
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, Ethernet/IP (from nVision-i Release 24.1)
Digital inputs / outputs	2 + 1 external trigger / 4 + 1 ready signal
Image storage	Via FTP / manually in the software
Protection class	IP67

* The ID upgrade ID Pro is only possible on the basis of an existing ID license.

ACCESSORIES
MACHINE VISION

Customized accessories

It is not only the quality of the sensors that plays a major role in the reliable detection and identification of parts and objects, but also the accessories, which can ensure flexible, stable fastenings, reliable signal transmission and much more.

Lighting for industrial image processing

There are applications that have specific requirements for the illumination of objects. di-soric has an extensive portfolio of lights for industrial image processing and identification that meet these requirements..

ID-READER
FIXMOUNT OR HANDHELD

Identification solutions

Production logistics is an important factor in a smart factory. Identification solutions are required for the detection and localization of parts, product carriers, products, packaging, etc. from goods receipt to final dispatch. di-soric has fixed-mounted or handheld code readers for reading 1D and 2D codes in its portfolio for such applications.

YOU WANT MORE?

Further information can be found in our brochures „ID Reader Fixed-mounted and Handheld“ and „Vision.ID Illuminations“ and on our website: www.di-soric.com

Or would you like to speak directly to one of our employees?

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