CS60
::di-soric

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", „ID Pro" and „OCR" 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)
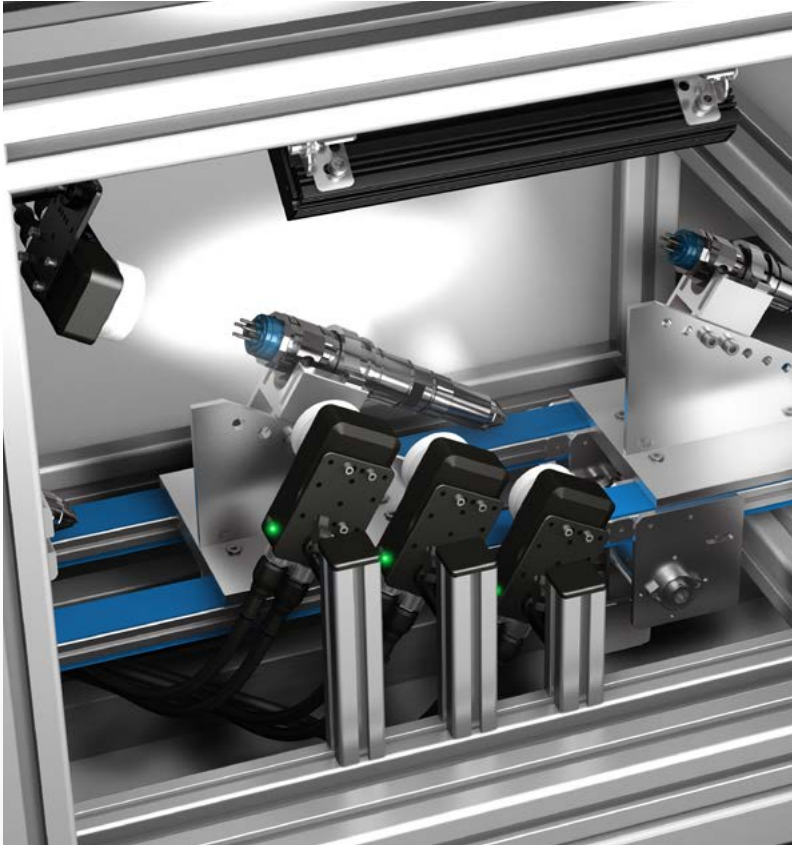
Supported industrial protocols

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

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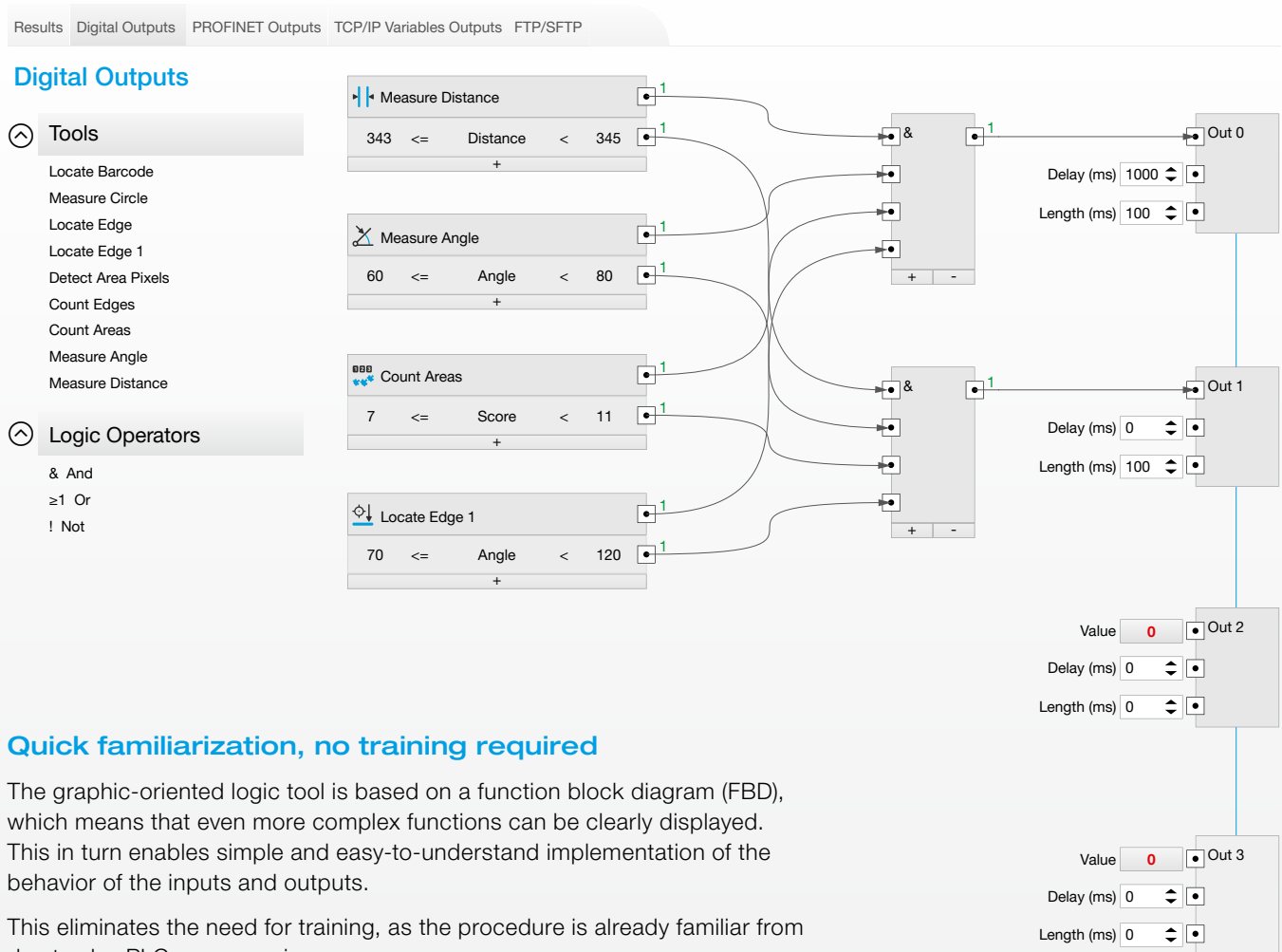
CS-60 vision sensors therefore have the ability to reliably perform all detections across the entire field of view.

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.

Results   Digital Outputs   PROFINET Outputs   TCP/IP Variables Outputs   FTP/SFTP

Digital Outputs

Tools

Locate Barcode
Measure Circle
Locate Edge
Locate Edge 1
Detect Area Pixels
Count Edges
Count Areas
Measure Angle
Measure Distance

Logic Operators

& And
≥1 Or
! Not

Measure Distance				1
343	<=	Distance	<	345	1
+				

Measure Angle				1
60	<=	Angle	<	80	1
+				

Count Areas				1
7	<=	Score	<	11	1
+				

Locate Edge 1				1
70	<=	Angle	<	120	1
+				

& → 1 → Out 0
Delay (ms) 1000
Length (ms) 100

& → 1 → Out 1
Delay (ms) 0
Length (ms) 100

Out 2
Value 0
Delay (ms) 0
Length (ms) 0

Out 3
Value 0
Delay (ms) 0
Length (ms) 0

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, DPM code reading (ID) and OCR 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.

CS-60 – Standard Tool-Set: Localization - Detection - Counting			
+			+
Measurement module			Measurement module
	+		+
	ID module		ID module
	+		+
⬇	ID Pro* module	+	ID Pro module
			+
	⬇	OCR module	OCR module
		⬇	⬇
Complete modules:	**Complete modules:**	**Complete modules:**	**Complete modules:**
Localization - Detection - Counting	Localization - Detection - Counting	Localization - Detection - Counting	Localization - Detection - Counting
Measurement	–	–	Messen
–	ID Reading 1D/2D/DPM codes	–	ID Reading 1D/2D/DPM codes
–	ID Pro* Reading hard-to-recognize DPM codes and code grading (based on ISO 15415)	–	ID Pro* Reading hard-to-recognize DPM codes and code grading (based on ISO 15415)
–	–	OCR Character recognition	OCR Character recognition

* 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.

NVISION-I
# THE IMAGE PROCESSING TOOLS

Fast and simple

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.

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

Locate Area — Area : 33851px

Locate Area — Area : 34160px
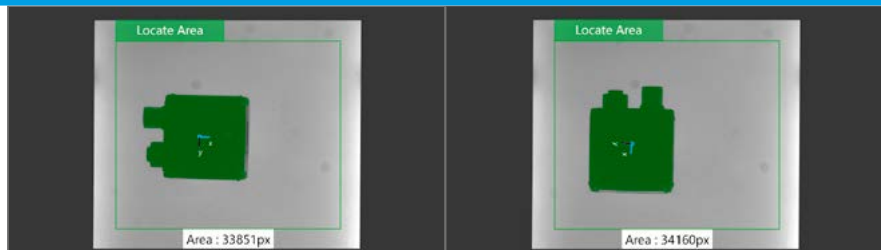
EDGE

Finds an edge within the defined search field and serves as a guide for subsequent tools

Locate Edge — Angle : 90°

Locate Edge — Angle : 81°
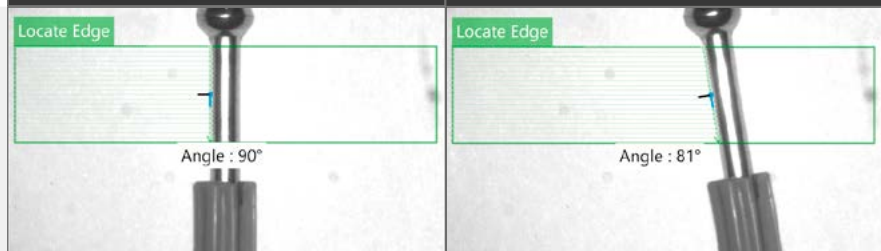
SHAPE

Compares learned patterns within the defined working area and also serves as position correction for subsequent tools

Locate Shape — Score : 100%

Locate Shape — Score : 0%
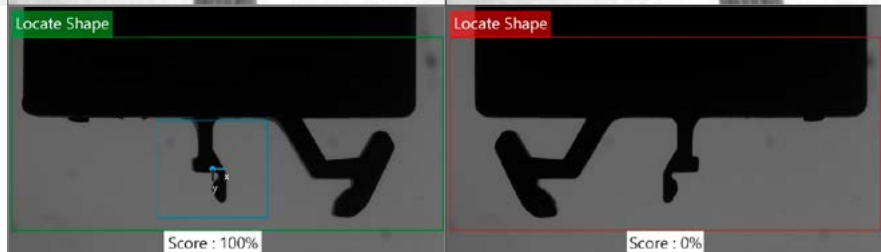
Can the range of functions of all CS-60 vision sensors be extended with upgrades?

Yes, it can. The only point that needs to be taken into account is the resolution of the vision sensor: devices with the type designation CS60-BM28 have a slightly lower resolution than devices of the type CS60-BM38.

Whether the lower resolution is sufficient for application requirements with ID, ID Pro or OCR depends on the field of view, quality and complexity of the area to be scanned and can only be assessed directly in the application.

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

Detect Brightness — Ø Brightness : 2%

Detect Brightness — Ø Brightness : 95%
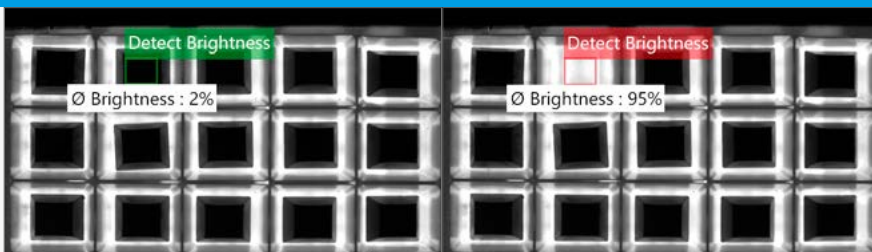
CONTRAST

Detects the contrast as a function of the threshold range within a defined area in the image

Detect Contrast — Contrast : 56%

Detect Contrast — Contrast : 13%

AREA PIXELS

Detects the number of pixels as a function of the threshold range within a defined area in the image

Detect Area Pixels — Area : 2867px

Detect Area Pixels — Area : 0px
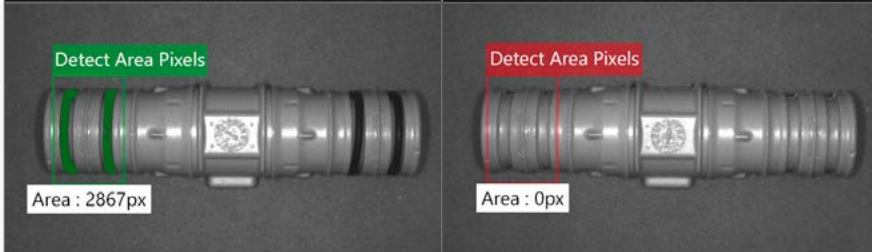
EDGE PIXELS

Detects the number of edge pixels as a function of the threshold range within a defined area in the image

Detect Edge Pixels — Area : 1921px

Detect Edge Pixels — Area : 3px
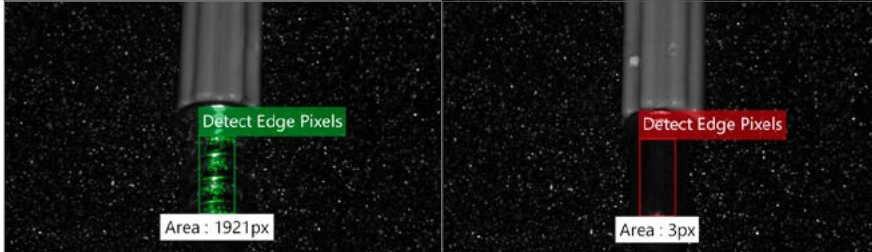
COUNTING areas, edges and shapes

AREAS

Determines the number of contiguous dark or bright regions

Count Areas — Score : 9

Count Areas — Score : 8
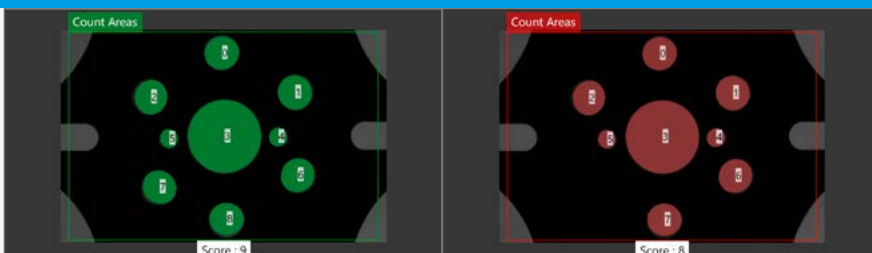
EDGES

Determines the number of edges along a line/search beam

Count Edges — Score : 10

Count Edges — Score : 8

SHAPES

Identifies and counts objects whose contour matches the learned contour

Count Shapes — Score : 5

Count Shapes — Score : 5

NVISION-I
OPTIONAL UPGRADE MODULES

Function extensions on demand

The upgrade licenses extend a CS-60 vision sensor with additional functions such as measuring angles, diameters and circularity, distances and spacing in mm and pixels, locating, detecting and counting 1D and 2D codes, detecting directly marked codes on difficult surfaces and locating, detecting and counting characters.

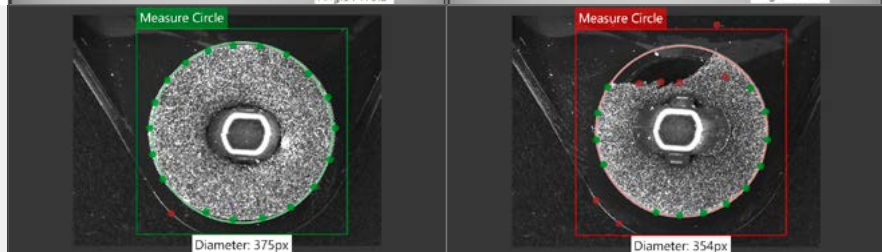**MEASUREMENT:** Measurement of angles, diameters, distances and spacings in mm and pixels

ANGLE
Determines the angle of an edge
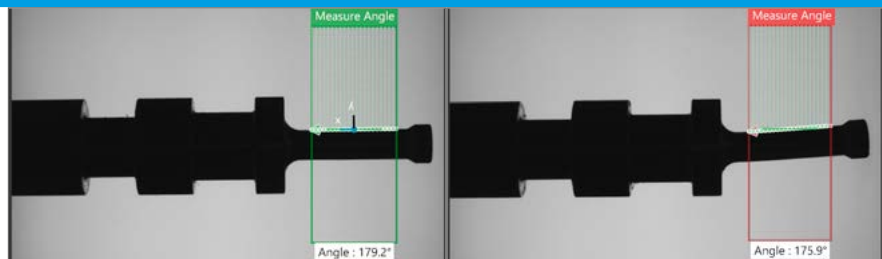
CIRCLE
Determines the diameter and circularity

DISTANCE
The slider determines the distance between 2 edges

POINT-TO-POINT
Measures the distance between 2 contour patterns, 2 circles or mixed points
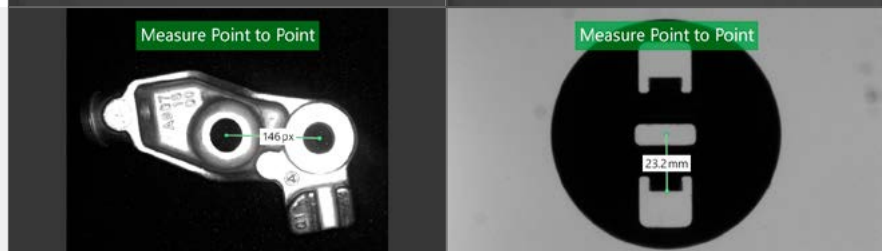
POINT-TO-LINE
Measures the distance between a point (from blob, contour pattern, circle or edge) and a line/edge

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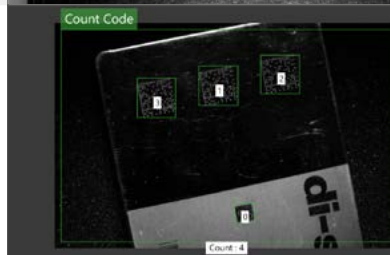
ID PRO: Read hard-to-read DPM codes on difficult surfaces

READ DPM CODES

The upgrade enables high-performance reading of hard-to-read directly marked codes on difficult surfaces and code grading
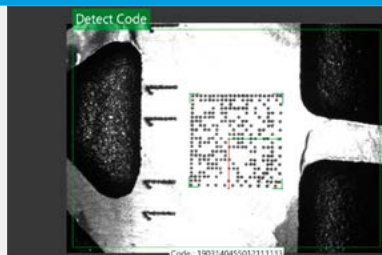
OCR: Locate, recognize and count characters (from nVision-i Version 24.2)

LOCALIZATION

Finds characters within the defined search field and serves as tracking for subsequent tools. Efficient for checking label fit.

READING

Finds characters and can evaluate the content using various criteria (regular expressions)

COUNTING

Counts the number of different characters in the search field

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.

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?

Customer Service:
Phone +49 7181 9879 - 710
customer-service@di-soric.com

Technical Customer Service:
Phone +49 7181 9879 - 700
service@di-soric.com

Mon-Fri during usual business hours.

VISION . ID
LIGHTING
SYSTEMS

di-soric

ID READERS
FIXED-MOUNTED
AND HANDHELD

FOR INDUSTRIAL
AUTOMATION
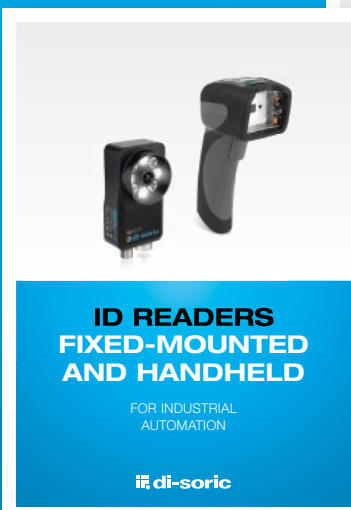
di-soric

NOTES

SOLUTIONS. CLEVER. PRACTICAL.