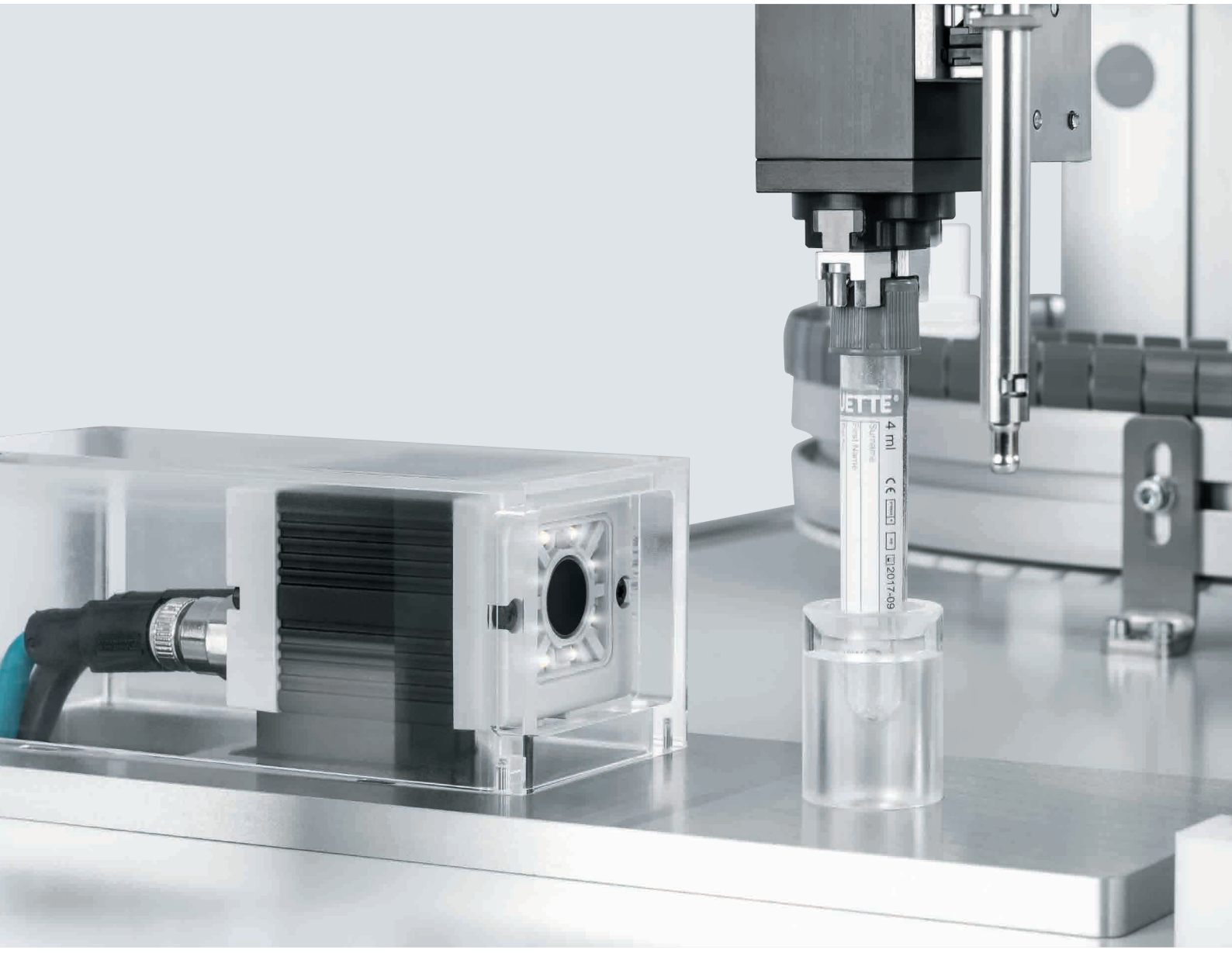
Machine vision with vision sensors, smart camera and checkbox

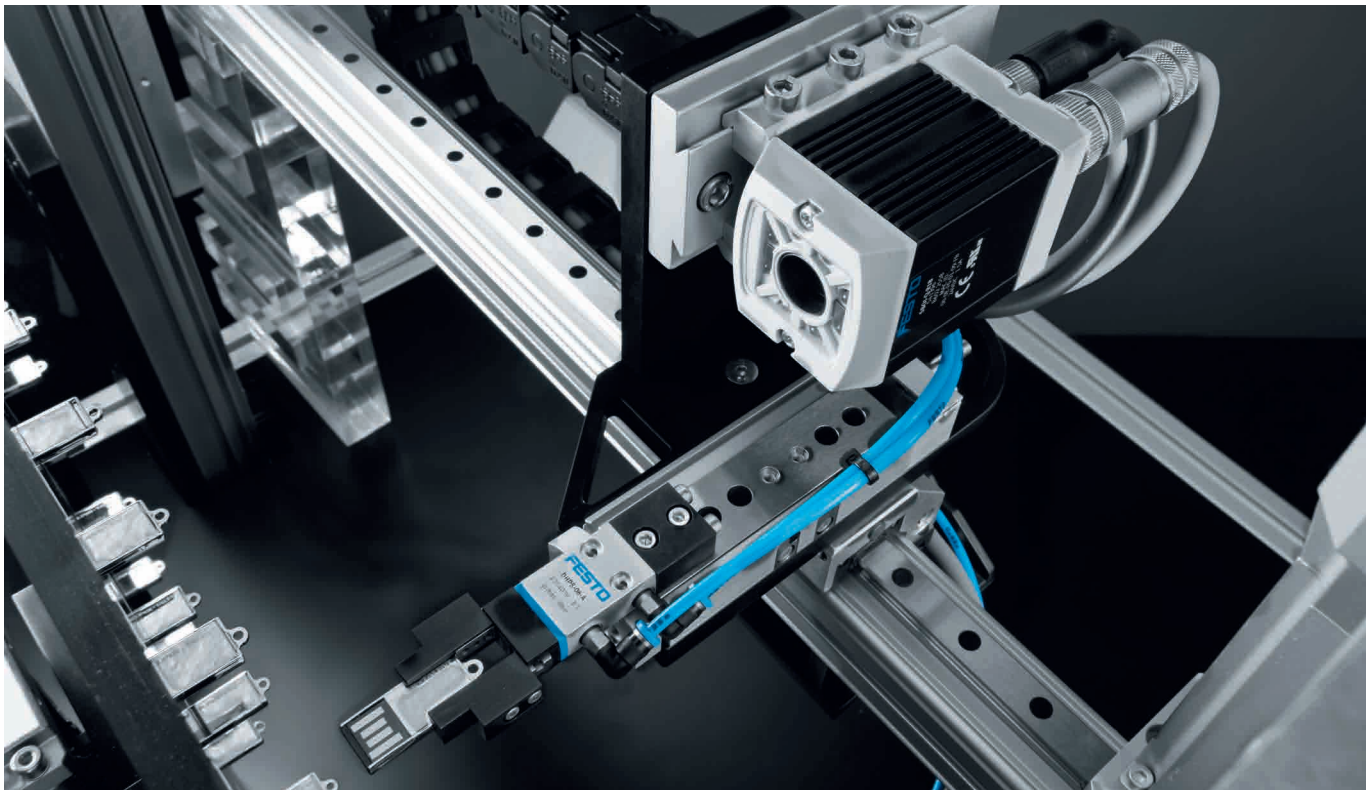
FESTO



Productivity in focus

You want a reliable solution for identifying products.
You demand 100% quality output.
We have the right vision for achieving maximum productivity.

→ WE ARE THE ENGINEERS OF PRODUCTIVITY.



Applications page 4

Suitable for a broad range of applications, reliable in every respect

Machine vision for virtually all industries and applications. Be inspired by how and where you can use our cameras

Vision sensor SBSx page 6

Vision sensor SBSx for a variety of applications

Cost-effective and quick to commission. Powerful as a code reader and reliable as an object sensor or universal variant

Machine vision systems from Festo give you a decisive productivity advantage

Your vision: maximum process reliability. The objective: total quality. The method: a high level of productivity.

Our solutions contribute significantly to harmonise the input and output. They monitor and stabilise the process, whether they are reading codes or detecting positions for handling tasks. In some cases, they even control the process itself. And they inspect quality from when the goods come in to when they are finished.

That makes your work easier. It makes your machines and systems more productive and flexible. And it further optimises your use of materials.

Smart camera SBRD page 14

Smart camera SBRD as a powerful Machine vision

New opportunities in automation and robotics: perfect for beginners as well as professionals

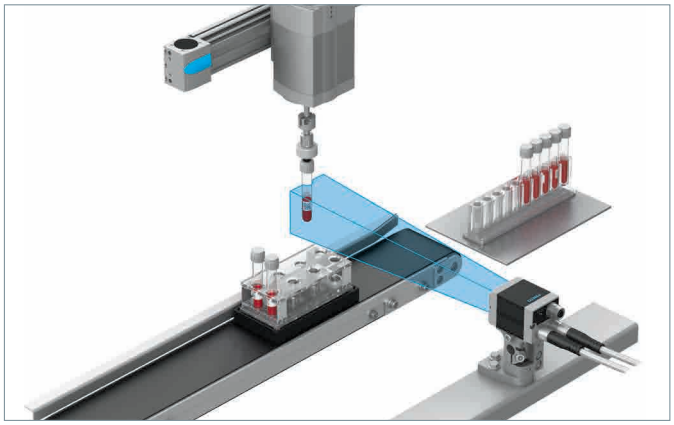
Checkbox compact CHB-C-N page 22

Checkbox compact CHB-C-N for sorting, checking and counting assembly parts

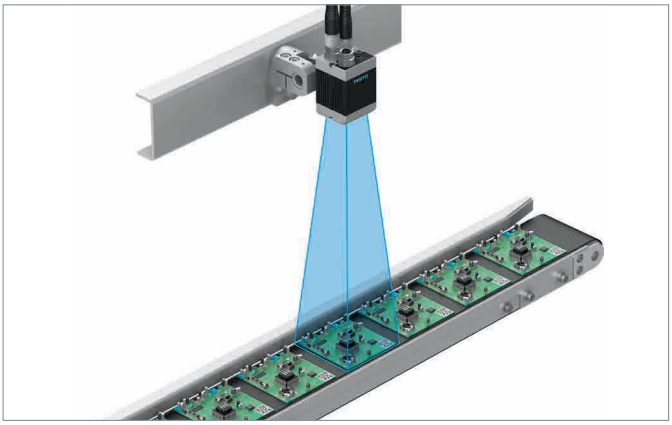
Convincing all round: the intelligent system with adaptive parts flow control and optical identification of the parts and workpieces

Application examples of part identification

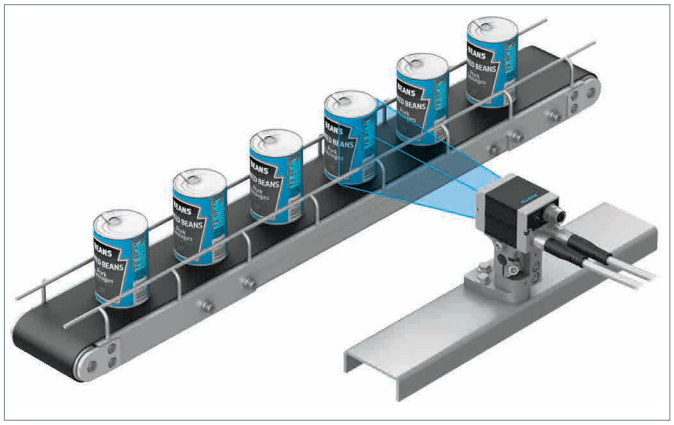
Part identification plays a central role in automated production and logistics, e.g. for just-in-time delivery to the production line. To protect both you as a manufacturer and the consumer, we place great emphasis on topics such as serialisation and traceability of products, especially for automotive parts, medicines or food.



Reading 1D codes
Reading 1D codes such as code 39, EAN etc. with quality assessment to ISO-ICE 15416



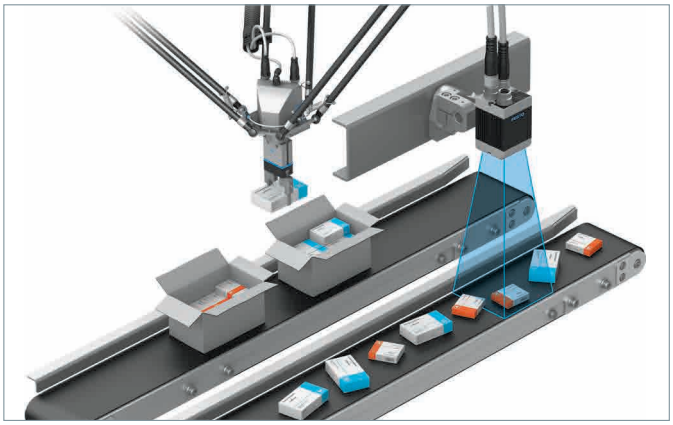
Reading 2D codes
Reading 2D codes such as ECC 200, PDF 417 and QR codes with quality assessment to ISO 15415/AIM DPM 2006



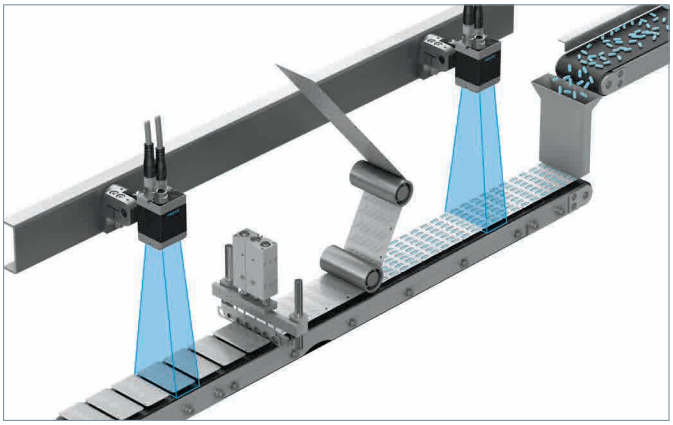
Text recognition (OCR)
Reading plain text and detecting characters and numbers printed in various fonts, including detection classification

Application examples of quality inspection and position sensing

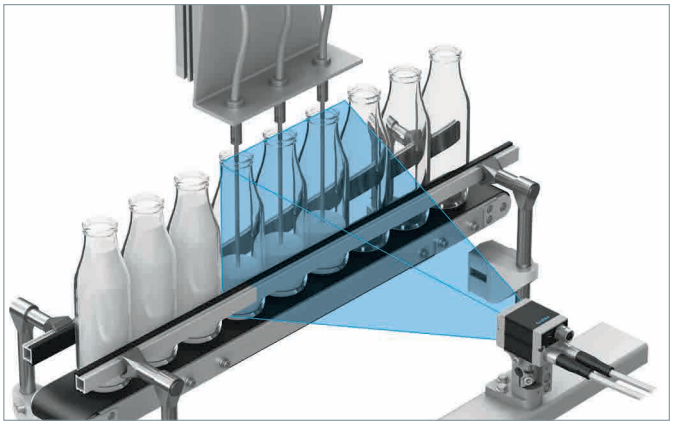
You can count on Festo! Whether you want to ensure smooth production processes through position detection or check quality criteria such as complete packaging or the correct fill level, with our camera systems you can optimally implement a wide variety of inspection processes.



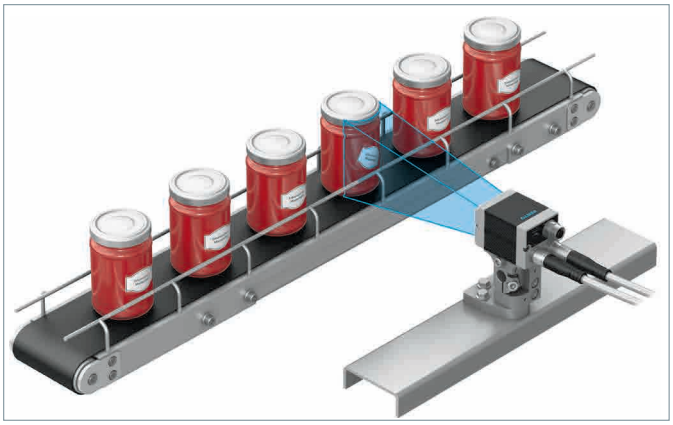
Position/rotation detection
Determining the position and rotary orientation of any part



Checking for presence and completeness
Inspection to ensure that all parts are mounted, installed or printed



Fill level monitoring
Fill level monitoring within permissible tolerances



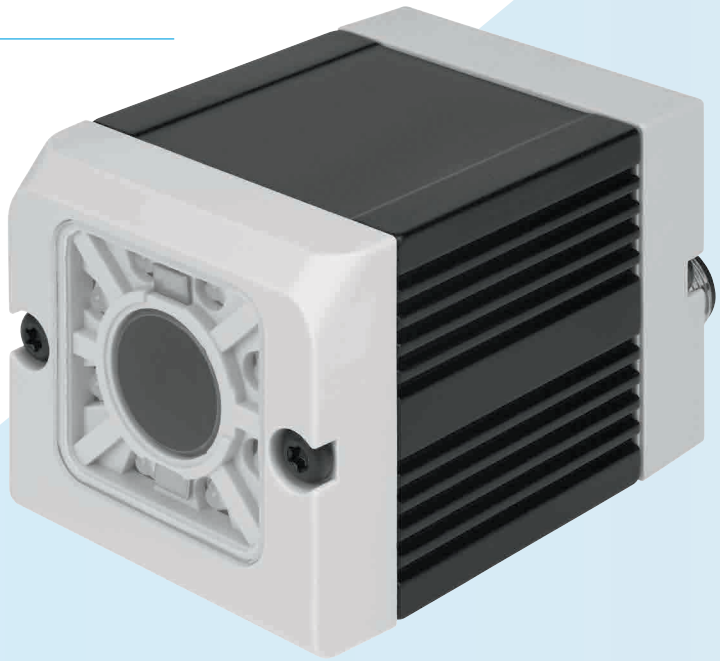
Printing and labelling inspection
Checking the label and the printing while simultaneously checking the closure

Easy. Inexpensive. Efficient: vision sensor SBSx

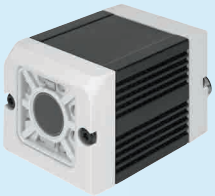
With our vision sensors, you can implement your camera applications quickly and cost-effectively, even without expert knowledge. Available as an object sensor and code reader, as a powerful colour sensor or as a universal sensor combining object sensor and code reader. The SBSI version with its integrated optics and different focal lengths as well as lighting in different colours is especially practical.

Highlights

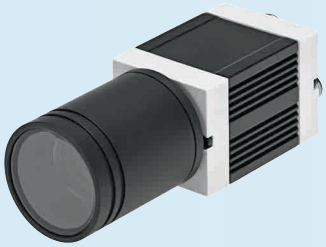
- All-in-one device with optical system, lighting, evaluation and communication (SBSI)
- Easy and intuitive: just three steps to a finished solution
- Powerful and fast software tools
- External lighting
- Lighting SBAL can be directly connected thanks to Festo plug and work



SBSI version:
Practical: the optics with various focal lengths are built in, as is the lighting in different colours.



SBSC version:
Flexible: more scope for optics and lighting with an extensive range of accessories.



Object sensor SBSx-Q
The object sensor SBSx-Q detects incomplete parts, as well as parts that are incorrectly positioned or orientated or in the wrong order. The SBSx-Q also identifies combinations of these quickly and easily.

Functions:
- Pattern matching
- Contour detection
- Brightness detection
- Greyscale value threshold and contrast detection
- Flexible 360° position tracking
- BLOB tool
- Calliper tool for measuring tasks

Code reader SBSx-B
The code reader SBSx-B effortlessly reads barcodes as well as printed and directly marked data matrix codes to the ECC200 standard on any carrier material. The sensor also deciphers skewed, distorted codes applied to convex, mirroring or transparent surfaces at a glance. As a user, you can also evaluate the code quality according to official standards. You get information from a variety of codes at the same time.

Functions:
- 1D barcodes: EAN, UPC, RSS, 2/5 Interleaved, 2/5 Industrial, Code 39, Code 93, Code 128, GS1, Pharmacode, Codabar
- 2D codes: ECC200, QR-Code, PDF 417
- Evaluating the quality of the code
- Multi-code reading
- Reading directly marked codes
- OCR

Colour sensor SBSx-F
The colour sensor SBSx-F combines powerful object detection with precise colour detection. This increases the stability of many applications that have too little contrast in the grey image. In addition, self-illuminating parts such as coloured LEDs and “non-colours” such as white or black can be identified.

Functions:
- Colour area: determines the colour area or a colour range
- Colour list: compares a colour with a list of known colours to sort parts accordingly
- Colour value: determines average colour values RGB/HSV/LAB for output via interfaces

Universal sensor SBSx-U
The new universal variant SBSx combines the functions of an object sensor with the powerful tools of our code reader.

Functions:
- Object sensor functions such as pattern comparison, contour recognition, calibration, etc.
- Code reader functions such as barcodes, data matrix and plain text reading

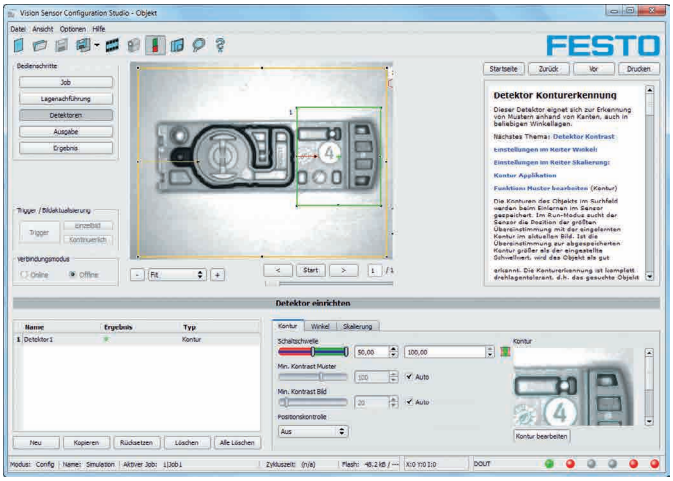
Quick to commission and intuitive to operate: vision sensor SBSx

Our vision sensor SBSx is ready for use in just three steps. Its perfectly matched software tools make commissioning much easier for you. Operation is really uncomplicated so that you can get started without needing any specialist knowledge.

1. Connect
The vision sensor from Festo is connected to a PC or notebook via Ethernet. To find it in the Ethernet network, simply start the vision sensor software of the SBSx. The vision sensor device manager first provides you with an overview of all devices available in the network. You can also actively scan for devices, if necessary. Once you have found the right device, you can configure it straightaway. The various device models can even be simulated offline.

2. Job configuration
The inspection program or job can be configured in just a few steps (see image below) in the vision sensor's Configuration Studio. And if the parts to be inspected cannot be repeatedly fed in the correct position, you have the option of setting up a flexible 360° position tracking system.

It just takes a few steps to create an inspection program:
- Job: optimise the camera image and general settings including auto-shutter function
- Position tracking (optional): if the position of the part changes, 360° position tracking can be selected with the SBSx-Q. This is done automatically with the SBSx-B using its code reading tools.
- Detectors: this is where the suitable tools can be selected.
- Output: configuring the digital I/O and the communication interfaces for the output of the results



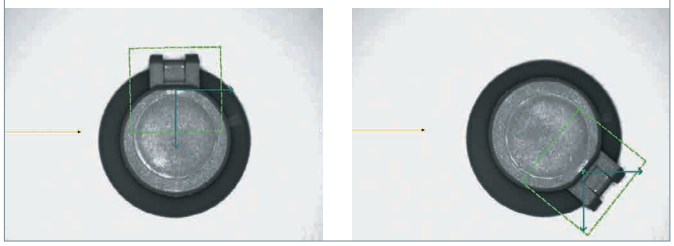
3. Display results
When the SBSx is configured, the results are displayed during operation in the vision sensor's Configuration Studio or Web Viewer. If necessary, you can also switch back and forth between different jobs – a real advantage when it comes to flexibility.

Many detectors – one vision sensor

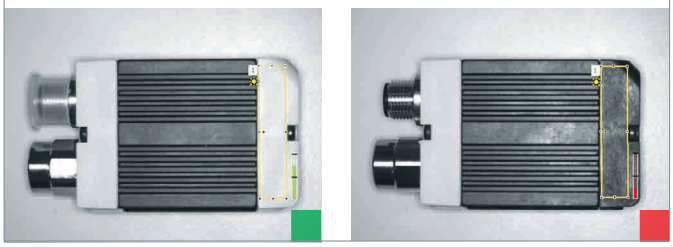
The vision sensor SBSx takes on many tasks. And if the parts to be inspected cannot be repeatedly fed in the correct position, the SBSx-Q even offers you the option of flexible 360° position tracking. Its powerful and fast detectors can meet just about any challenge.

Examples of tools

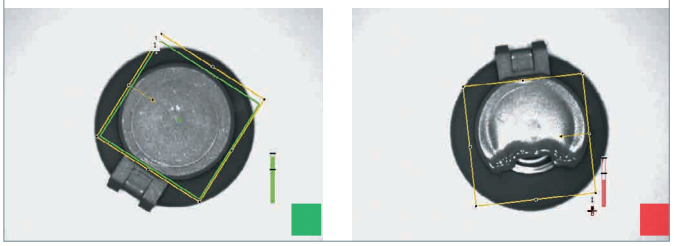
Position tracking



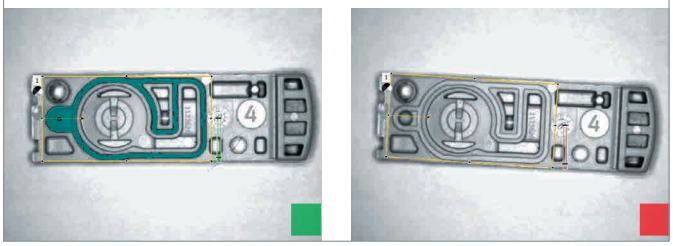
Brightness



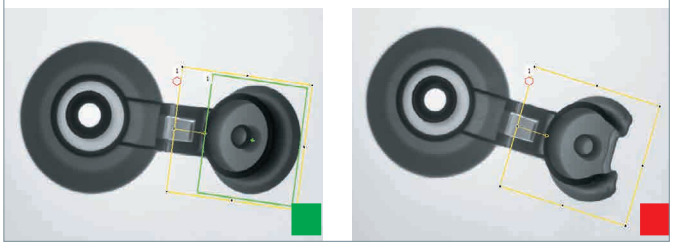
Pattern matching



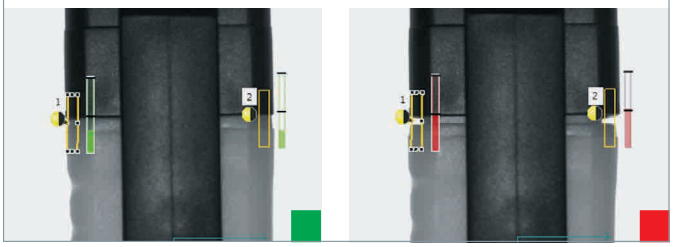
Greyscale



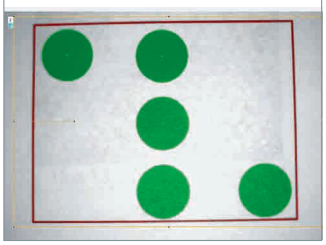
Contour



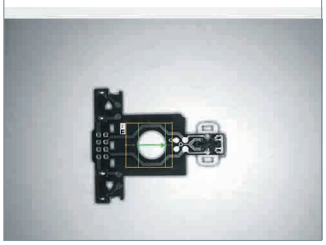
Contrast



Blob



Vernier calliper

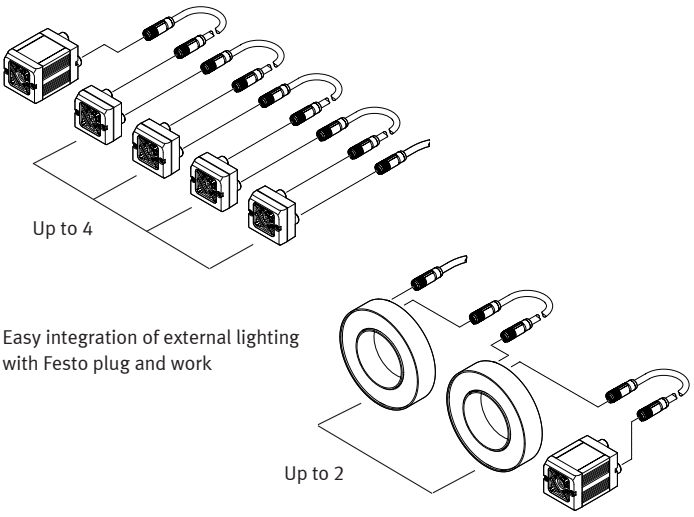


Barcode

Data matrix code

Flexible lighting concept: Festo plug and work

The choice is yours: integrated lighting eliminates the need for additional orders and installation effort. Segments can be flexibly activated and deactivated for internal lighting, so that various lighting effects can be achieved. If necessary, external lighting units can be easily connected. Available lighting colours include white, red and infrared.



Easy integration of external lighting with Festo plug and work

Unique: external lighting directly at the vision sensor
Festo offers a unique concept for situations where better lighting is required: external lighting SBAL can be connected directly to the vision sensor, there is no need for additional accessories.

All lights flash automatically and are synchronised with the sensor. Either two ring lights or four area lights can be connected in series. The ring light can be attached in front of the sensor using a mounting bracket.
The SBAL can also be used for continuous lighting, if needed.

The entire portfolio from a single source


Variant SBSI


Variant SBSC


Lens protection tube SBAP


Surface light SBAL


Ring light SBAL


Connecting cables NEBS and NEBC


Mounting components SBAM

Technical data		
Type	Type R2B	Type R3x
Sensor resolution [pixels]	1280 x 1024 (SXGA)	736 x 480 (WideVGA)
Sensor type	Monochrome	Monochrome, colour
Lens mounting	CS mount/C mount, integrated	
Frame rate (full image) [fps]	40	50, colour 40
Max. number of inspection programs/jobs	Advanced: 255, Standard: 8	
Max. number of inspection criteria/detectors	Advanced: 255, Standard: 32, Code reader standard: 2	
Function of detectors/characteristics	• Position tracking by: contour comparison, pattern matching, edge detection • Pattern matching • Contour matching • Contrast • Brightness • Greyscale • Vernier calliper • Vernier calliper • Blob • Barcode: 2/5 Industrial, 2/5 Interleaved, Codabar, Code 39, Code 93, Code 128, EAN, UPC, Pharmacode, RSS, Code 32 • Data code: ECC200, QR-Code, PDF 417, GS1 • OCR • Colour value • Colour surface • Colour list	

Typical cycle time	
Position tracking [m]s	30
Pattern matching [ms]	20 (colour: 30)
Contour matching [ms]	30 (colour: 60)
Contrast [ms]	4 (colour: 2)
Brightness [ms]	2
Greyscale [ms]	4 (colour: 2)
Vernier calliper [ms]	8 (colour: 12)
BLOB [ms]	30 (colour: 50)
1D barcode [ms]	30
2D code [ms]	40
OCR per character [ms]	15
Colour surface [ms]	30
Colour value [ms]	2
Colour list [ms]	2
Dimensions W x H x L [mm]	45 x 45 x 76.7
Product weight [g]	160
Information on housing materials	Wrought aluminium alloy
Information on cover materials	Reinforced ABS
Note on materials	RoHS compliant

Ethernet interface	
Information on Ethernet, connection technology	Socket, M12, 4-pin
Ethernet, transmission speed	100 Mbit/s
Ethernet, supported protocols	TCP/IP, Ethernet/IP, FTP, SMB, PROFINET

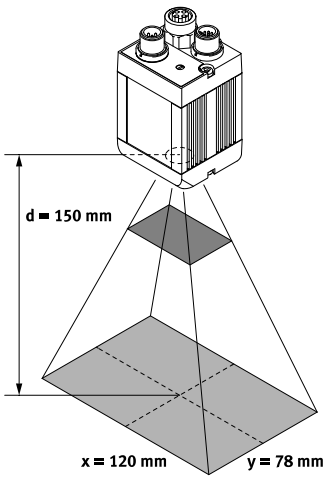
Serial interface	
Serial interface, connection technology	Plug, M12, 12-pin
Serial interface, type	RS 232/RS 422 (code reader and universal)

Digital inputs/outputs and power supply	
Electrical connection	Plug, M12, 12-pin
Number of digital inputs	2
Number of digital outputs	2
Number of selectable digital inputs/outputs	4
Switching input	PNP/NPN, switchable
Switching level [V]	• Signal 0: ≤3 • Signal 1: ≥UB –1
Switching output	PNP/NPN, switchable
Max. output current [mA]	50
Short circuit current rating	For all electrical connections
Nominal operating voltage [V DC]	24
Permissible voltage fluctuations [%]	–25 ... +10
Max. current consumption [mA]	550
Current consumption with load-free outputs [mA]	200

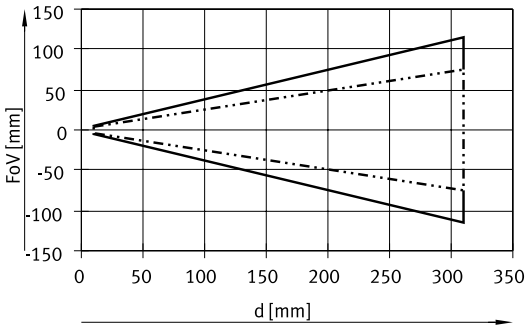
Operating and environmental conditions	
Ambient temperature [°C]	0 ... +50
Storage temperature [°C]	–20 ... +60
Degree of protection	IP67, C mount version: IP65
Information on degree of protection	C mount version with protective tubing
Vibration resistance	To EN 60068-2-6
Shock resistance	Shock test with severity level 2 to FN 942017-5 and EN 60068-2-27
CE marking (see declaration of conformity)	To EU EMC Directive[2])
Approval	c UL us – Listed (OL)
	RCM mark

[2]) For information about the area of use, see the EC declaration of conformity: www.festo.com/sp, Certificates.
If the component is subject to usage restrictions in residential, office or commercial locations, or in small businesses, further measures for the reduction of interference emission may be necessary.

Integrated optics – fields of vision with sensor size 1/3" (resolution R3B/R3C)

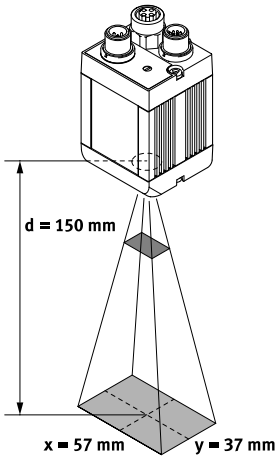


Field of vision (6 mm focal length)

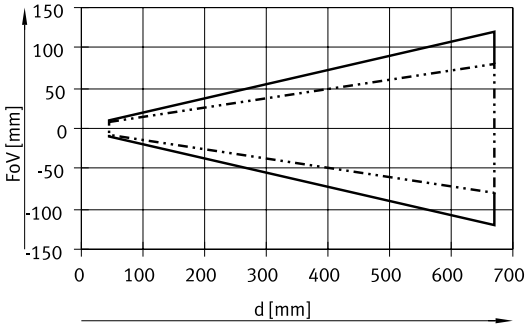


X direction
Y direction

d = working distance
FoV = field of vision



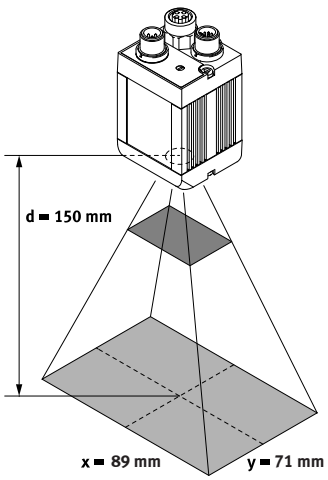
Field of vision (12 mm focal length)



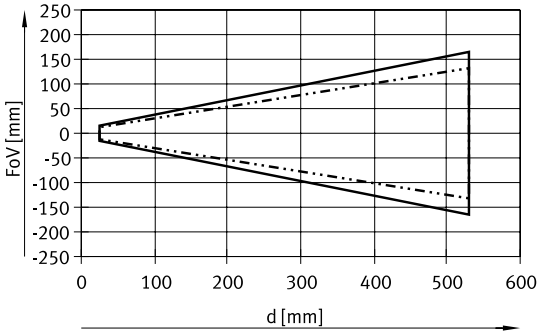
X direction
Y direction

d = working distance
FoV = field of vision

Integrated optics - fields of vision with sensor size 1/1.8" (resolution R2B)



Field of vision (12 mm focal length)



X direction
Y direction

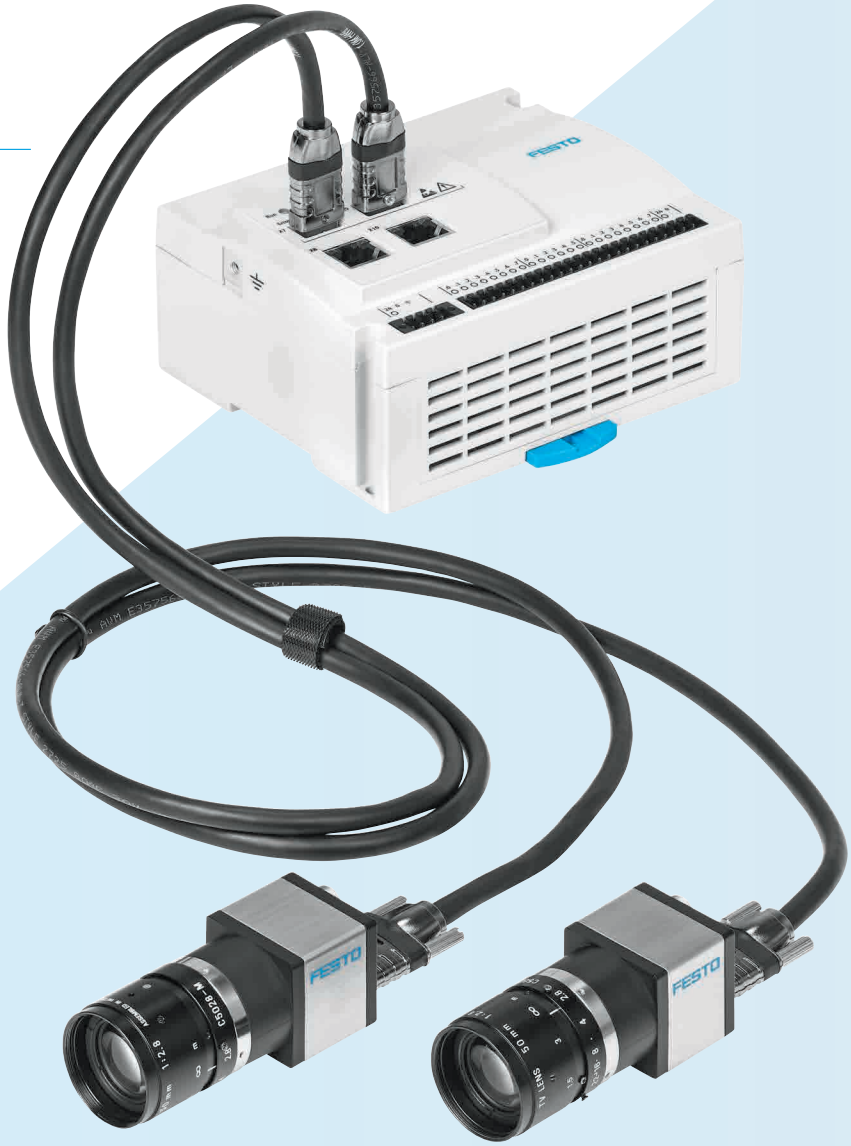
d = working distance
FoV = field of vision

New possibilities in automation and robotics: smart camera SBRD

The smart camera SBRD is suitable for beginners as well as for professionals. Its high-resolution cameras, the specially designed machine vision controller and powerful machine vision software open up new opportunities for automation and robotics. All with tried-and-tested performance from Festo.

Highlights

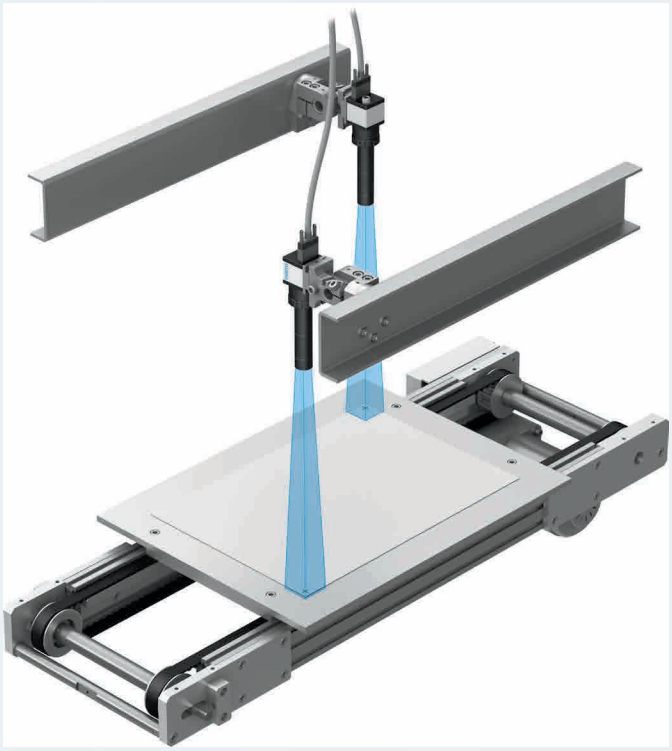
- Two camera interfaces for inspections from multiple perspectives or inspections with large fields of view
- Easy and intuitive operation
- The complete system can be easily integrated into your application



Camera control for robotics and handling systems
How can robots receive and process information from the real world? Festo has developed a powerful machine vision controller whose modules can work together easily with robot and handling systems.

First, a camera takes a picture of the workpieces lying anywhere in the working area. It then determines the gripping points and rotation angles using image processing algorithms, and displays them. After the values have been converted using coordinate transformation, all information can be transmitted to the robot/motion controller. The robot is thus immediately able to grip the workpiece flexibly and take it to the deposit position, e.g. workpiece carriers, packaging, pallets, etc.

Camera control for robotics and handling systems
The space-optimised, fanless remote head controller SBRD-Q features a powerful dual-core processor and PROFINET interface, and is specially designed for multi-camera tasks. The two camera interfaces allow inspections to be carried out from several perspectives or with large fields of view. The lightweight and ultra-compact USB cameras SBPB provide monochrome or colour images. Resolution of up to 5 mega pixels is the optimal solution for many standard applications, and is extremely cost-effective too.



Aligning products with the double-head camera system

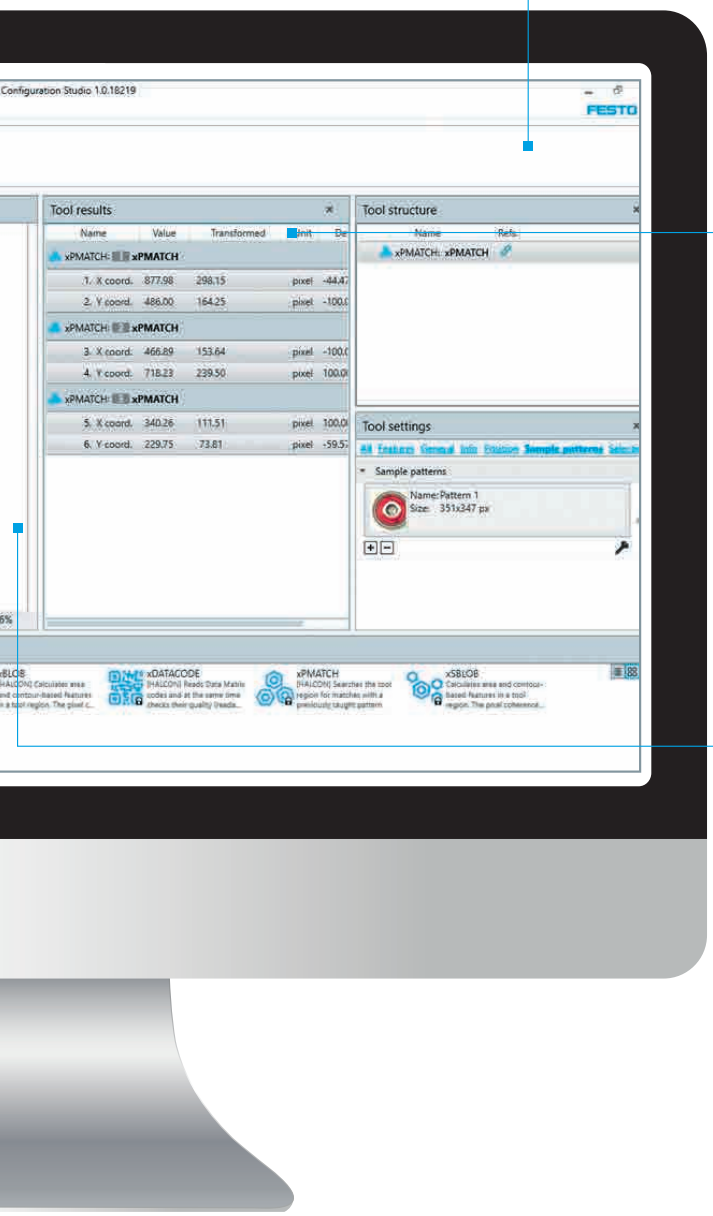
Get pictures up and running: Camera Configuration Studio

The machine vision software Camera Configuration Studio (CCS) delivers fast and reliable results for your tasks using the smart camera SBRD. You can configure inspection programs and define, log and adjust all processes, from image recording to input and output parameters, and simulate them on the PC before starting.

Access to all important information
Once you have finished defining your tool settings, tool combinations or special task settings, they can easily be saved in the tool memory. This means that tried-and-tested settings for your application solution are available directly in the program without having to set the same parameters time and time again.

Commissioning step-by-step
The Job Navigator allows you to conveniently jump back and forth between the components' individual commissioning steps. All steps are displayed in the required and correct order. To do this, the corresponding editing program opens on the right of the screen. If everything is OK, simply save your job on one of the 256 storage spaces on the smart camera.

Inspection for all relevant characteristics
In the Camera Configuration Studio, you can also define and evaluate the inspection characteristics with any number of images. To do this, simply take different sample parts and record them. You can define what exactly needs to be inspected and how this should be done. The tolerance ranges are automatically calculated on the basis of the recorded teach images. Making manual changes later on is not a problem. Such corrections are of course possible at any time.



Specially developed for pick and place solutions
The additional tool CCS xRun enables you to quickly parameterise the inspection tools. With this tool, you only need to determine the settings once so that they can subsequently be automatically applied to all found objects. This makes program development and maintenance easier and keeps the program structure very neat and tidy.

Flexible and versatile settings
Numerous settings can be created using the editing function within the Job Navigator, e.g.:

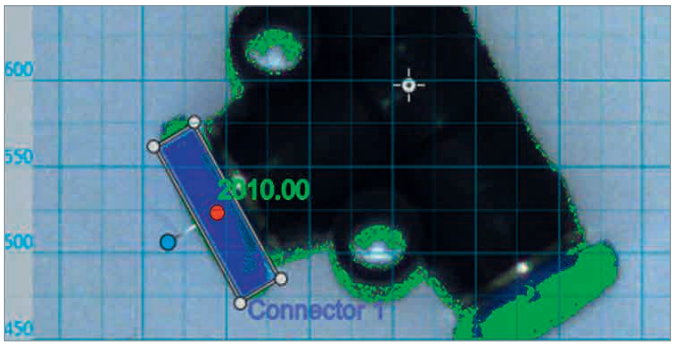
- Various evaluation modes, e.g. free-running image recording, image recording with fixed cycle time or triggered image recording
- Displaying and editing image parameters such as exposure time, gain and the boundaries of the field of vision
- Selecting filters for image enhancement: median, mean value, Sobel, opening etc.
- Definitions of the signal behaviour, e.g. delay times, activation times, and functionality
- Protocol of the Ethernet interfaces
- Evaluation and selection of device statistics
- Displaying, logging and storing the image of the inspection parts and their characteristics in a ring buffer

Evaluation using image lists
Define and evaluate the inspection characteristics with any number of recordings. To do this, simply take different sample parts and record them. You can define what exactly needs to be inspected and how this should be done. The results are generated on the basis of a wide range of data and thus enable particularly stable image processing.

Great functionality at a small price: available tools

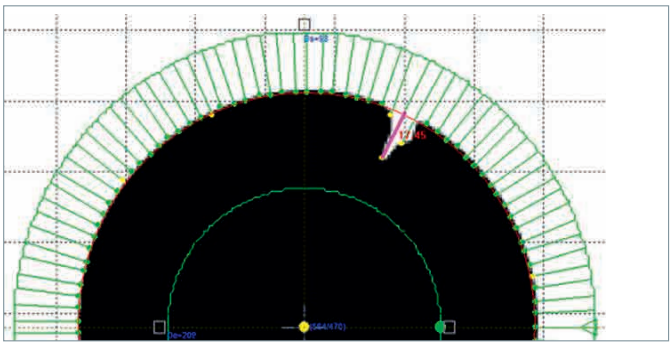
The many inspection programs and functions it can run are what make the smart camera SBRD so flexible. Take a closer look: the smart camera from Festo has a wide range of tools with which you can inspect almost anything. It offers the best value for money on the market.

ROI



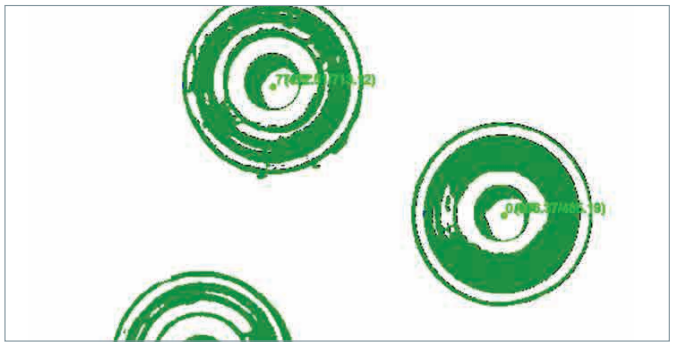
Calculates characteristics such as key coordinates, dimensions, circumference and surface area

Circle and edge finder



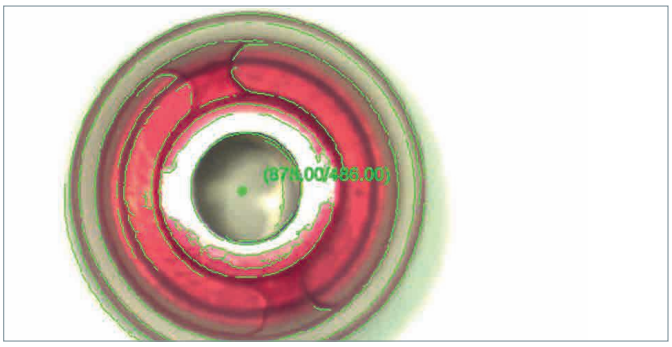
Determines least-square circles and least-square lines of object edges and the associated quality characteristics

Blob finder



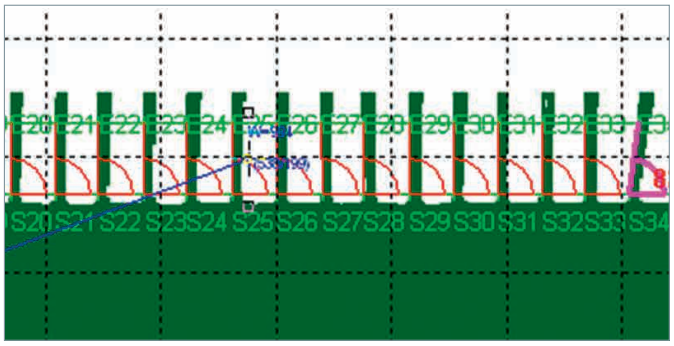
Searches for adjacent pixels within the previously selected brightness or colour range to generate individual objects from pixel clouds

Pattern matching



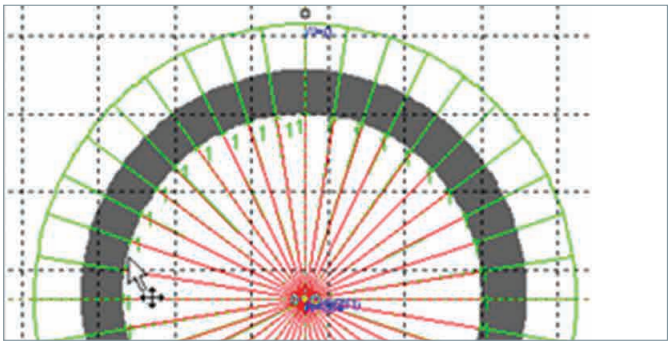
Searches for up to four pre-learned patterns per tool

Single and multiple measurement



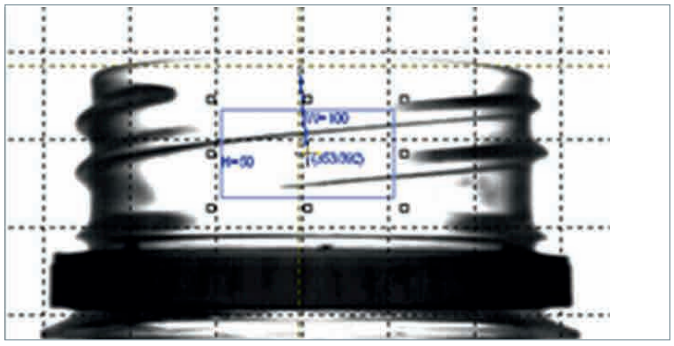
Searches along a search line or search circle for transitions between the background and the part, or for relevant changes in brightness.

Blasting tool



Searches along parallel or star-shaped search lines for transitions between the background and the part, or for relevant changes in brightness

Brightness check

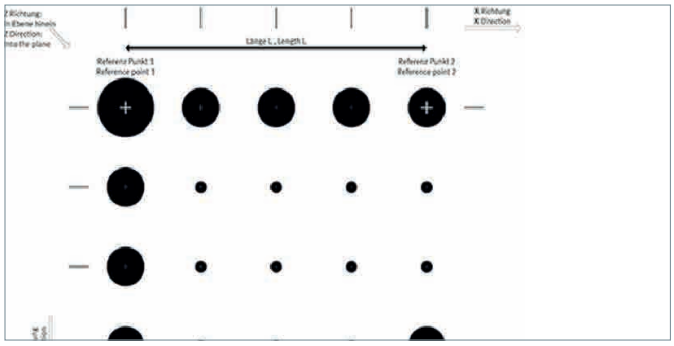


Determines the brightness or contrast of the pixels in a freely definable area within the image

Colour check

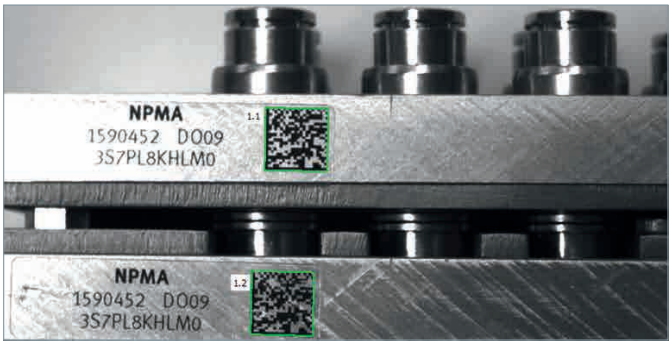
Determines the colour of the pixels corresponding to the RGB, HSV and YUV colour spectra in a freely definable area within the image

Coordinate transformation



Transforms camera coordinates into global coordinates in a non-linear way

Data matrix code reader

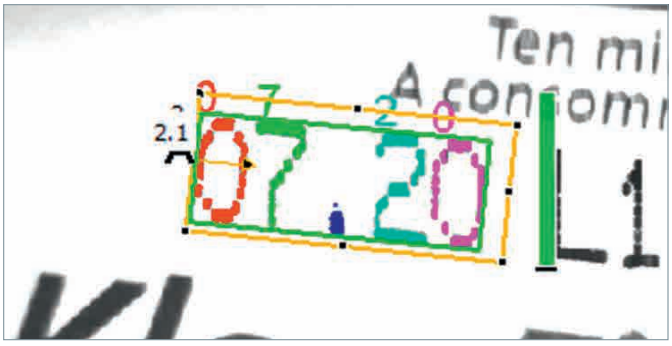


Reads 2D codes (QR, PDF417 and ECC200) and additionally determines the quality of each ECC200 code read in accordance with ISO 15415 guidelines

Bar code reader

Reads 1D codes (barcodes) of a variety of types

Text recognition (OCR)



Reads plain text in different fonts and forms

Controller SBRD

General technical data	
Dimensions W x H x L [mm]	130 x 106 x 60
Type of mounting	• Via through-hole for M4 screw • Via H-rail
Product weight [g]	315
CE marking (see declaration of conformity)	To EU EMC Directive
Protection against direct and indirect contact	PELV
Nominal operating voltage DC [V]	24
Permissible voltage fluctuations [%]	±10
Power consumption 24 V [W]	20

Input/output interface	
Function	• 10x digital input • 2x digital input with pull-up resistor • 8x digital output • Ground • Power supply
Switching logic, inputs	PNP (positive switching)
Number of outputs	8
Digital output, output current [mA]	450
Switching logic, outputs	PNP (positive switching)

Camera interface	
Function	Only communication with camera
Connection type	2 x socket
Connection technology	USB 3.0 type A
Number of pins/wires	9
Note on the camera interface	Only use the cables explicitly identified by Festo as accessories
Storage temperature [°C]	–20 ... +70
Degree of protection	IP20
Ambient temperature [°C]	–5 ... +50
Relative air humidity [%]	95 Non-condensing

Ethernet interface	
Protocol	Type of connection for communication with camera
Function	• Diagnostics • Programming

Cameras

General technical data		
Sensor resolution	-R2	1280 x 1024 pixels (SXGA)
	-R5	1600 x 1200 pixels (UXGA)
	-R9	2456 x 2054 pixels (5MPix)
Sensor type	-B	Monochrome
	-C	Colour
Lens mounting		C mount
Field of vision [mm]		Depends on the chosen lens

USB interface		
Connection type		Socket
Connection technology		USB 3.0 type B micro
Number of pins/wires		10
Nominal operating voltage DC [V]		5
Permissible voltage fluctuations [%]		±5
Electrical power consumption [W]	-R2	1.3 ... 1.5
	-R5	1.3 ... 1.5
	-R9	2.3 ... 3

Electronics		
Working distance [mm]		Depends on the chosen lens
Frame rate (full image) [fps]		60
Exposure time	-R2	9 µs – 2000 ms
	-R5	20 µs – 10000 ms
	-R9	27 µs – 999 ms

Camera	Sensor size (inch)	Pixel size
SBPB-R2B-U3-1E1A-C	1/1.8	5.3
SBPB-R2C-U3-1E1A-C	1/1.8	5.3
SBPB-R5B-U3-1E1A-C	1/1.8	4.5
SBPB-R5C-U3-1E1A-C	1/1.8	4.5
SBPB-R9B-U3-1E1A-C	2/3	3.45
SBPB-R9C-U3-1E1A-C	2/3	3.45

Cable		
Field device side		
Connection technology left	[U7]	USB 3.0 type B micro
Cable outlet left	[G]	Straight
Cable design	[S]	With shielding
Cable length	[S]	5 m
Type of connector	[S]	Plug on both sides
Controller side		
Connection technology right	[U5]	USB 3.0, type A
Cable outlet right	[G]	Straight

Correctly sorted and exactly counted with the checkbox CHB-C-N

The checkbox CHB-C-N for camera-based sorting, checking and counting of assembly parts is an intelligent system with adaptive parts flow control and optical workpiece identification. It sorts small parts according to type, position orientation, quality as well as quantity (with quantity pre-selection). You will benefit from its qualities, especially in applications with a high part rate and a large number of types.

Highlights

- 100% part inspection and precise parts flow control
- Extremely easy integration
- High part rate (up to >1500/min) and part diversity (256 memory locations)
- No additional PLC and no programming required

Compact flexibility in one system
All the necessary components for the checkbox CHB-C-N are available in a stable aluminium housing:
- User interface, including buttons, indicator lights and display.
- Connectors for the electrical connection of actuators, buffer zone sensors, diagnostic PC, power supply, encoder and a higher-level PLC.
- Line camera technology. Complete system with line scan camera, light guide and lighting. No optical layout and no optical adjustment necessary.

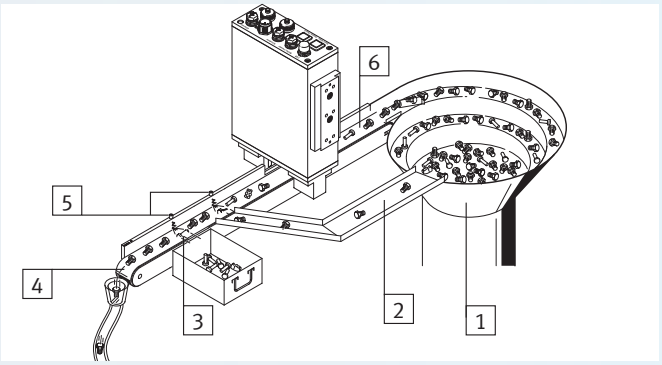
Further attractive features of the checkbox
- Convenient: teach-in takes place directly on the device without the need for machine vision expertise.
- Reliable and extremely efficient: precise flow control of the parts is possible at transport speeds of › 60 m/min.
- Cost-saving: all control components, in particular for the conveyor device and buffer zone monitoring, are already integrated. This makes PLC and programming superfluous!
- Actuators can be connected directly.
- Can be expanded by integrating additional sensors, such as colour or vision sensors, additional quality features can be checked and the parts can be inspected in the third dimension.

For which parts is the checkbox suitable?
All workpieces that can be transported in a stable position and whose quality and position orientation can be recognised by contour features in the camera image.

Functional principle
The CHB-C-N scans the workpieces you want to inspect in the optical channel between the two prisms on the underside of the unit. The open design on the underside of the optical system means it can be mounted on various types of transport devices in your application, e.g. a conveyor belt.

The checkbox compact provides 24 VDC high-power signals as outputs with which you can directly control fast switching pneumatic valves, such as those of the MHE2-MS1H, without interposing external interface modules or controllers. This allows incorrect or misaligned parts to be reliably ejected from the workpiece flow using an air jet. Other types of actuators such as pneumatic or electric ejectors, deflectors or turning stations can also be controlled directly.

The range of functions is rounded off by inputs for encoders to monitor the belt speed and for buffer zone sensors, as well as an output to control the transport device.



Integration of the checkbox into a transport device:
Example of conveyor belt and two actuators
1 Small parts conveyors e.g. vibrating conveyors, centrifuges, step conveyors
2 Returning incorrectly orientated parts to the small parts conveyor
3 Removing bad parts (faulty parts, foreign parts)
4 Transferring good parts to a buffer zone or the next machine
5 Actuators, e.g. blow-out valves, pusher or turning station
6 Transport device e.g. conveyor belt

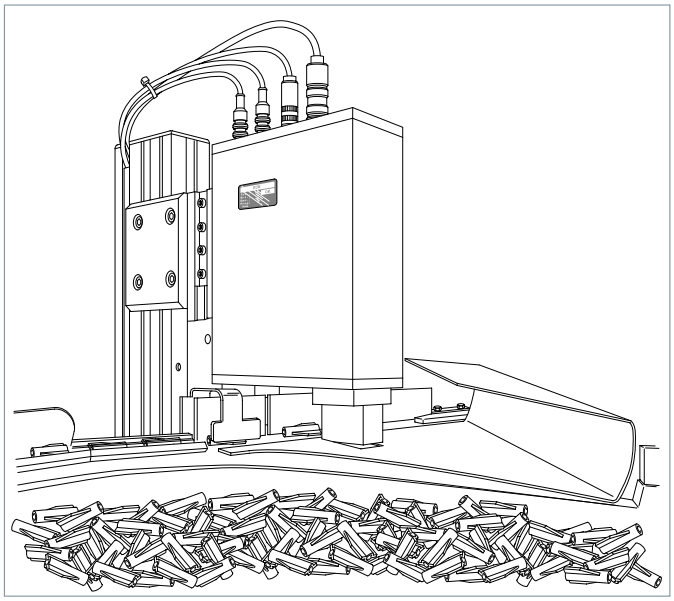
Camera-based sorting, inspecting and counting of assembly components

The checkbox compact is suitable for a wide range of parts in a wide variety of industries. Some of them are listed here as examples.

Parts
- Axes and shafts
- Batteries
- Fittings
- Dental drills
- Turned parts
- Dowels
- Electrical and electronic components
- Springs and threaded pins
- Bottle caps
- Glass ampoules
- Hygiene products
- Cosmetic products
- Ballpoint pen parts
- Bearings and bearing components
- Medical technology components
- Motor components
- Rivets
- Screws
- Stamped parts
- Contact pins
- Valve springs
- Toothbrush parts

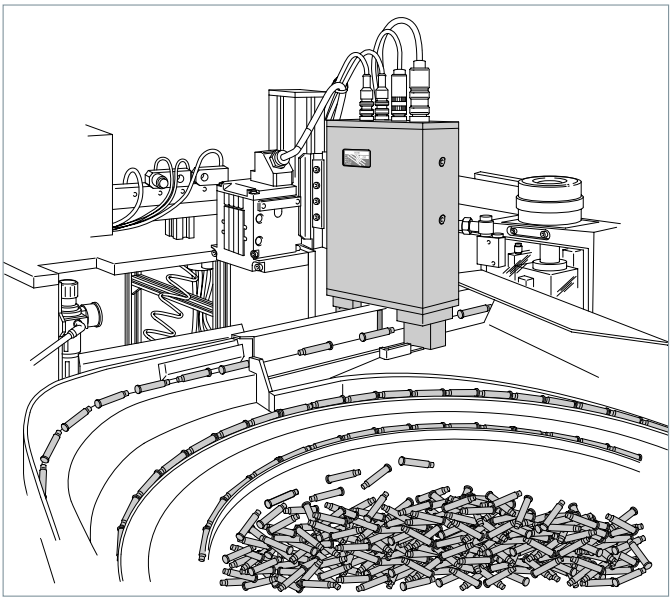
Industry segments
- Automotive
- Textile industry
- Medical technology
- Electronics
- Precision engineering
- Wood processing industry
- Metalworking industry
- Packaging technology
- Cosmetics
- Tools

Application examples



Inspecting the correct orientation and quality of light guides
The checkbox CHB-C-N checks the transparent display elements, controls the flow of the parts and reliably removes incorrectly orientated or faulty parts using blow-out nozzles.

The following characteristics are checked:
- Orientation
- Shape
- Diameter
- Air pockets



Inspecting the correct orientation and quality of electrodes
The checkbox CHB-C-N checks the electrodes and controls the complete feeding process, such as a subsequent turning station for turning incorrectly orientated good parts and a blow-out nozzle for sorting out bad parts.

The following characteristics are checked:
- Orientation
- Type and shape
- Diameter
- Length

Gentle part feeding – reliable sorting

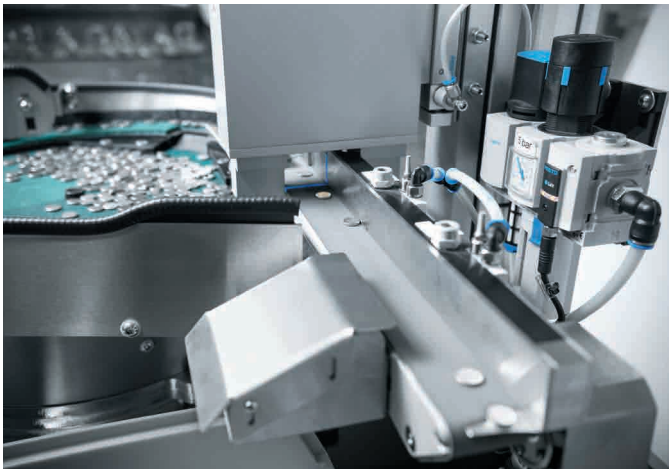
IFC Intelligent Feeding Components GmbH has been offering innovative solutions in feeding technology for over 15 years. The checkbox from Festo was included right from the start. The latest product in the checkbox series, CHB-C-N, is used to feed metal discs into an injection moulding machine in the correct position.

What is special about it is that the metal discs, which are only 12 mm wide and 2 mm high, show practically no differences in both possible conveying orientations and therefore cannot be sorted mechanically. The only way to differentiate between the two positions is by one characteristic: the stamped plates with their slightly rounded edges. This is partly at the top, partly at the bottom, which makes recognition even more difficult.

Reliable and fast
This is where the checkbox CHB-C-N comes into its own. Thanks to high-resolution optical recognition, the line scan camera system from Festo can reliably detect the orientation of the metal discs, even at a part rate of 200 inspection parts per minute. Incorrect and correct positions can be easily differentiated.

In addition, stamping waste and damaged parts are safely removed from the feeding process. This avoids machine downtime and ensures dependable processes since the end products reliably pass the quality control.

Very user-friendly
The parts to be inspected are conveyed from a so-called area accumulator with a coated conveyor surface to the checkbox gently and with a high conveying rate. The entire autonomous feeding system is user-friendly. New part types can be taught in directly on the system or the appropriate inspection programs can be created offline. Last but not least, the fast service via remote maintenance reduces operating costs.

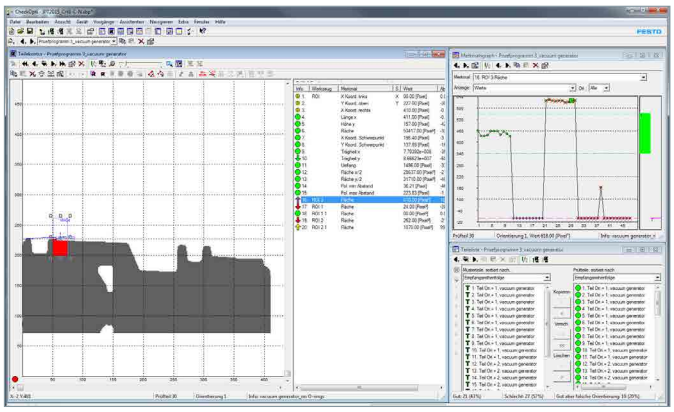


The checkbox CHB-C-N checks the metal discs and controls the entire sorting process. The position and quality inspection is carried out completely contact-free

IFC Intelligent Feeding Components GmbH
System partner of Festo
- Optoelectronic feeding systems
- Modular, standardised feeding systems
- Feeding systems with robot/flex feeder
- Mounting/inspection systems with camera
- Commissioning/service for camera technology

“The checkbox from Festo fits perfectly into our concept of very flexible and modular feeding systems. It is compact, easy to integrate, user-friendly, fast and reliable.”
Andreas Schirmer
Managing Director IFC Intelligent Feeding Components GmbH

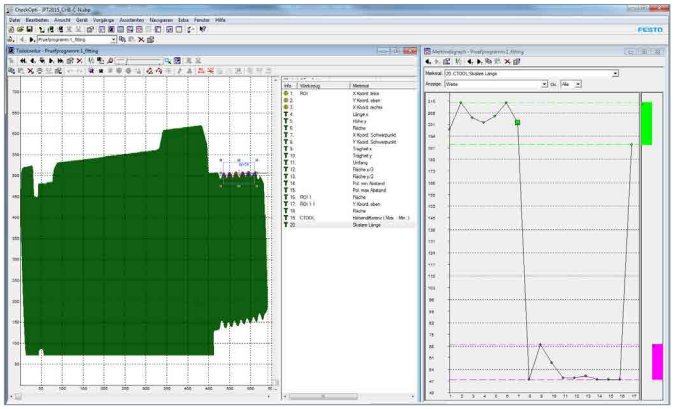
Software for your individual requirements



Software program CheckKon

CheckKon can be used to display, log and adapt the processes within the checkbox CHB-C-N, from the image evaluation by the camera to the I/O parameters. Thanks to this software, you benefit from many useful functionalities:

- System configuration with display and modification of parameters and operating modes
- System diagnostics and fault analysis
- Display and recording of inspection part images and inspection results
- Archiving and documentation of system settings
- Inspection program management
- Statistical evaluation of the results



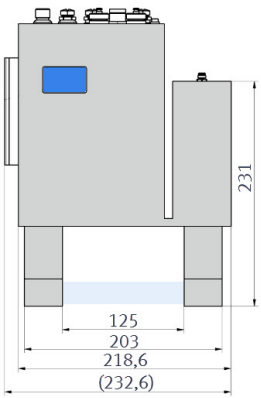
Software program CheckOpti

CheckOpti can be used whenever the standard teach-in process of the checkbox CHB-C-N reaches its limits due to insufficient contour differences. The program helps you to reliably ensure the orientation and/or quality recognition of an inspection part. And if necessary, you can define additional powerful inspection features to optimise your system for specific applications.

Last but not least, CheckOpti can also be used to set the default value for the counting function and to archive and document the inspection programs.

Available on request: special version with enlarged optical channel

- 125 mm wide optical tunnel
- 40 mm longer optical fingers



Technical data	
Type of mounting	• Via dovetail slot • Via female thread • With accessories
Dimensions W x H x L [mm]	60 x 164 x 256.9
Dimensions of optical channel W x H [mm]	59.2 x 40
Product weight [g]	2325
Sensor resolution, pixel size	2048 pixels/line, 14 µm
Image sensor type	CMOS line scan
Sensor resolution	2048 pixels/line
Max. line frequency, sensor [Hz]	8500
Max. no. of inspection programs	256
Max. no. of types per inspection program	1
Max. no. of different orientations per type	8
Count range	1 ... 9999999
Min. part length [mm]	1
Max. part length [mm]	Up to >1000, depending on speed and resolution
Min. part diameter [mm]	0.5
Max. part diameter [mm]	25
Nominal operating voltage DC [V]	24 (–15 ... +20%)
Max. starting current per output channel [A]	1.3
Electronic limitation of outputs [mA]	700
Interfaces	• Ethernet, TCP/IP • Actuators: 4 digital high current outputs • Conveyor/buffer zone: 4 digital I/O • PLC: 19 digital I/O • Encoder: RS 485
Ambient temperature [°C]	–5 ... +45
Degree of protection of the device	IP64
Installation site	Dry, shielded from extreme influences of ambient light, ambient air as clean as possible
Order number	**3501040**

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