Checkbox CHB

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Checkbox CHB

Key features

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Industrial design

- Compact integrated construction, protected against external light and maladjustment, IP54 protection class
- Flexible installation, thanks to a modular system concept

Easy to use

- Automatic Teach-in of new parts in seconds, no programming required
- Robust recognition algorithm based on part characteristics
- Up to 48 different parts can be saved to memory

Sturdy construction and high functionality

- High conveying performance thanks to variable belt speed (standard: 300 mm/s)
- Maintenance-free system
- Sturdy pneumatic components: Integrated valves and flow controls
- Long service life thanks to brushless DC servo motor

High reliability and checking performance

- Simple, sturdy optics with high-quality industrial line-scan camera and LED light strip
- Insensitive to extraneous light, with contour detection via back-lighting method
- High resolution: 0.02 mm or 0.1 mm

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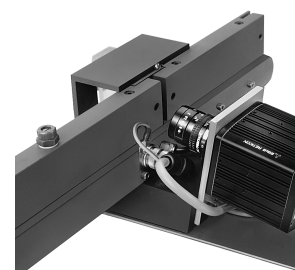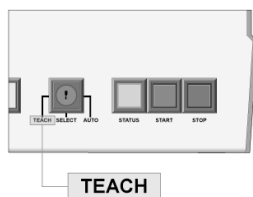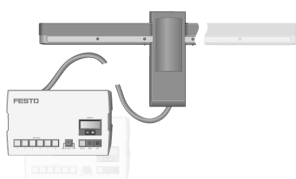
Key features

The Checkbox family CHB

The Checkbox is a system for the optical orientation detection and quality inspection of small parts. It consists of an optical unit, e.g. a conveying unit with integral camera and a control unit.

The part to be inspected is fed past the camera on the conveyor belt. The control unit analyses the contour of the part and distinguishes between good parts and those which are incorrectly oriented or defective and foreign parts.

All Checkbox units feature a Teach-in function which allows them to "learn" different parts automatically – without the need for programming. They are easy to use – the press of a button is all that is needed to change your feed system over from one part type to another.

The Checkbox is used wherever small parts need to be fed into assembly or machining units. This is where mechanical sorting devices reach their limits, especially where parts of complex shape or fast cycle times are involved. This calls for intelligent optical devices: The Checkbox family.

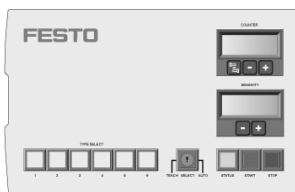Incorrectly oriented parts

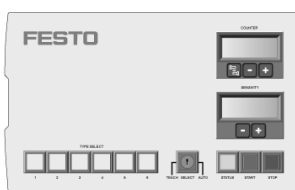Defective or foreign parts
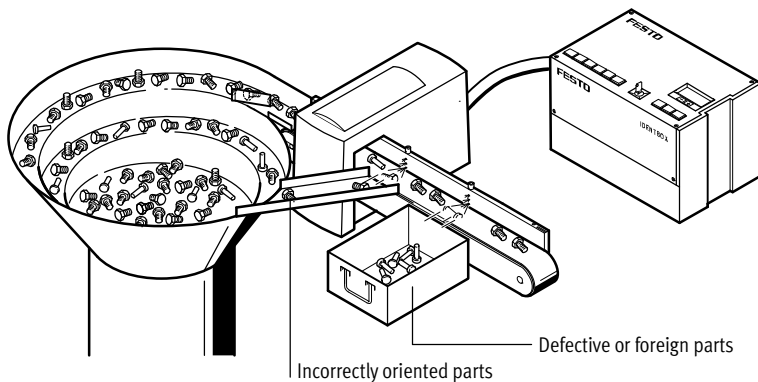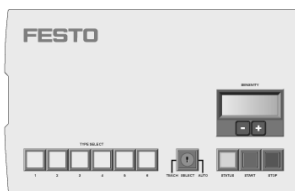
Identbox CHB-IB

The Identbox is the basic unit in the Checkbox family and is used to separate good parts, incorrectly-oriented parts and defective parts.

Countbox CHB-CB

The Countbox combines the features of the Identbox with a function for counting good parts with pre-selection of the desired quantity.

Sortbox CHB-SB

The Sortbox unites the functions of the Identbox and the Countbox in one unit and also conveys, sorts and compiles several different types of parts.

Checkbox CHB

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Key features

Which parts are suitable?

Here is a small selection of the many possibilities:

- Axes
- Bolts
- Brushes
- Buttons
- Ceramic seals
- Curtain hangers
- Drill bits
- Drills
- Fuses
- Game pieces
- Glass ampoules
- Inserts
- Insulating terminals
- Lever stoppers
- Link plates

- Lipstick casings
- Lock nuts
- Mouldings
- Mountings
- Needles
- O-rings
- Pen tops
- Plastic housings
- Plug connectors
- Screws
- Self-locking nuts
- Sensor housings
- Shafts
- Sleeves
- Small wares

- Sockets
- Spring washers
- Springs
- Stampings
- Switch contacts
- Tablets
- Threaded pins
- Toothbrush components
- Turned parts
- Wall plugs
- Washers
- Wooden dowels
- Zip-fastener components

Which industries use the Checkbox family?

- Metalworking industry
- Electrical engineering industry
- Woodworking industry
- Electroplating industry
- Injection moulding industry
- Packaging industry
- Pharmaceutical industry

- Cosmetics industry
- Jewellery industry
- Textile and clothing industry
- Assembly-systems industry
- Food industry
- Precision engineering industry

Checkbox CHB

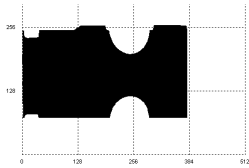Key features

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Contour recognition using back-lighting method
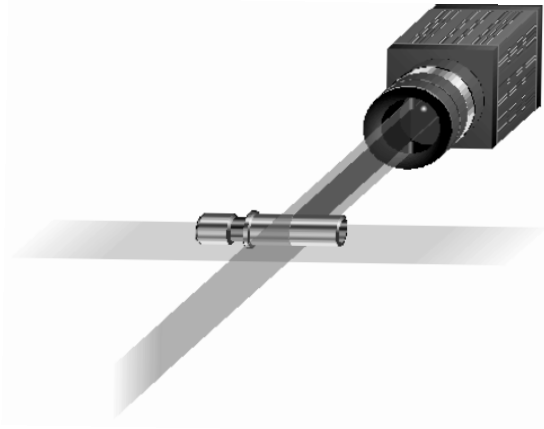
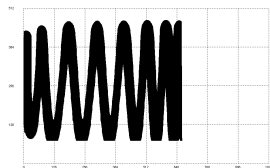## What does the camera see?

Part to be checked
Brass sleeve

Part to be checked
Valve spring

Part to be checked
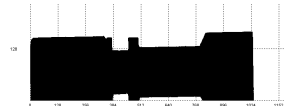Plug connector

Camera image
Brass sleeve

Camera image
Valve spring

Camera image
Plug connector

Part to be checked
Unmachined rod clevis

Part to be checked
Link plate

Part to be checked
Insulating terminal insert

Camera image
Unmachined rod clevis

Camera image
Link plate

Camera image
Insulating terminal insert
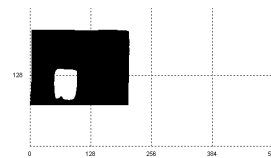
Checkbox CHB

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Product range and peripherals overview

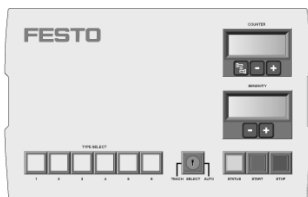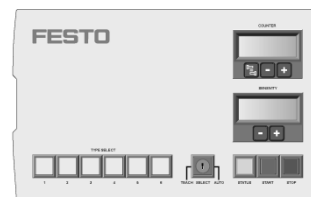| Possible combinations		
Identbox CHB-IB	Countbox CHB-CB	Sortbox CHB-SB
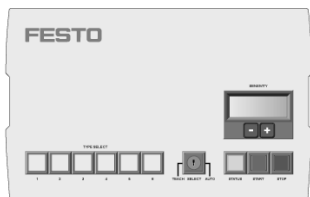
Technical data ➜ 10   Technical data ➜ 10   Technical data ➜ 10

Connecting cable
Control unit/conveying unit

Cable lengths: 2 m
                   3 m
                   5 m
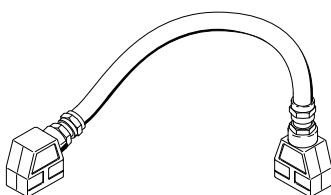
Conveying unit		Tunnel version	
with reject positions and conveyor belt		without reject positions and conveyor belt	

Part ∅	0.5 ... 10 mm	Part ∅	3 ... 30 mm
Part length:	3 mm and above	Part length:	3 mm and above
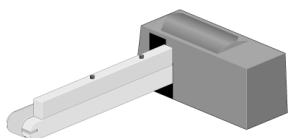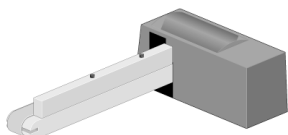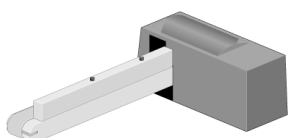
Part ∅	3 ... 30 mm	Part ∅	3 ... 80 mm
Part length:	3 mm and above	Part length:	5 mm and above

Part ∅	3 ... 80 mm
Part length:	5 mm and above

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Selection aid

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Product features			
	Identbox CHB-IB	**Countbox CHB-CB**	**Sortbox CHB-SB**
Performance characteristics			
Basic unit with full checking functionality	■	■	■
Up to 48 parts can be taught-in	■	■	■
Three feed paths: – Good parts › to the assembly station – Incorrectly oriented parts › back to the bowl feeder – Defective or foreign parts › to the reject bin	■	■	■
Automatic control of the bowl feeder	■	■	■
Monitoring of part buffer zones	■	■	■
Self-diagnosis	■	■	■
Can be remote-controlled	■	■	■

Integrated counting function:
– 1 … 10 million parts can be pre-selected
  – When desired quantity is reached › signal to downstream machine
  – Upon acknowledgement › start of next cycle
– Continuous counting for production monitoring
		■	■

Simultaneous conveying of different part types and sorting into different buffer zones			■
Compiling of several parts			■
Sample applications			
Correctly oriented feeding at high cycle rates	■	■	■
Automatic rejection of defective or foreign parts	■	■	■
Quality inspection of turned and milled components for chips, burrs, etc.	■	■	■
Ejection of end pieces following automatic bar turning	■	■	■
Feeding of predetermined quantities of parts for packaging and compiling functions		■	■
Set feeding of small parts on to assembly pallets		■	■
Triggering of maintenance cycles		■	■
Feeding to several buffer zones from one bowl feeder (space saving)			■
Packaging terminal: Fully-automated control and monitoring of compiling procedures with several parts and different numbers of items			■
Sorting of mixed parts (e.g. after galvanising or grinding)			■

Checkbox CHB

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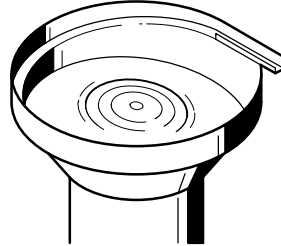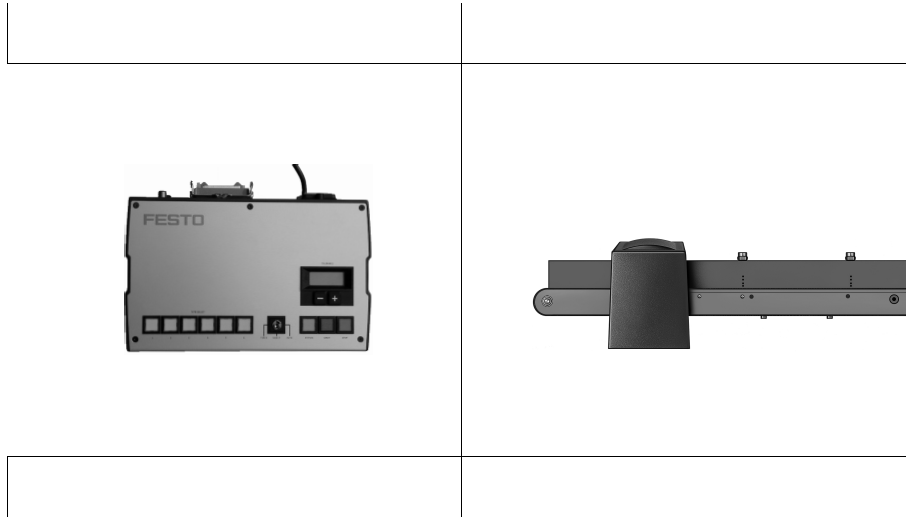
Sample applications

Feeding of parts

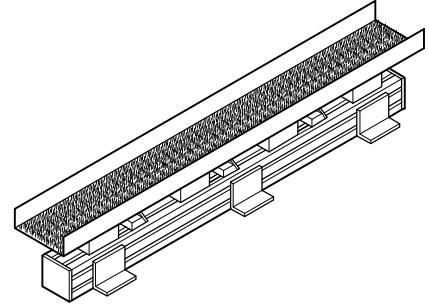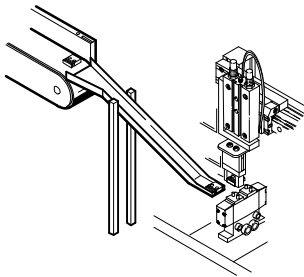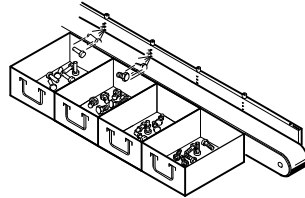| Vibratory bowl feeder	Centrifugal bowl feeder	Linear conveyor
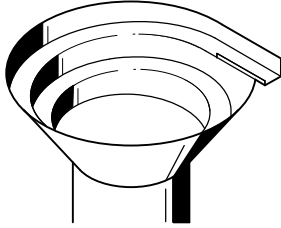
Transfer of parts

Slide into the processing centre	Chute	Downpipe	Triple buffer zone
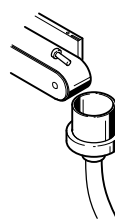
Checkbox CHB

FESTO
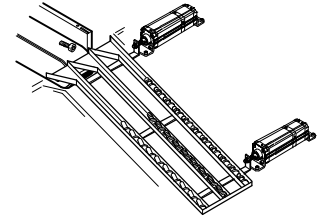
Type code

CHB – SB – F30 – L4P – K20 – D – EC – V33 – VA – BTA

Basic function	
CHB	Checkbox family

Control function	
IB	Identbox
CB	Countbox
SB	Sortbox

Component size	
F10	for ⌀ 0.5 … 10 mm
F30	for ⌀ 3 … 30 mm
F80	for ⌀ 3 … 80 mm

Transport function	
L2P	2 reject pos., belt transport dir.: to the left
R2P	2 reject pos., belt transport dir.: to the right
L4P	4 reject pos., belt transport dir.: to the left
R4P	4 reject pos., belt transport dir.: to the right
L6P	6 reject pos., belt transport dir.: to the left
R6P	6 reject pos., belt transport dir.: to the right
TU	without reject positions and conveyor belt

Connecting cable	
K20	2 m long
K30	3 m long
K50	5 m long

User manual	
D	German
E	English
F	French
S	Spanish
I	Italian

Additional function	
EC	Encoder

Field of view	
V10	Adjustment to 10 mm
V20	Adjustment to 20 mm
V33	Adjustment to 33 mm

Guiding bar material	
VA	Stainless steel

Alternative conveyor belts	
BTA	with longitudinal ridges
BTB	with longitudinal recesses

Checkbox CHB

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Technical data

Identbox
CHB-IB

Countbox
CHB-CB

Sortbox
CHB-SB

CHB-IB-...   CHB-CB-.../CHB-SB-...

General technical data				
For part sizes		⌀ 10 mm	⌀ 30 mm	⌀ 80 mm
Min. component ⌀	[mm]	0.5	3	3
Max. component ⌀	[mm]	10	30	80
Min. component length	[mm]	3	3	5
Max. component length		Dependent on belt speed and required resolution		
Component range		Rotationally symmetrical parts and pre-oriented parts of any shape		
Camera resolution	[mm]	0.02	0.1	
Exposure time	[µs]	72 ... 8 192		136 ... 8 192
Number of part memories		48		
Max. number of different orientations per memorised part		8		
Orientation		Part orientation function within checking and counting process can be switched off		
Belt speed	[mm/s]	200 (adjustable: 100 ... 250)	300 (adjustable: 100 ... 400)	
Conveyor rate of good parts		Depending on the size of the component, the number and frequency of the supplied and requested component orientations. Example: 4 screws (M3x25) per second, in the correct position for mounting 4 axes (⌀ 18 x 5 mm) per second, for quality check		
Only with CHB-CB and CHB-SB				
Quantity pre-selection		CheckOpti software		
Counting range		1 ... 10 million per part type		

Electrical data		
Operating voltage range AC	[V]	85 ... 264 (at 50/60 Hz)
Max. power consumption	[VA]	100
Internal fuse protection		1 A, slow-blowing, safety circuit breaker integrated in mains switch

Operating and environmental conditions		
Ambient temperature	[°C]	10 ... 50
Protection class		IP54
Operating medium		Compressed air in accordance with ISO 8573-1:2010 [7:4:4]
Note on operating/pilot medium		Operation with lubricated medium not possible
Operating pressure	[bar]	6
Installation site		Dry, screened from extreme external light sources, cleanest possible ambient air

Checkbox CHB
Technical data

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Interfaces			
PLC coupling outputs			The connection of an external power supply is recommended in order to achieve full electrical isolation. Load per output: < 100 mA, total load < 1 A
			Ready for operation
			Error output
			Feeder control
			Conveyor belt control
			Part acceptable and correctly oriented
			Part acceptable but incorrectly oriented
			Wrong part
	Additionally with	CHB-CB CHB-SB	Pre-selected counter reading reached
		CHB-SB	1 … 6 (recognised type)
PLC coupling inputs			External type select
			External start
			Buffer zone sensors
			External sensor
	Additionally with	CHB-CB CHB-SB	Start new counting cycle
Diagnostic interface			RS 232 interface (115 kBaud), socket, M12x1, 4-pin
			Cable included in scope of delivery

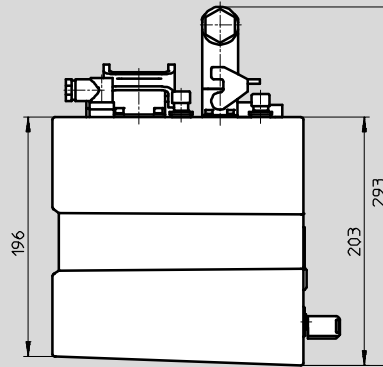| Weights [g]			
For part sizes	⌀ 10 mm	⌀ 30 mm	⌀ 80 mm
Control unit	6 000		
Conveying unit with 2 reject positions	4 000	7 000	12 000

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Technical data

Dimensions

Download CAD data ➔ **www.festo.com**

Control unit
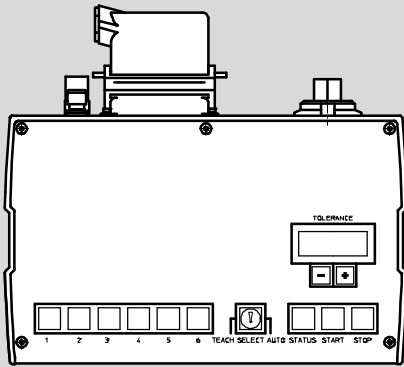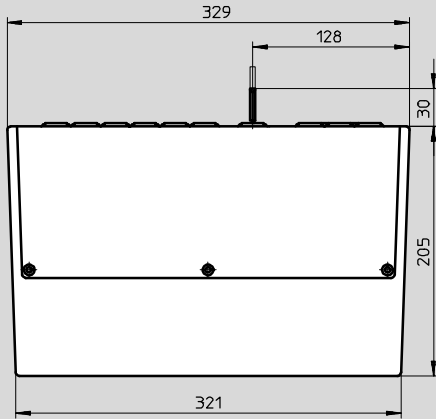
[1] PLC coupling
[2] RS 232 diagnostic interface
[3] Small-parts conveyor control
[4] Buffer zone sensors
[5] Cable to conveying unit

Rear view (rotated 180°)

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Technical data

Dimensions – Conveying unit, part sizes up to ⌀ 10 mm

Download CAD data → **www.festo.com**
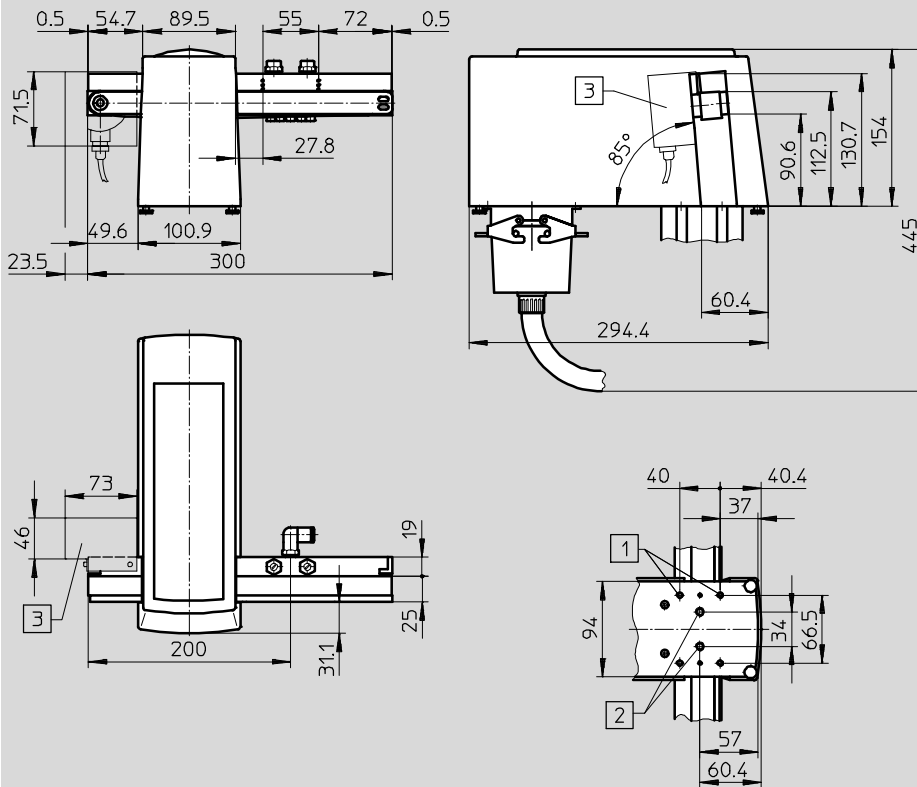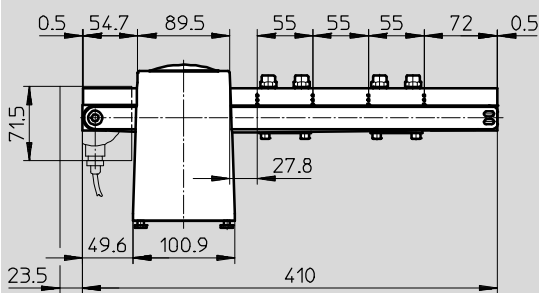
2 reject positions

[1] 4x connecting thread M6 for 80x80 mm profile support
[2] 2x connecting thread M8 for 50x50 mm profile support
[3] Encoder (optional)
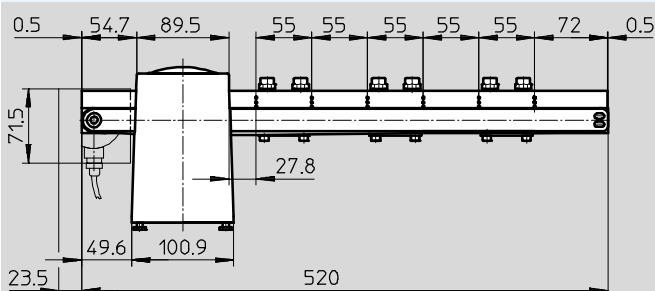
4 reject positions

6 reject positions

Checkbox CHB

Technical data

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Dimensions – Conveying unit, part sizes up to ⌀ 30 mm

Download CAD data ➜ **www.festo.com**
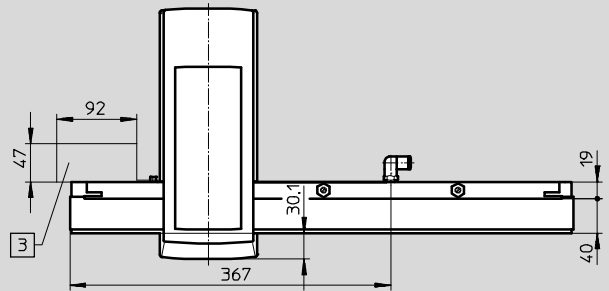
2 reject positions

1	4x connecting thread M6 for 80x80 mm profile support
2	2x connecting thread M8 for 50x50 mm profile support
3	Encoder (optional)

4 reject positions

6 reject positions

Checkbox CHB

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Technical data

Dimensions – Conveying unit, part sizes up to ∅ 80 mm

Download CAD data ➔ **www.festo.com**

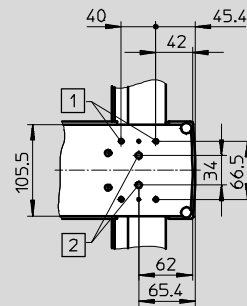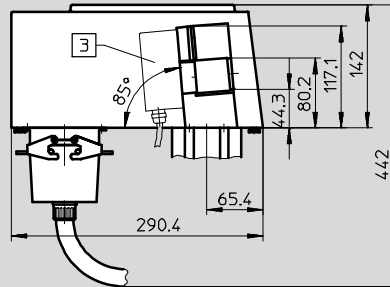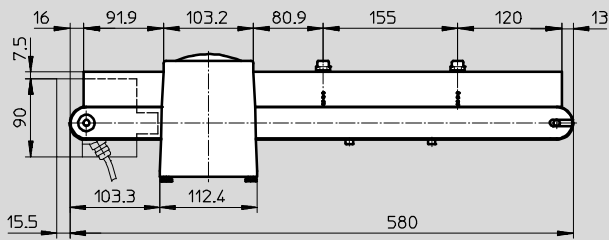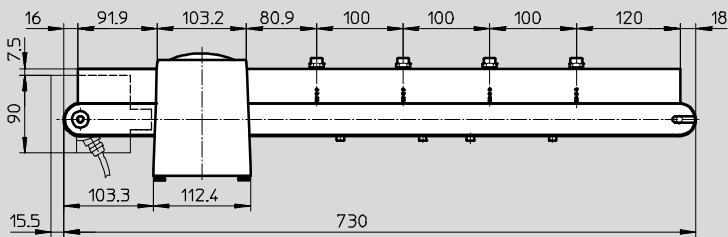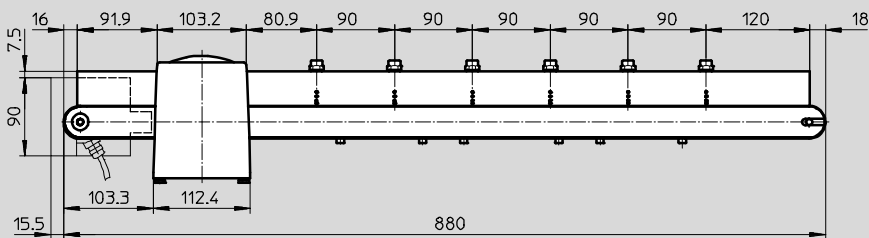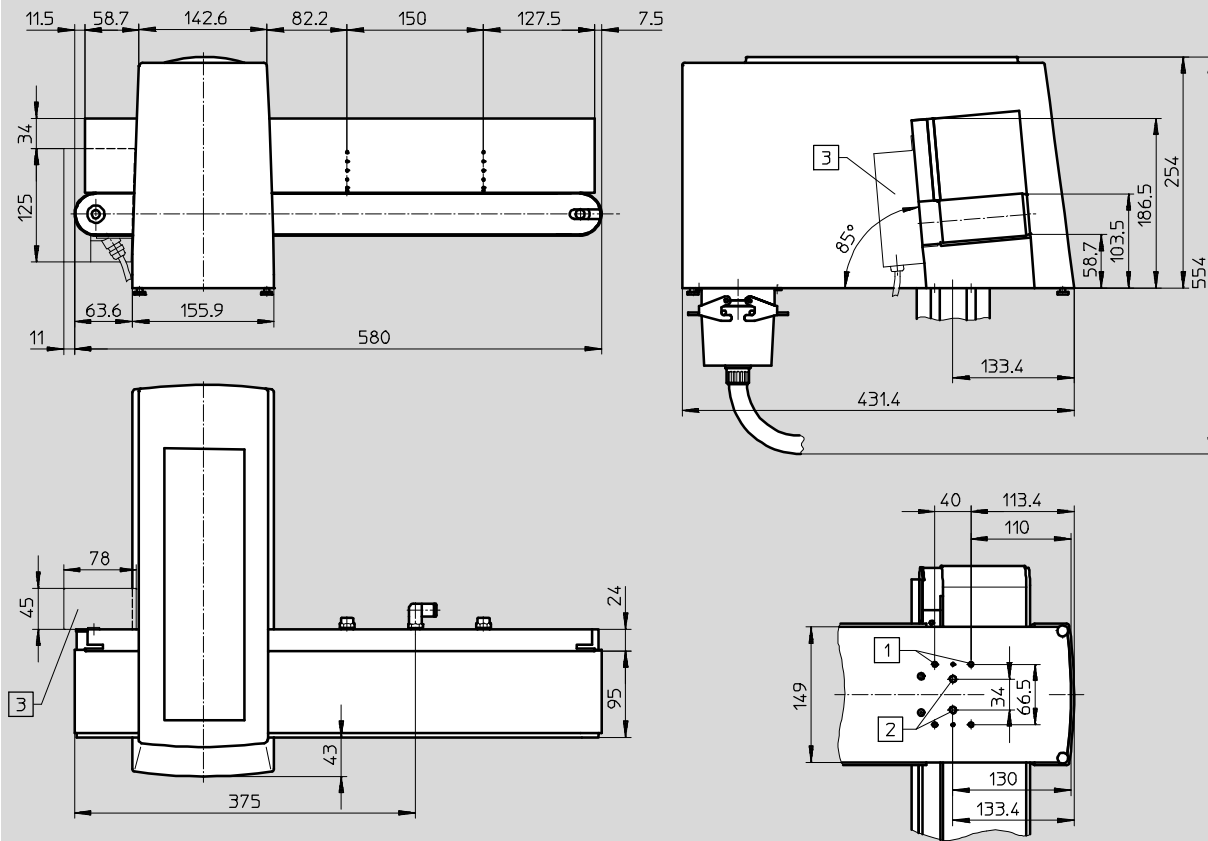2 reject positions

1	4x connecting thread M6 for 80x80 mm profile support
2	2x connecting thread M8 for 50x50 mm profile support
3	Encoder (optional)

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Technical data

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Dimensions – Tunnel variant, for part sizes up to ⌀ 30 mm

Without reject positions and conveyor belt

Download CAD data ➜ **www.festo.com**

|1| 2x connecting thread M8 for 50x50 mm profile support
|2| Part sizes ⌀ 3 ... ⌀ 30 mm
|3| Conveyor belt
|4| Guiding bar
|5| Provide cutout for camera light beam (approx. 5°)

Dimensions – Tunnel variant, for part sizes up to ⌀ 80 mm

Without reject positions and conveyor belt

Download CAD data ➜ **www.festo.com**

|1| 2x connecting thread M8 for 50x50 mm profile support
|2| Part sizes ⌀ 3 ... ⌀ 80 mm
|3| Conveyor belt
|4| Guiding bar

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Accessories

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Dimensions – Mounting options   Download CAD data → **www.festo.com**

50x50 mm profile support

50
34
M8

2
15

1
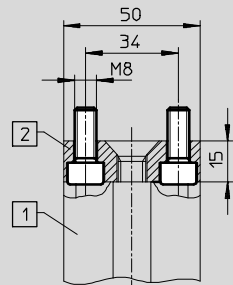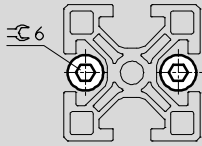
|1| 50x50 mm profile support
|2| Profile connector HV-50
as adapter

80x80 mm profile support

2
66.5
80
1
40
80

M6
3

1

|1| 80x80 mm profile support
|2| Automatic profile connector
|3| 4 socket head screws
M6x40 DIN 912

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Ordering data – Modular products

M	Mandatory data					➜

Module No.	Basic function	Control function	Component size	Transport function	Connecting cable	User manual
197890	CHB	IB CB SB	F10 F30 F80	L2P R2P L4P R4P L6P R6P TU	K20 K30 K50	D E F S I

Ordering example
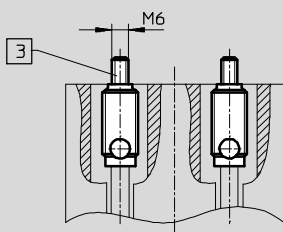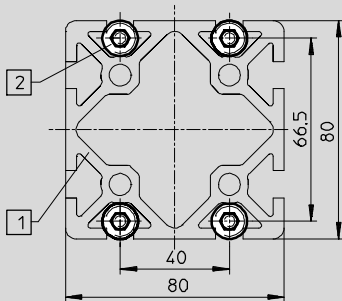
197890	CHB	–	SB	–	F30	–	L4P	–	K20	–	D

Ordering table

			Condi-tions	Code	Enter code
M	Module No.	**197890**			
	Basic function	Checkbox family		**CHB**	CHB
	Control function	Identbox		**-IB**	
		Countbox		**-CB**	
		Sortbox		**-SB**	
	Component size	Part size $\varnothing$ 0.5 … 10 mm, part length 3 mm and above		**-F10**	
		Part size $\varnothing$ 3 … 30 mm, part length 3 mm and above		**-F30**	
		Part size $\varnothing$ 3 … 80 mm, part length 5 mm and above		**-F80**	
	Transport function	2 reject positions, belt transport direction: to the left		**-L2P**	
		2 reject positions, belt transport direction: to the right		**-R2P**	
		4 reject positions, belt transport direction: to the left	1	**-L4P**	
		4 reject positions, belt transport direction: to the right	1	**-R4P**	
		6 reject positions, belt transport direction: to the left	1	**-L6P**	
		6 reject positions, belt transport direction: to the right	1	**-R6P**	
		No reject positions and conveyor belt	2	**-TU**	
	Connecting cable	Cable length 2 m		**-K20**	
		Cable length 3 m		**-K30**	
		Cable length 5 m		**-K50**	
	User manual	German		**-D**	
		English		**-E**	
		French		**-F**	
		Spanish		**-S**	
		Italian		**-I**	

1 **L4P, R4P, L6P, R6P** Not in combination with component size F80.

2 **TU** Not in combination with component size F10.

Transfer order code

197890	CHB	–		–		–		–		–	

Checkbox CHB

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Ordering data – Modular products

O Options			
Additional function	**Field of view**	**Guiding bar material**	**Alternative conveyor belt**
EC	V10 V20 V33	VA	BTA BTB

– **EC** – **V33** – **VA** – **BTA**

Ordering table			Condi-tions	Code	Enter code
↓ Additional function	Encoder			**-EC**	
O Field of view	Adjustment of field of view to 10 mm		3	**-V10**	
	Adjustment of field of view to 20 mm		3	**-V20**	
	Adjustment of field of view to 33 mm		3	**-V33**	
Guiding bar material	Stainless steel		4	**-VA**	
Alternative conveyor belt	Conveyor belt with longitudinal ridges		4 5	**-BTA**	
	Conveyor belt with longitudinal recesses		4 5	**-BTB**	

3 **V10, V20, V33**
   Only with component size F30.

4 **VA, BTA, BTB** Not in combination with transport function TU.
5 **BTA, BTB** Not in combination with component size F80.

Transfer order code

– – – –

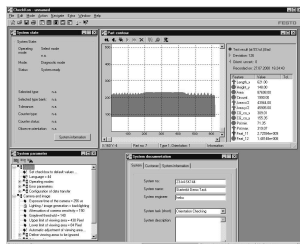➔ **Internet: www.festo.com/catalogue/...**

Checkbox CHB
Accessories

FESTO

## Software to meet individual requirements

CheckKon

Performance characteristics

Using this software the processes within the Checkbox can be displayed, logged and adapted from the camera image evaluation through to the I/O parameters.

This means:
- Transfer of new programs to the Checkbox
- Display and editing of system parameters
- Display of the evaluation of the last inspected parts recorded
- Display and logging of part contour and characteristics derived
- Display and print-out of system configuration

CheckOpti
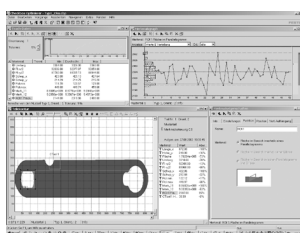
Performance characteristics

"CheckOpti" is used in cases where the standard Checkbox learning program reaches its limits due to the fact that contour differences are too small, meaning that part orientation or quality features cannot be reliably recognised.

"CheckOpti" facilitates a complete analysis of the Checkbox recognition processes based upon contour data for the parts to be checked.
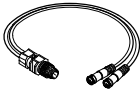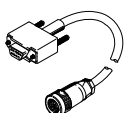
Additional, high performance test features can be defined and optimised if necessary. The new configuration can be subsequently transferred to the Checkbox.
Further product information
➔ Internet: sbox-q

Ordering data – Software				
	Version	Language	Part No.	Type
	CheckKon software	German, english	**194496**	**P.SW-KON**
	CheckOpti software	German, english	**568339**	**P.SW-OPTI**

Ordering data					
	Application	Connection	Cable length [m]	Part No.	Type
DUO cable				Technical data ➔ Internet: km12-duo	
	Connect buffer zone sensors	Straight plug, M12x1, 4-pin 2x straight socket, M8x1, 3-pin	0.6	**18685**	**KM12-DUO-M8-GDGD**
Connecting cable				Technical data ➔ Internet: km12-m12	
	Connect buffer zone sensors	Straight plug, M12x1, 4-pin Straight socket, M12x1, 4-pin	2.5	**18684**	**KM12-M12-GSGD-2,5**
			5	**18686**	**KM12-M12-GSGD-5**
Programming cable				Technical data ➔ Internet: kdi	
	On diagnosis	Straight socket, M12x1, 4-pin Straight socket, Sub-D, 9-pin	5	**150268**	**KDI-SB202-BU9**

Checkbox CHB
Sample applications

FESTO

Orientation detection and quality inspection of lipstick tubes

The part check is carried out at a speed of 30 parts/s directly in a centrifuge.

The Checkbox controls the complete feed process, e.g. the start and switch-off reaction of the centrifuge or the rejection of incorrectly orientated or faulty parts.

The following features are checked:
- Orientation on the basis of a chamfer
- Length
- Diameter
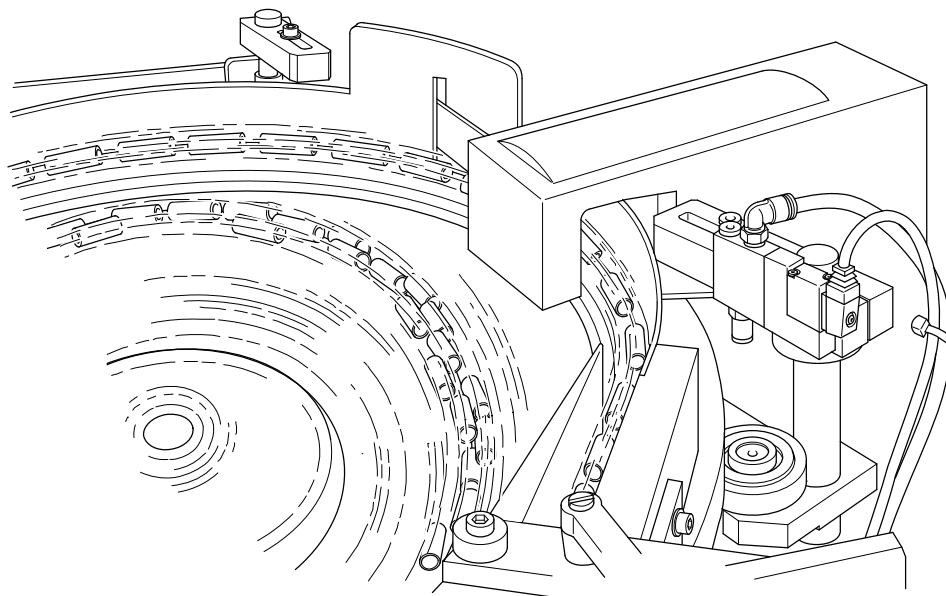
Orientation detection and type identification of valve springs

Checking valve springs and controlling the integrated turning station for the supply in a measuring and marking system. The Checkbox distinguishes reliably more than 100 spring types and by means of an electronic type memory permits conversion by the pressing of a button.

The following features are checked:
- Orientation
- Length
- Diameter