



- Designed to meet the needs of industry
- Easy to use
- Sturdy construction and high functionality
- High reliability and checking performance

Checkbox CHB

Key features



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

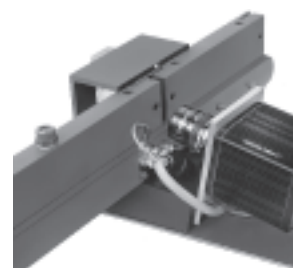
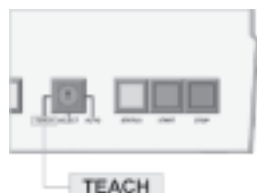
- Automatic Teach-in of new parts in seconds, no programming required
- Robust recognition algorithm based on part characteristics
- Up to 48 different parts can be saved to memory

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



Checkbox CHB

Key features



Key features

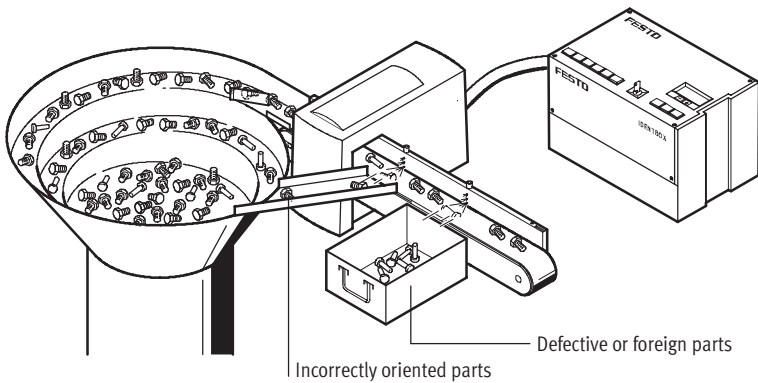
The Checkbox family CHB

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.



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

Key features

FESTO

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

Contour recognition using back-lighting method



What does the camera see?

Part to be checked
Brass sleeve



Camera image
Brass sleeve



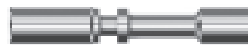
Part to be checked
Valve spring



Camera image
Valve spring



Part to be checked
Plug connector



Camera image
Plug connector



Part to be checked
Unmachined rod clevis



Camera image
Unmachined rod clevis



Part to be checked
Link plate



Camera image
Link plate



Part to be checked
Insulating terminal insert



Camera image
Insulating terminal insert



Checkbox CHB

Product range and peripherals overview

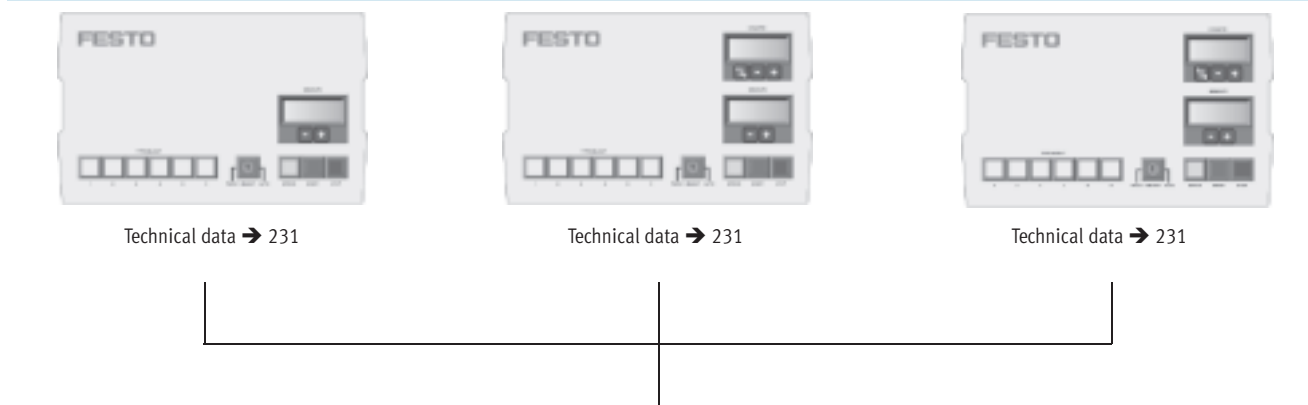


Product range and peripherals overview

Vision systems
Visual orientation detection and quality inspection

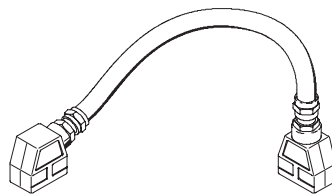
2.1

Possible combinations



Connecting cable Control unit/conveying unit

Cable lengths: 2 m
3 m
5 m



Conveying unit	Tunnel version	OEM version
with reject positions and conveyor belt	without reject positions and conveyor belt	without reject positions, conveyor belt and housing
Part Ø: 0.5 ... 10 mm Part length: 3 mm and above	Part Ø: 3 ... 30 mm Part length: 3 mm and above	Part Ø: 3 ... 30 mm 3 ... 80 mm Part length: 3 mm and above
Part Ø: 3 ... 30 mm Part length: 3 mm and above	Part Ø: 3 ... 80 mm Part length: 5 mm and above	
Part Ø: 3 ... 80 mm Part length: 5 mm and above		






Checkbox CHB

Selection aid



Selection aid

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)			•

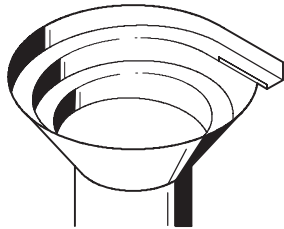
Checkbox CHB

Sample applications

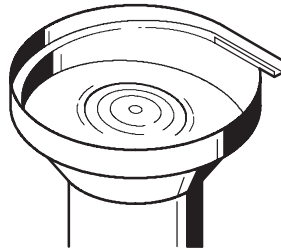


Feeding of parts

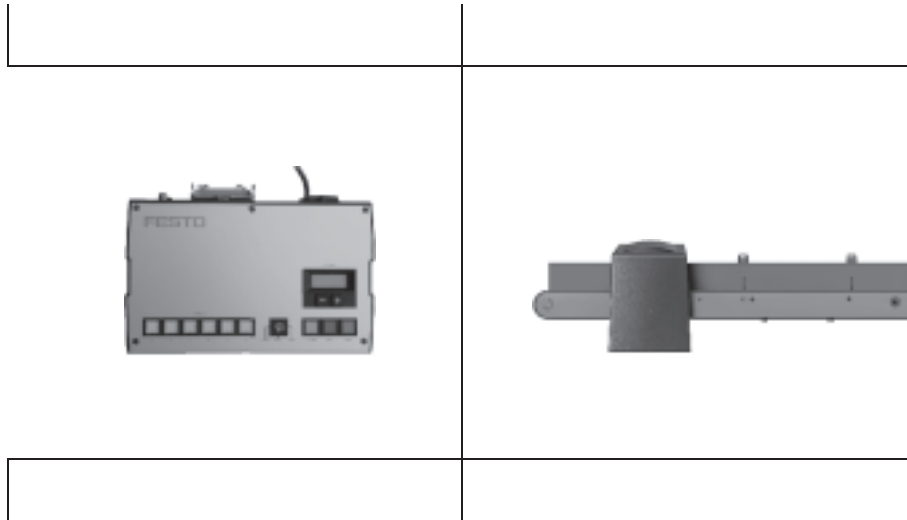
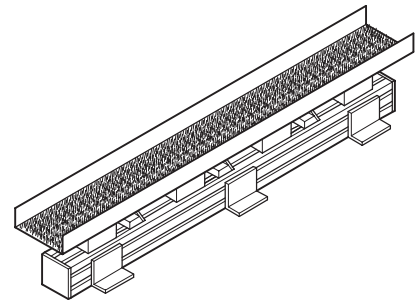
Vibratory bowl feeder



Centrifugal bowl feeder

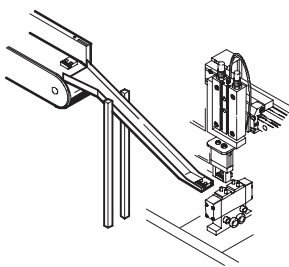


Linear conveyor

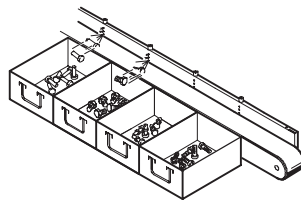


Transfer of parts

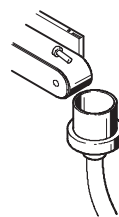
Slide into the processing centre



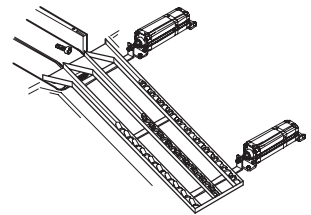
Chute



Downpipe



Triple buffer zone



2.1 Vision systems
Visual orientation detection and quality inspection

2.1

Checkbox CHB

Type code

		CHB	-	SB	-	F30	-	L4P	-	K20	-	D	-	EC	-	V33	-	VA	-	BTA	-	UE	-	MP	
Basic function																									
CHB	Checkbox family																								
Control function																									
IB	Identbox																								
CB	Countbox																								
SB	Sortbox																								
Component size																									
F10	for Ø 0.5 ... 10 mm																								
F30	for Ø 3 ... 30 mm																								
F80	for Ø 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																								
OEM	without reject positions, conveyor belt and housing																								
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																								
BTD	with smooth surface, made of silicone																								
Belt end																									
UE	Guide roller unit with belt																								
Accessories																									
MP	Mounting plates																								

Checkbox CHB

Technical data

Technical data

Identibox

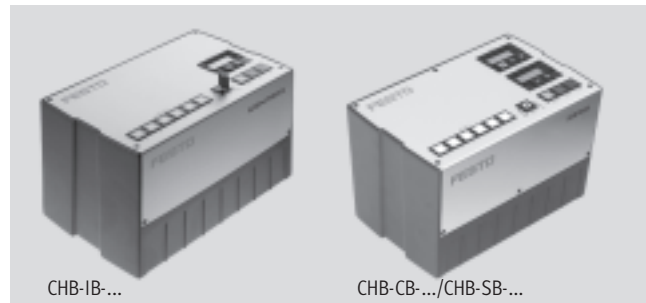
CHB-IB

Countbox

CHB-CB

Sortbox

CHB-SB



General technical data			
For part sizes	Ø 10 mm	Ø 30 mm	Ø 80 mm
Component Ø	0.5 ... 10	3 ... 30	3 ... 80
Component length [mm]	3 and above	3 and above	5 and above
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		
Orientation	Max. 8 different orientations per part type		
Only with CHB-CB and CHB-SB			
Quantity pre-selection	Required quantities can be pre-selected separately for all stored parts		
Counting range	1 ... 10 million per part type		

Electrical connection technology			
Operating voltage [V AC]	85 ... 264 (at 50/60 Hz), automatic detection		
Max. power consumption [VA]	100		

Operating and environmental conditions			
Operating medium	Filtered, unlubricated compressed air		
Operating pressure [bar]	0 ... 6		
Temperature range [°C]	10 ... 50 (non-condensing)		
Protection class	IP54		
Installation site	Dry, screened from extreme external light sources, cleanest possible ambient air		

Checkbox CHB

Technical data



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 CHB-SB	Pre-selected counter reading reached 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 for laptop connection (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

Checkbox CHB

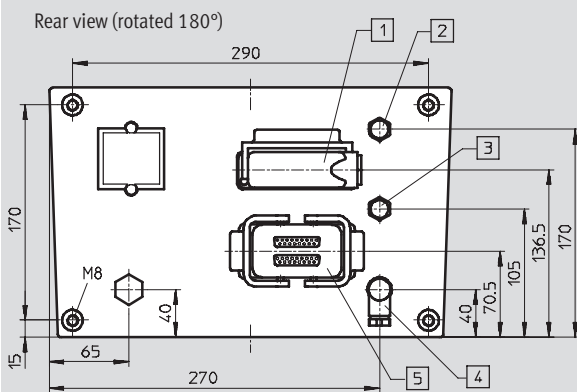
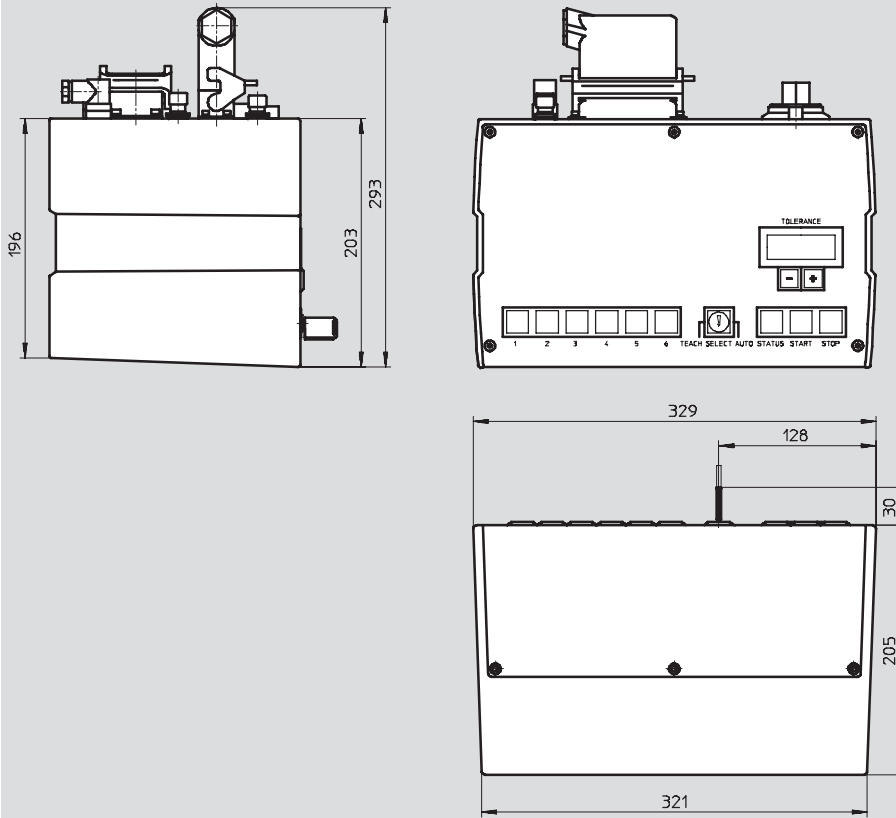
Technical data



Dimensions

Download CAD data → www.festo.com/en/engineering

Control unit



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

Checkbox CHB

Technical data



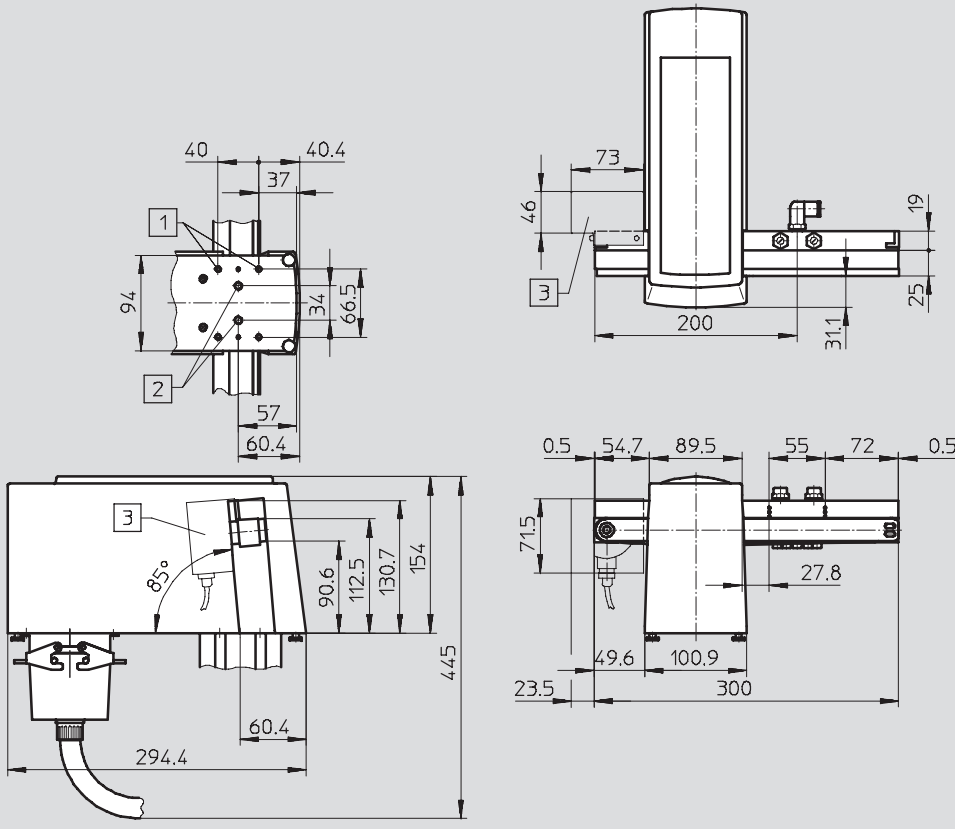
Vision systems
Visual orientation detection and quality inspection

2.1

Dimensions – Conveying unit, part sizes up to $\varnothing 10$ mm

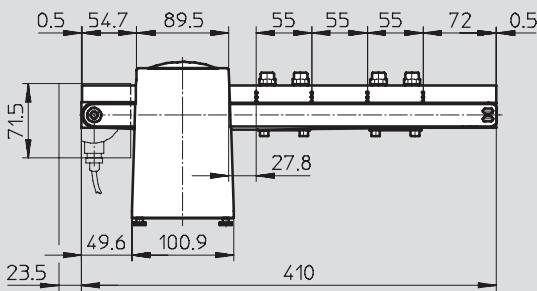
Download CAD data → www.festo.com/en/engineering

2 reject positions

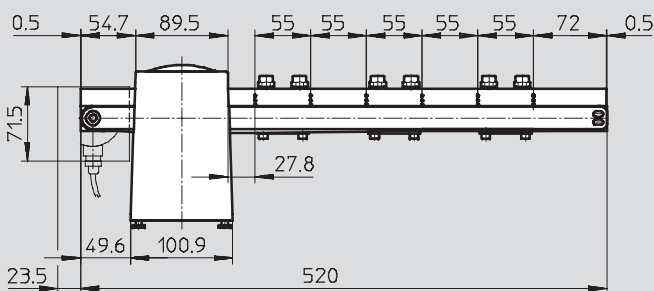


- 1 4x connecting thread M6 for 80x80 mm profile support
- 2 2x connecting thread M8 for 50x50 mm profile support
- 3 Encoder (optional)

4 reject positions



6 reject positions



Checkbox CHB

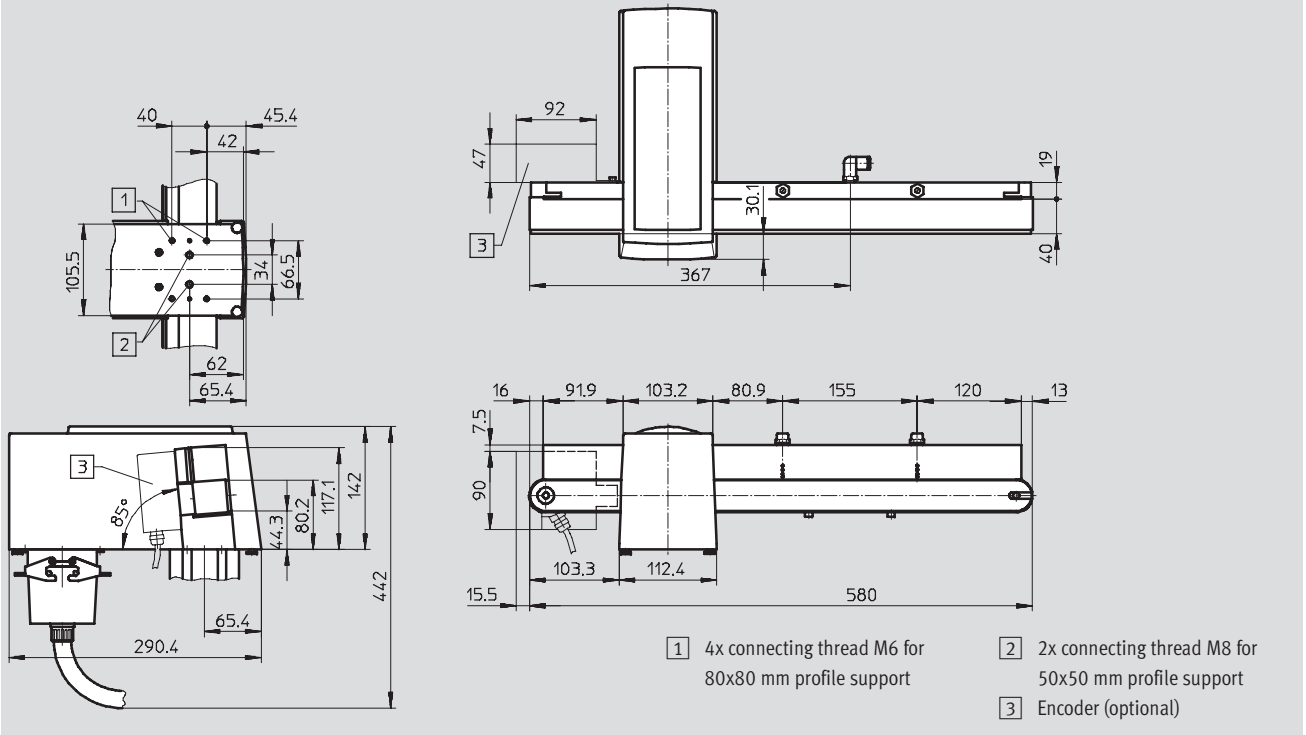
Technical data



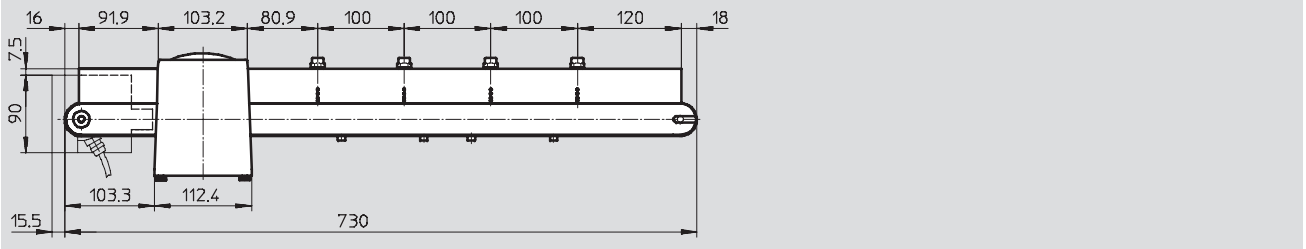
Dimensions – Conveying unit, part sizes up to $\varnothing 30$ mm

Download CAD data → www.festo.com/en/engineering

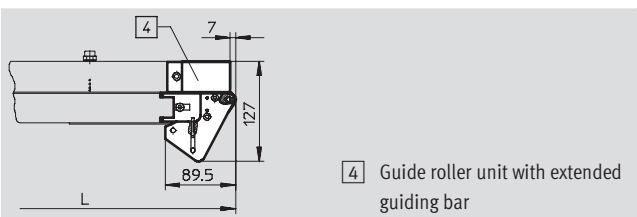
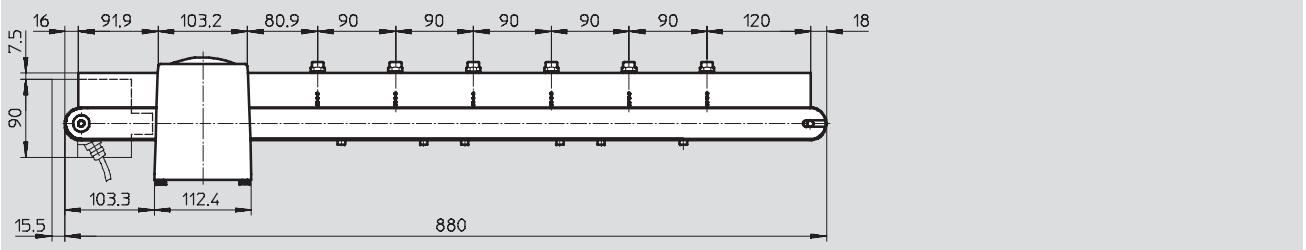
2 reject positions



4 reject positions



6 reject positions



Guide roller unit	
Reject positions	L
2	632
4	782
6	932

2.1
 Vision systems
 Visual orientation detection and quality inspection

Checkbox CHB

Technical data

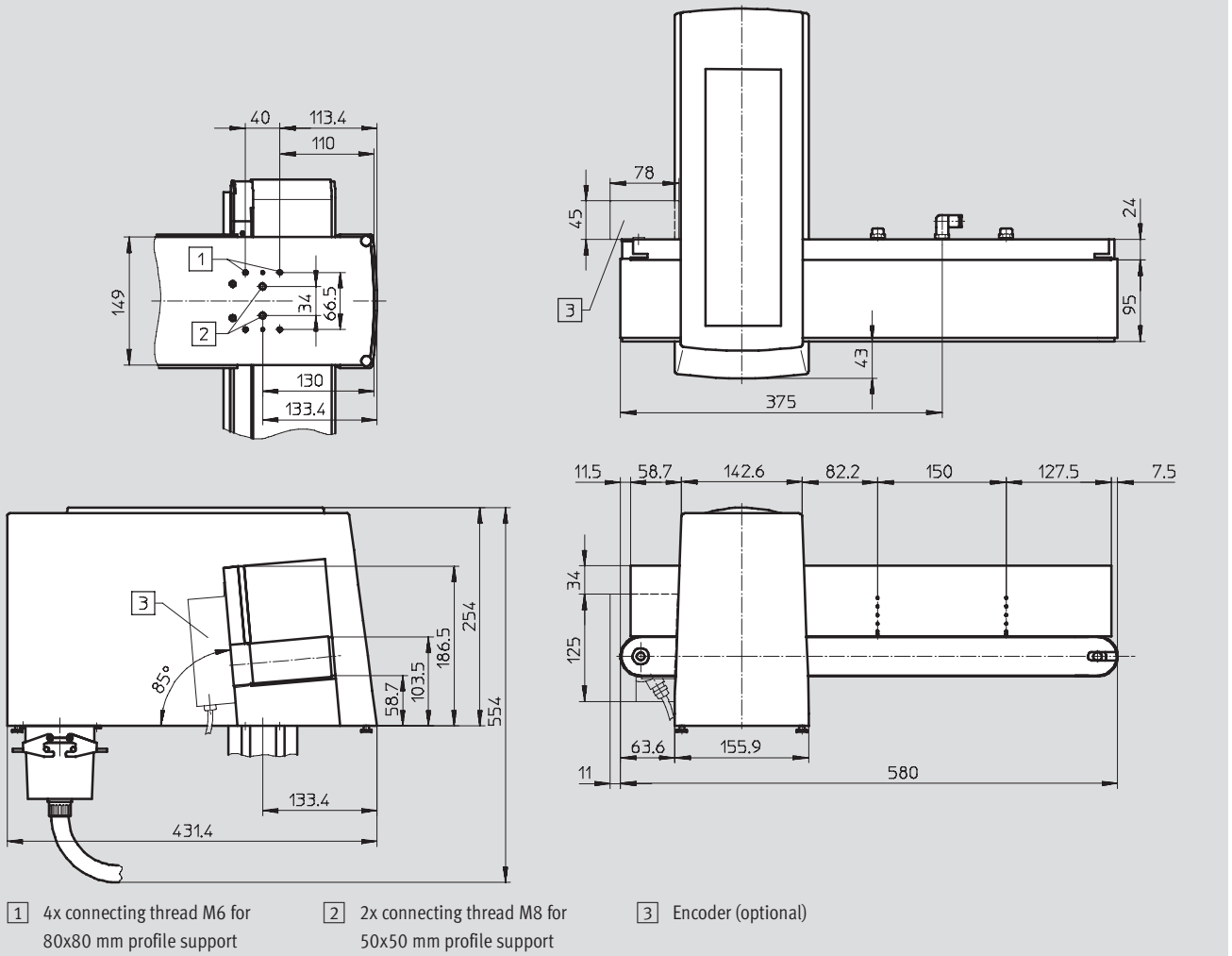


2.1 Vision systems
Visual orientation detection and quality inspection

Dimensions – Conveying unit, part sizes up to $\varnothing 80$ mm

Download CAD data → www.festo.com/en/engineering

2 reject positions



Checkbox CHB

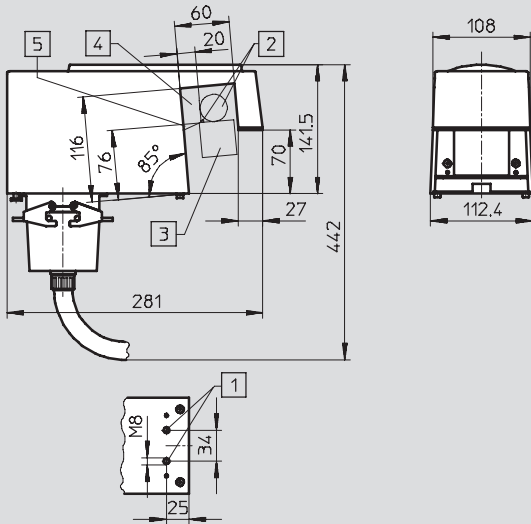
Technical data



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

Download CAD data → www.festo.com/en/engineering

Without reject positions and conveyor belt

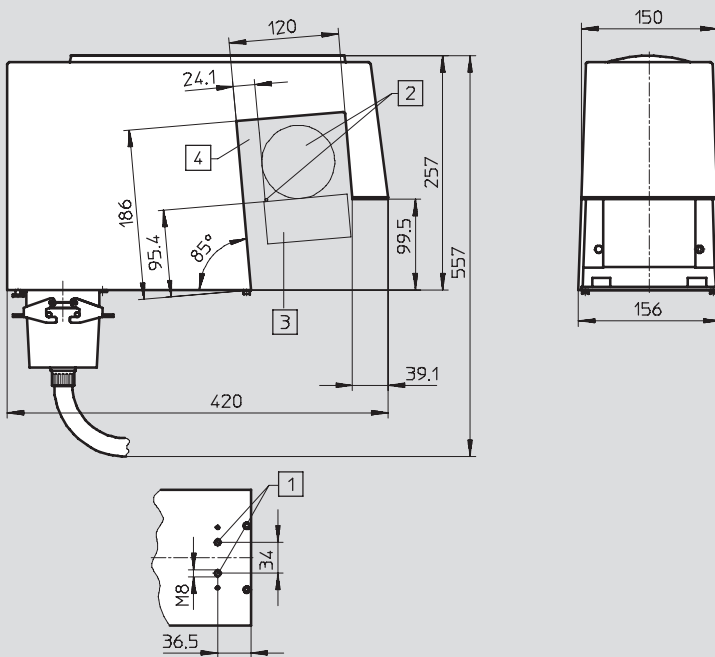


- 1 2x connecting thread M8 for 50x50 mm profile support
- 2 Part sizes \varnothing 3 ... \varnothing 30 mm
- 3 Conveyor belt
- 4 Guiding bar
- 5 Provide cutout for camera light beam (approx. 5°)

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

Download CAD data → www.festo.com/en/engineering

Without reject positions and conveyor belt



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

Checkbox CHB

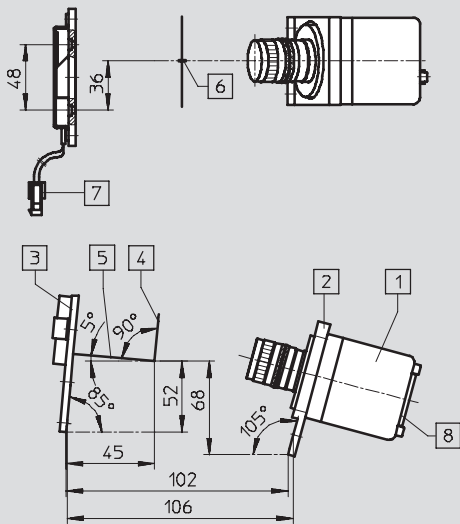
Technical data



Dimensions – OEM variant, for part sizes up to $\varnothing 30$ mm

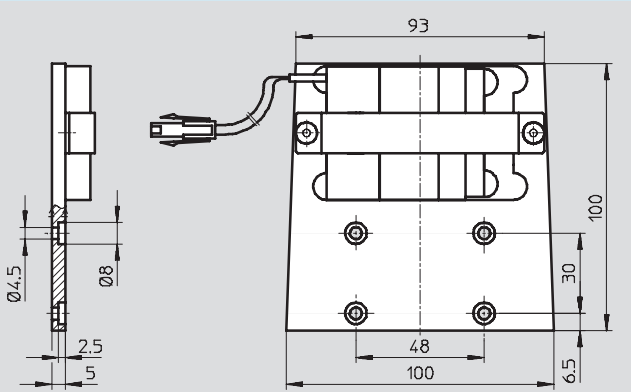
Download CAD data → www.festo.com/en/engineering

Without reject positions, conveyor belt and housing

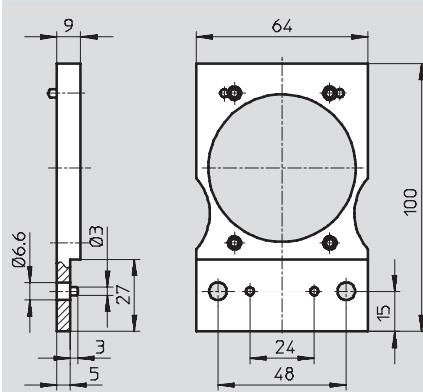


- 1 Camera with adapter, lens and extension tube
- 2 Camera bracket
- 3 Lighting bracket
- 4 Guiding bar for part guide
- 5 Parts conveyor
- 6 Viewing slot, 1 mm wide
- 7 Connection for light
- 8 Connection for camera

Lighting bracket



Camera bracket



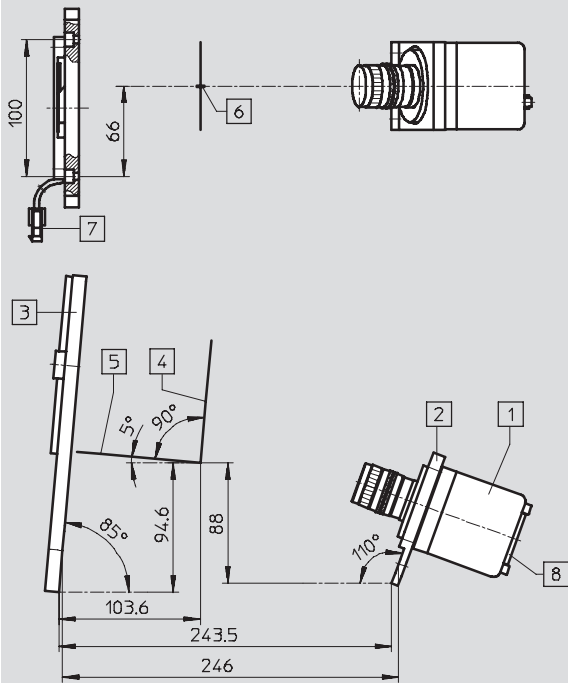
Checkbox CHB

Technical data

Dimensions – OEM variant, for part sizes up to $\varnothing 80$ mm

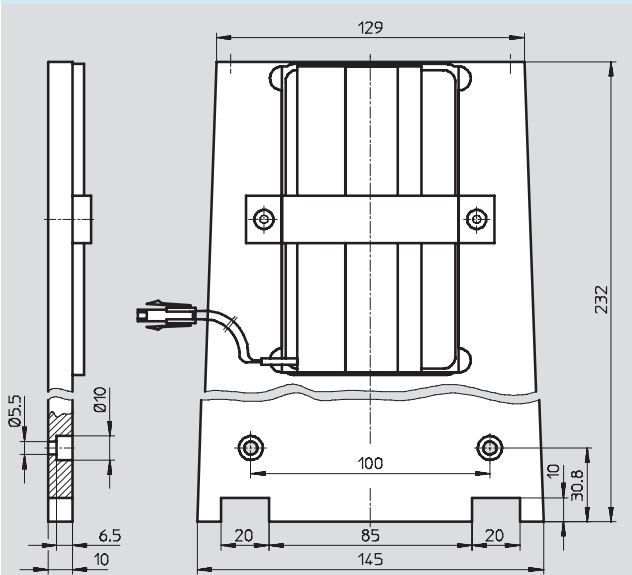
Download CAD data → www.festo.com/en/engineering

Without reject positions, conveyor belt and housing

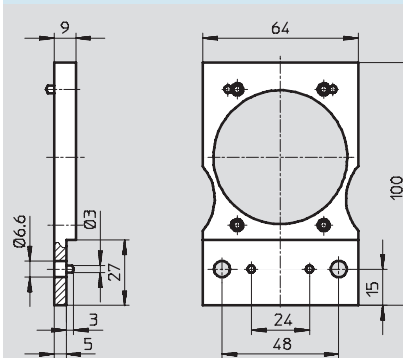


- 1 Camera with adapter, lens and extension tube
- 2 Camera bracket
- 3 Lighting bracket
- 4 Guiding bar for part guide
- 5 Parts conveyor
- 6 Viewing slot, 1 mm wide
- 7 Connection for light
- 8 Connection for camera

Lighting bracket



Camera bracket



Checkbox CHB

Accessories

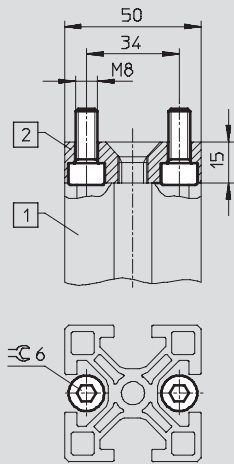


2.1 Vision systems
Visual orientation detection and quality inspection

Dimensions – Mounting options

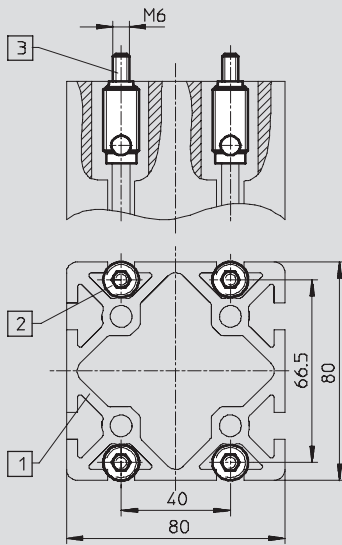
Download CAD data → www.festo.com/en/engineering

50x50 mm profile support



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

80x80 mm profile support



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

Checkbox CHB

Ordering data – Modular products



M Mandatory data →

Module No.	Basic function	Control function	Component size	Transport function	Connecting cable	User manual
197 890	CHB	IB CB SB	F10 F30 F80	L2P R2P L4P R4P L6P R6P TU OEM	K20 K30 K50	D E F S I
Ordering example						
197 890	CHB	- SB	- F30	- L4P	- K20	- D

Ordering table

		Condi- tions	Code	Enter code
M	Module No.	197 890		
	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	¹ -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	² -L4P	
		4 reject positions, belt transport direction: to the right	² -R4P	
		6 reject positions, belt transport direction: to the left	² -L6P	
		6 reject positions, belt transport direction: to the right	² -R6P	
		No reject positions and conveyor belt	³ -TU	
		No reject positions, conveyor belt and housing	³ -OEM	
	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 **F80** Not in combination with field of view V10 and V20.
- ² **L4P, R4P, L6P, R6P** Not in combination with component size F80.
- ³ **TU, OEM** Not in combination with component size F10.

Transfer order code

197 890 CHB - - - - -

Checkbox CHB

Ordering data – Modular products



Options

Additional function	Field of view	Guiding bar material	Alternative conveyor belt	Belt end	Accessories
EC	V10 V20 V33	VA	BTA BTB BTD	UE	MP
- EC	- V33	- VA	- BTA	- UE	- MP

Ordering table		Condi- tions	Code	Enter code
Additional function	Encoder		-EC	
Field of view	Adjustment of field of view to 10 mm	4	-V10	
	Adjustment of field of view to 20 mm	4	-V20	
	Adjustment of field of view to 33 mm	5	-V33	
Guiding bar material	Stainless steel		-VA	
Alternative conveyor belt	Conveyor belt with longitudinal ridges	6	-BTA	
	Conveyor belt with longitudinal recesses	6	-BTB	
	Conveyor belt with smooth surface, made of silicone	7	-BTD	
Belt end	Guide roller unit with belt	8	-UE	
Accessories (supplied loose)	Mounting plates		-MP	

- 4 **V10, V20** Not in combination with component size F10, F80.
- 5 **V33** Not in combination with component size F10.
- 6 **BTA, BTB** Not in combination with component size F80.
Not in combination with belt end UE.
- 7 **BTD** Not in combination with belt end UE.
- 8 **UE** Not in combination with component size F30.

Transfer order code

- - - - - -

Checkbox CHB

Accessories

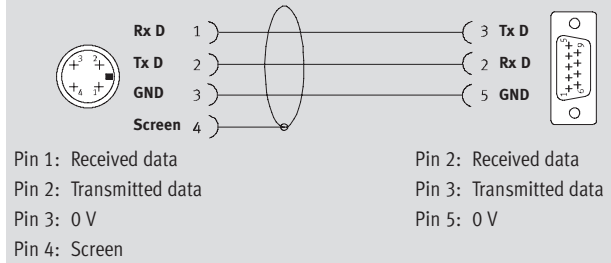


Programming cable KDI

Material:
 Cable sheath: Polyvinyl chloride
 Round connector:
 Polybutylenterephthalate
 Socket: Steel



Terminal allocation



Ordering data					
Cable length [m]	Plug	Socket	Weight [g]	Part No.	Type
5	M12, 4-pin	9-pin	181	150 268	KDI-SB202-BU9

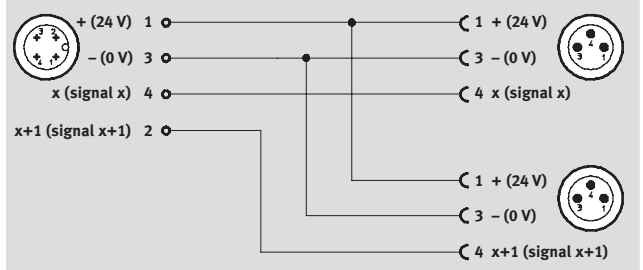
DUO cable KM12-DUO

for buffer zone sensors

Material:
 Cable sheath: Polyurethane
 Plug, socket: Polyurethane
 Knurled screw, locknut: Brass



Terminal allocation



Ordering data					
Cable length [m]	Plug	Socket	Weight [g]	Part No.	Type
0.6	M12, 4-pin	M8, 3-pin	58.2	18 685	KM12-DUO-M8-GDGD

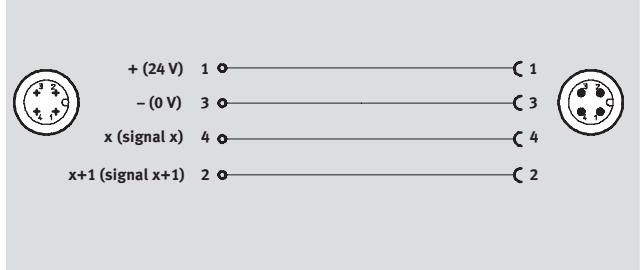
Connecting cable KM12-M12

for buffer zone sensors

Material:
 Cable sheath: Polyurethane
 Plug, socket: Polyurethane
 Knurled screw, locknut: Brass



Terminal allocation



Ordering data					
Cable length [m]	Plug	Socket	Weight [g]	Part No.	Type
2.5	M12, 4-pin	M12, 4-pin	100.32	18 684	KM12-M12-GSGD-2,5
5			173.17	18 686	KM12-M12-GSGD-5

2.1
 Vision systems
 Visual orientation detection and quality inspection

Checkbox CHB

Accessories



Software to meet individual requirements

CheckKon



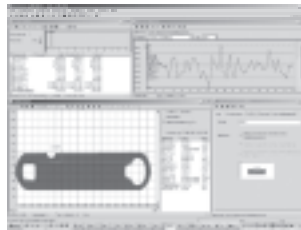
Performance characteristics

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.

Ordering data			
Version	Language	Part No.	Type
CheckKon software with manual	German	194 496	P.SW-CB-KON-DE
	English	194 497	P.SW-CB-KON-EN
CheckOpti software with manual	German	192 144	P.SW-CB-OPTI-DE
	English	192 145	P.SW-CB-OPTI-EN

Checkbox CHB

Sample applications



Application examples

Application examples

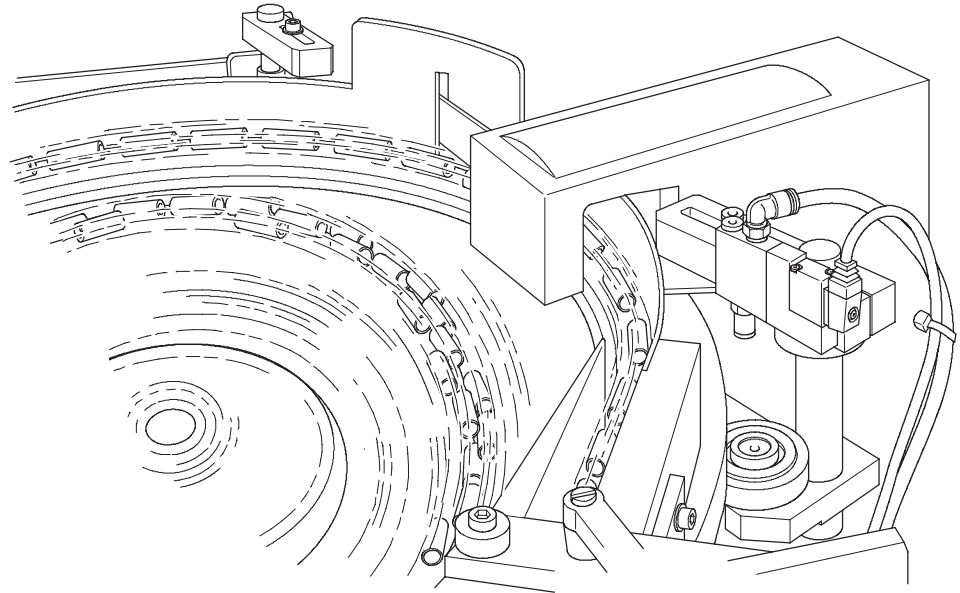
Orientation detection and quality inspection of lipstick tubes

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

