Checkbox Compact, CHB-C-N

FESTO

New

Checkbox Compact, CHB-C-N

Key features

The new Checkbox Compact

Camera-based sorting, inspecting and counting of assembly components

The Checkbox Compact is an automation component with optical workpiece identification for sorting small parts by type, by position orientation and quality, and, if appropriate, also by quantity (quantity selection).
It is particularly suitable for fault-free feeding of small parts to assembly and production machines, especially where there is a high parts rate and a large number of different types.

The Checkbox Compact enables reliable rejection of faulty parts, prevents assembly of incorrect types and reduces setup times to a minimum.

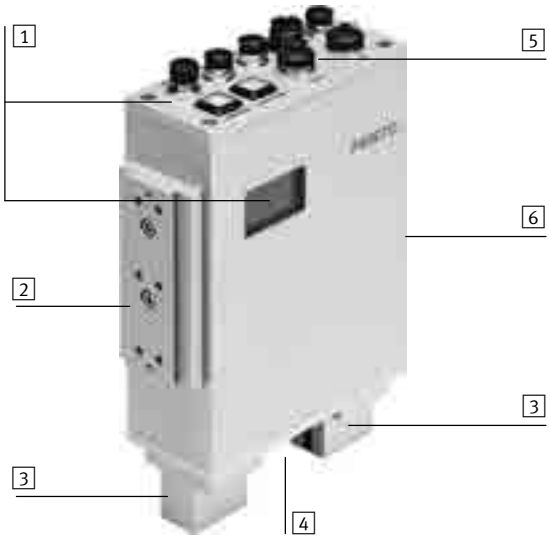
Compact versatility

Camera technology and control of parts flow integrated into field-tested unit

The Checkbox Compact consists of a sturdy aluminium housing which accommodates all the necessary components.

- User interface (keys, LEDs, display)
- Plugs for the electrical connection of actuators, buffer zone sensors, diagnostics PC, power supply, encoder
- Line scan technology (light, fibre-optic cable, image sensor)

The optical channel in which the parts are scanned is on the underside of the Checkbox Compact. It is open at the bottom, allowing the Checkbox to be mounted above a range transportation devices (e.g. conveyor belt).



The Checkbox Compact provides 24 V DC high-power signals at its outputs, which can be used to directly actuate quick-switching pneumatic valves, for example, in order to reliably filter faulty or incorrectly oriented parts out of the parts flow using an air jet. However, other actuators such as pneumatic or electrical ejectors, deflectors or turning stations can also be controlled.
By integrating additional sensors (inductive, capacitive, optical, colour sensors) additional quality characteristics can be checked, or vision sensors or vision systems can be connected to integrate further complex workpiece inspections into the process. The function range is completed by inputs for encoders for belt speed monitoring and buffer zone sensors and an output for controlling the conveying device.

1 User interface front panel:
- Keys
- LEDs

Housing side:
- Display

2 Mounting component
- Mounting profile matches connecting kit HMSV-12 (accessories)
- 6 threaded holes M5, screw-in depth 12 mm
- Holes for dowel pins 3 mm (ISO 2338, 3m6)

Mounting profile can also be mounted on the opposite side

3 Prisms
4 Optical channel
5 Electrical connections
- Power supply
- Ethernet interface
- Actuators
- Buffer sensor/small parts conveyor
- Higher-order PLC
- Encoder

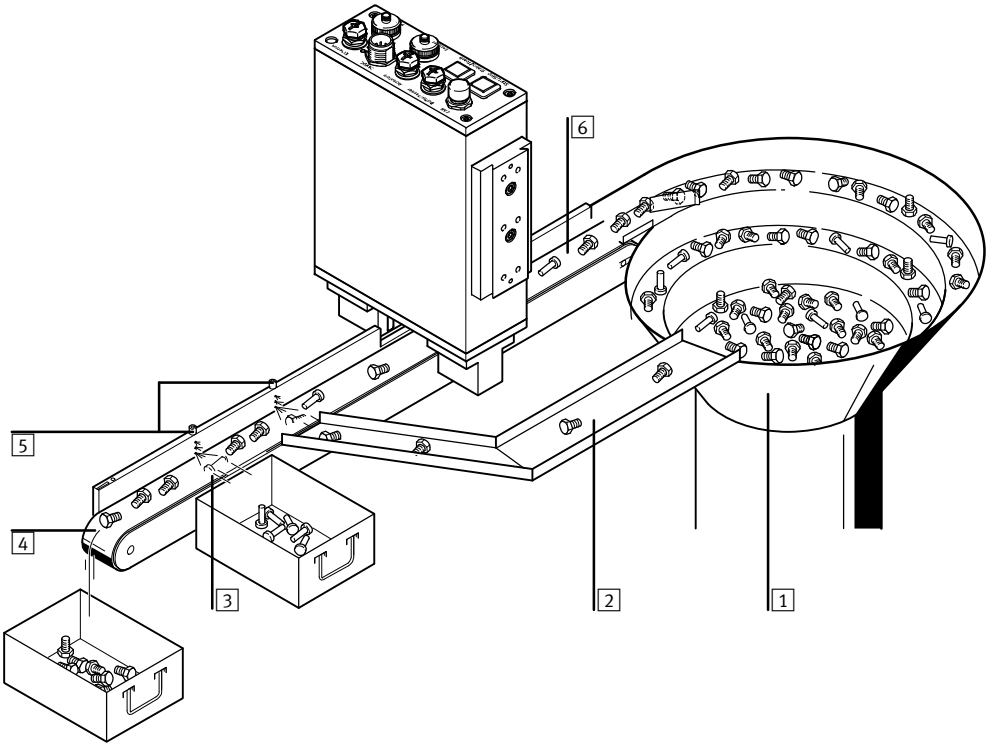
6 Mounting thread for
- Mounting profile with dovetail guide
- Direct mounting with thread M5, max. screw-in depth 6 mm, drill holes for dowel pins 3 mm (ISO 2338, 3m6)

Identical mounting pattern on the opposite side

Checkbox Compact, CHB-C-N

Key features

Operational principle



Integration of the Checkbox in a transportation device: Example with conveyor belt and two actuators	
1	Small parts conveyor e.g.: vibratory bowl feeder, centrifuge, step feeder
2	Return of incorrectly orientated parts to the small parts conveyor
3	Ejecting bad parts (faulty parts, wrong part type)
4	Onward transfer of good parts to a buffer zone or the next machine
5	Actuators e.g.: blow-off valves, pushers or turning stations
6	Transportation device e.g. conveyor belt, linear axis

The parts to be checked are passed through the optical channel of the Checkbox by a transportation device.

The Checkbox sorts the parts on the basis of the contour data into:

- Good part, correctly oriented: the checked part is conveyed to the end of the transportation device and passed to the next station
- Good part, incorrectly oriented: the checked part is filtered out, e.g. at the first actuator position, and returned to the conveying system or rotated to the correct orientation at a turning a rollover station. Filtering out can be carried out by a pulse of air, for example
- Bad part or incorrect type: the checked part is filtered out, e.g. at the second actuator position

The part contour is scanned using the transmitted-light method as it passes through the “optical channel”.

Compared to detection using an area scan camera, image detection with the scanning method used by the Checkbox (line-scan system) has significant advantages. For example, any combination of parts can be detected and processed without the need to maintain minimum distances, and considerably longer objects (up to > 1000 mm) can also be detected and processed

New

Checkbox Compact, CHB-C-N

Key features

Which parts are suitable?

In principle, all workpieces that can be transported in a stable position and the quality and position orientation of which can be detected in a camera image using contour features.

Colour or material properties can also be included in the inspection by using additional sensors.

Selection from the variety of parts from A to Z:

- Axes
- Applicators
- Batteries
- Fittings
- Mounting components
- Drills
- Pins
- Brushes
- Clips
- Dental drills
- Sealing rings
- Swivel parts
- Dowel pins
- Inserts
- Bicycle parts
- Fixtures
- Springs
- Spring washers
- Bottle tops
- Filter elements
- Threaded pins
- Threaded sleeves
- Glass ampoules
- Glass vials
- Buckles
- Wooden dowel
- Sleeves
- Hygiene products
- Hydraulic elements
- Installation parts
- Cannulae
- Ceramic seals
- Chain links
- Buttons
- Cosmetic items
- Ballpoint pen parts
- Plastic vials
- Haberdashery items
- Bearings
- Fibre-optic cables
- Lipstick casings
- Insulating terminals
- Motor parts
- Nuts
- Needles
- Nails
- Nail magazines
- Rivets
- Camshaft components
- O-rings
- Plastic housings
- Piercing parts
- Wheel bolts
- Zipper components
- Switch contacts
- Windscreen wiper parts
- Screws
- Writing utensils
- Sensor housing
- Fuses
- Game pieces
- Spikes
- Syringes and their parts
- Spray heads
- Stamping parts
- Plug connectors
- Pins
- Pen tops
- Tablets
- Washers
- Valve springs
- Valve guides and seat rings
- Shafts
- Corrugated tubes
- Toothbrush components
- Ignition parts

What parts rates and speeds can be achieved?

Depending on the length of the parts, parts rates of over 1500 per minute can be achieved, with transportation speeds for the parts of more than 60 metres per minute.

In which sectors is the Checkbox CHB-C-N used?

- Automotive
- Clothing
- Dental technology
- Electrical engineering and electronics
- Precision mechanics
- Electroplating
- Woodworking industry
- Cosmetics
- Metal working
- Furniture industry
- Pharmaceutical industry
- Optical industry
- Polymers
- Toys and games
- Grinding technology
- Tools
- Packaging technology

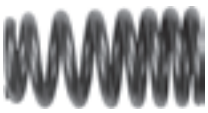
Checkbox Compact, CHB-C-N

Key features

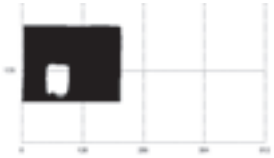
What does the camera see?

Inspection part
Insulating terminal insert

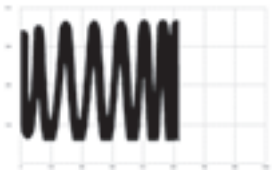
Inspection part
Valve spring



Camera image
Insulating terminal insert



Camera image
Valve spring



Inspection part
Glass ampoule

Inspection part
Glow plug

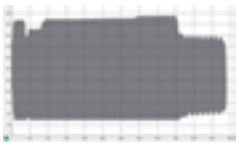
Camera image
Glass ampoule

Camera image
Glow plug

Inspection part
Check valve

Inspection part
Refill tip

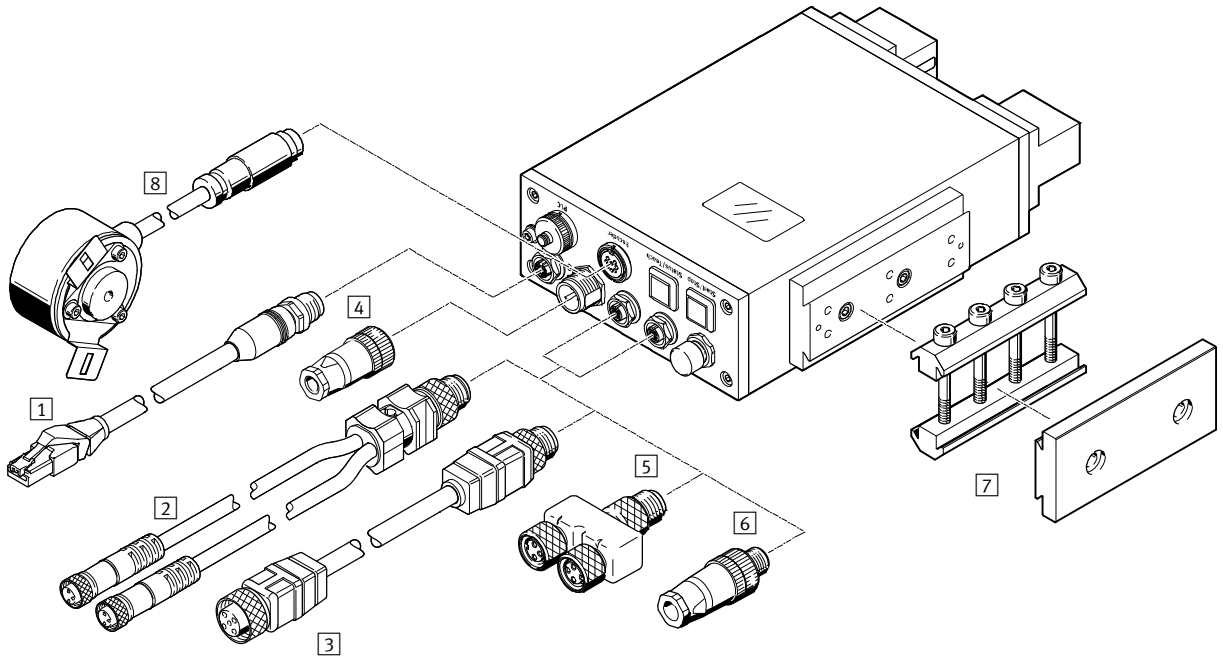
Camera image
Check valve



Camera image
Refill tip

Checkbox Compact, CHB-C-N

Peripherals overview



Mounting components and accessories		➔ Page/Internet
1	Connecting cable NEBC-D12G4-KS	12
2	Duo cable KM12-DUO	12
3	Connecting cable KM12-M12-GSGD	12
4	Plug socket NTSD-GD	12
5	T-plug connector NEDU-M8D3	12
6	Plug connector NECU-S-M12G4	12
7	Adapter kit HMSV-12	11
8	Encoder TU-30/80-EC-L/R	11
–	Software	11

Checkbox Compact, CHB-C-N

Technical data

General technical data		
Type of mounting		Via dovetail slot
		Via female thread
		Via accessories
Dimensions W x L x H	[mm]	60 x 164 x 256.9
Dimensions of optical channel W x H	[mm]	59.2 x 40
Product weight	[g]	2325

Immissions/emissions		
Ambient temperature	[°C]	–5 ... +45
Storage temperature	[°C]	–20 ... +70
Degree of protection		IP64
Certification		RCM mark
CE marking (see declaration of conformity)		To EU EMC Directive
Ambient conditions		Screened from extreme external light sources
		Cleanest possible ambient air
		Dry
Photobiological safety		Risk group 1 (low risk) to DIN EN 62471:2009-03
Vibration resistance		Transport application test with severity level 2 to FN 942017-4 and EN 60068-2-6
Shock resistance		Shock test with severity level 2 to FN 942017-5 and EN 60068-2-27
Protection against direct and indirect contact		PELV
Corrosion resistance class CRC[1)]		2

1) Corrosion resistance class CRC 2 to Festo standard 940070
Moderate corrosion stress. Internal applications in which condensation may occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

Checkbox Compact, CHB-C-N

Technical data

Electronics		
Sensor resolution		2048 pixels/line
Pixel size	[mm]	0.014
Sensor type		CMOS line scan
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 memorised type		8
Quantity preselection		Using CheckOpti software
Counting function		Yes
Counting range		1 ... 9999999
Min. part length	[mm]	1
Max. part length		Depends on belt speed and resolution required
Min. part diameter	[mm]	0.5
Max. part diameter	[mm]	25
Nominal DC operating voltage	[V]	24
Permissible voltage fluctuations	[%]	–15 ... +20
Current consumption with load-free outputs	[mA]	400
Internal fuse protection		4 A fuse
Max. no. of memorised types		1
Max. starting current per output channel	[A]	1.3
Electronic limitation of outputs	[mA]	700

Power supply interface		
Connection type		Plug
Connection technology		M 18x1
Number of pins, wires		4
Max. residual current	[A]	3.0

Actuator interface		
Connection type		Socket
Connection technology		M12x1, A-coded to EN 61076-2-101
Number of pins, wires		5
Max. residual current	[A]	1.9

Buffer/feeder interface		
Connection type		Socket
Connection technology		M12x1, A-coded to EN 61076-2-101
Number of pins/wires		5
Max. residual current	[A]	1.9

Checkbox Compact, CHB-C-N

Technical data

FESTO

PLC interface		
Connection type		Socket
Connection technology		M16x0.75
Number of pins, wires		24
Max. residual current	[A]	0.9
Outputs		Good part and correctly oriented
		Good part but incorrectly oriented
		Faulty part
		Conveyor control
		Status signal “Warning”
		Error output
		Counter reading reached
		PLC power supply
Inputs		Buffer sensor 1
		Buffer sensor 2/Inspection program bit 2
		External error
		Counter reset
		External start
		Ext. sensor/inspection program bit 3
		Key lock
		Check program bit 0
		Check program bit 1
Input characteristic curve		To IEC 61131-2, type 1

Ethernet interface		
Connection type		Socket
Connection technology		M12x1, D-coded to EN 61076-2-101
Number of pins, wires		4
Transmission rate	[Mbit/s]	10/100
Function		Diagnostics
		Programming

Encoder interface	
Connection type	Socket
Connection technology	M16x0.75
Number of pins, wires	8

Fieldbus interface	
Note	Not connected
Protocol	CAN, not supported

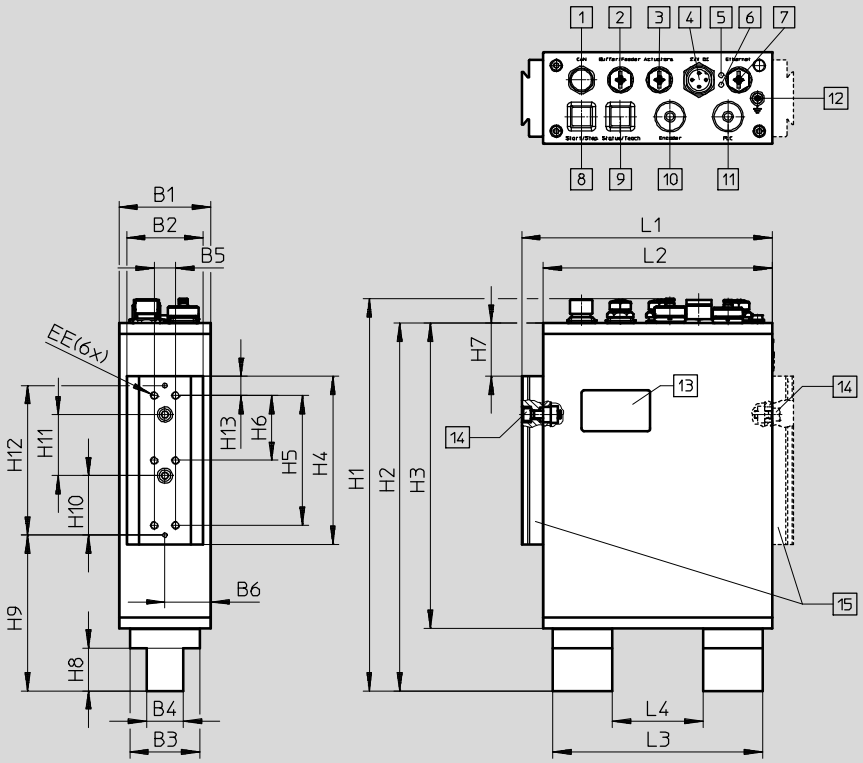
Materials	
Housing	Wrought aluminium alloy
End cap	Wrought aluminium alloy
Note on materials	RoHS-compliant

Checkbox Compact, CHB-C-N

Technical data

FESTO

Dimensions Download CAD data ➔ **www.festo.com**

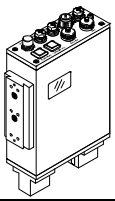


1 Fieldbus, not active
2 Buffer/feeder connection
3 Actuator connection
4 24 V DC connection
5 LED Ethernet speed
6 LED Ethernet link/traffic
7 Ethernet port
8 Start/stop button
9 Status/teach-in button
10 Encoder connection
11 PLC connection
12 PE
13 LCD display
14 M5. Screw-in depth max. 12 mm. For mounting without dovetail adapter plate, max. screw-in depth 6 mm.
15 Dovetail adapter plate

Type	L1	L2	L3	L4	H1	H2	H3	H4	H5	H6	H7	H8
CHB-C-N	164	150	137.4	59.4	256.9	241	200	110	85	42.5	35	28

Type	H9	H10	H11	H12	H13	EE	B1	B2	B3	B4	B5	B6
CHB-C-N	102	39	40	98	12.5	M5	60	50	46	24	14	30

Ordering data

Description	Part No.	Type
 Checkbox CHB-C-N	**3501040**	**CHB-C-N**

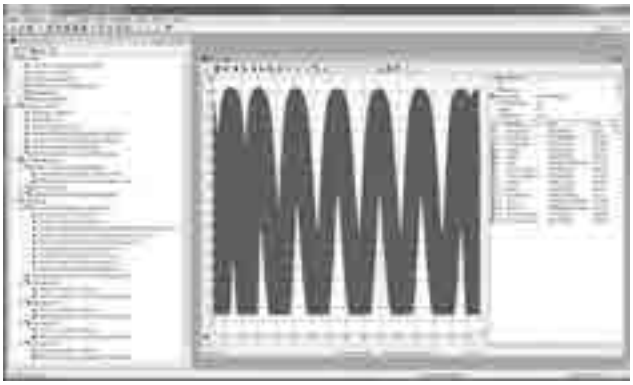
Checkbox Compact, CHB-C-N

Features and accessories

FESTO

Software to meet individual requirements

CheckKon



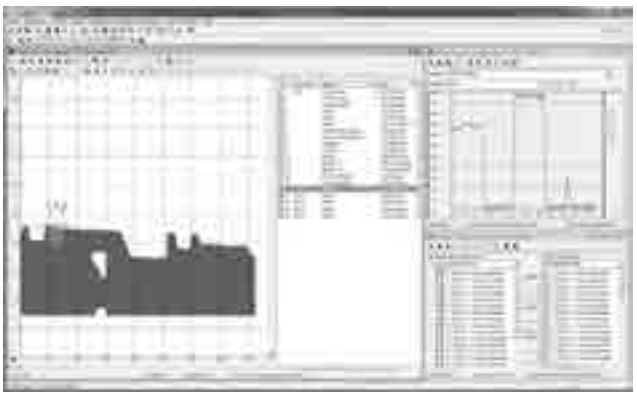
Performance characteristics

This software allows you to display, record and adjust the processes within the Checkbox CHB-C-N, from evaluation of the camera images through to the I/O parameters.

This includes:

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

CheckOpti



Software program

"CheckOpti" is used if the standard learning process of the Checkbox CHB-C-N reaches its limits due to the differences in contours being too small, i.e. if the orientation and quality detection for an inspection part is not reliably guaranteed.

If necessary, additional, effective inspection characteristics can be defined so that the system is optimised for the particular application.

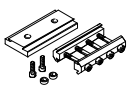
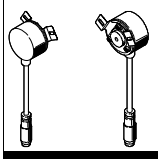
CheckOpti is also used for:

- Setting the default values for the counter function
- Filing and documentation of the inspection programs

Further product information ➔ www.festo.com

Engineering software	Technical data ➔ Internet: www.festo.com/sp
Description	Language
Software CheckKon	German, English
Software CheckOpti	German, English

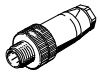
Operating instructions		
	Part No.	Type
German	**8046181**	**GDCA-CHB-C-N-DE**
English	**8046182**	**GDCA-CHB-C-N-EN**

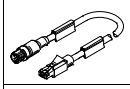
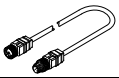
Ordering data – Accessories			
	Description	Part No.	Type
Adapter kit		Technical data ➔ Internet: hmsv-12	
	With screw-on adapter plate	**177658**	**HMSV-12**
Encoder			
	Encoder, cable length 2 m	**540140**	**TU-30/80-EC-L/R**

Checkbox Compact, CHB-C-N

Accessories

FESTO

Ordering data				
	Description	Connection cross section [mm²]	Part No.	Type
Plug socket				Technical data ➔ Internet: ntsd
	Straight socket, 4-pin, screw terminal	1.5	**18493**	**NTSD-GD-9**
		2.5	**18526**	**NTSD-GD-13,5**
Plug connectors				Technical data ➔ Internet: sea, necu
	Straight plug, M12x1, 4-pin, type A, screw terminal	0.14 ... 0.5	**192008**	**SEA-4-GS-7-2,5**
		0.75	**18666**	**SEA-GS-7**
		0.75	**18779**	**SEA-GS-11-DUO**
	Straight plug, M12x1, 4-pin, type A, screw terminal	0.14 ... 0.5	**570955**	**NECU-S-M12G4-P1-Q6-IS**
	Straight plug, M12x1, 4-pin, type A, screw terminal for intrinsically safe circuits	0.75	**570953**	**NECU-S-M12G4-P1-IS**
	Straight plug, M12x1, 4-pin, type A, screw terminal for intrinsically safe circuits	0.75	**570956**	**NECU-S-M12G4-D-IS**
T-plug connector				Technical data ➔ Internet: nedu
	4-pin, M12x1 plugs / 3-pin, M8x1 sockets	–	**541597**	**NEDU-M8D3-M12T4**
	4-pin A-coded M12x1 plugs/sockets	–	**541596**	**NEDU-M12D5-M12T4**

Ordering data						
	Electrical connection 1	Electrical connection 2	Weight [g]	Cable length [m]	Part No.	Type
Connecting cable						Technical data ➔ Internet: nebc
	Straight plug, M12x1, 4-pin, D-coded, screenable	Straight plug, RJ45, 4-pin	157	3	**8031121**	**NEBC-D12G4-KS-3-R3G4**
			455	10	**8031122**	**NEBC-D12G4-KS-10-R3G4**
Connecting cable						Technical data ➔ Internet: km12
	M12x1, 4-pin plug, straight	M12x1, 4-pin socket, straight	–	2.5	**18684**	**KM12-M12-GSGD-2,5**
			–	5	**18686**	**KM12-M12-GSGD-5**
Duo cable						Technical data ➔ Internet: km12-duo
	M12x1, 4-pin plug, straight	M12x1, 4-pin socket, straight	–	5	**18685**	**KM12-DUO-M8-GDGD**

Checkbox Compact, CHB-C-N

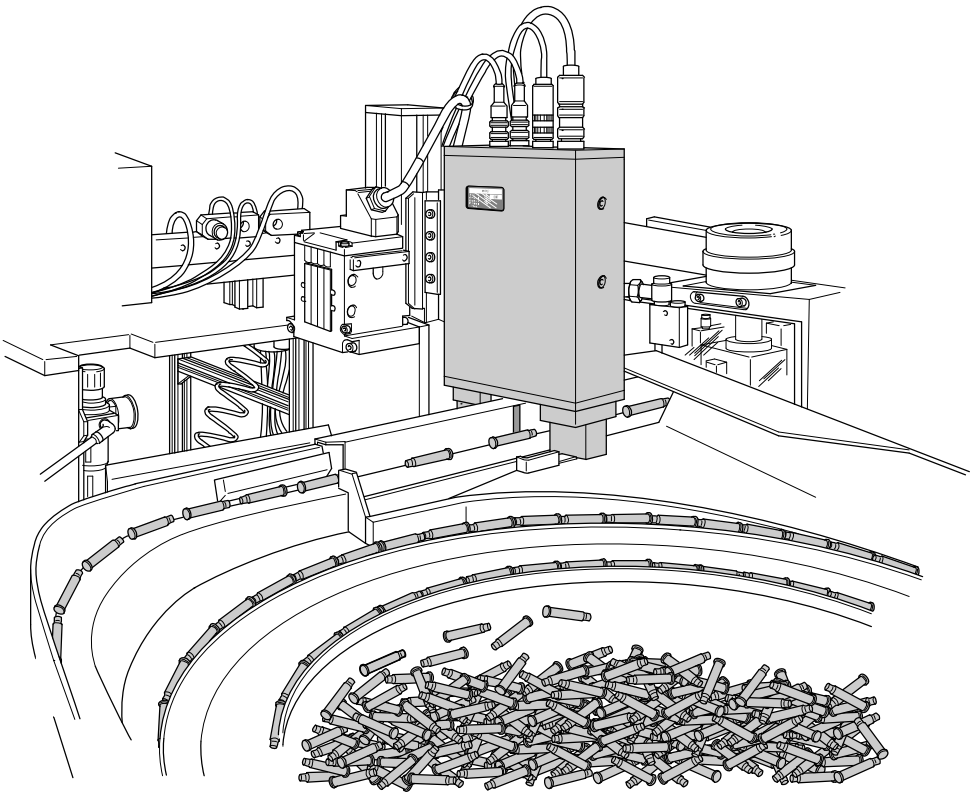
Application examples

Application examples

Position and quality inspection of inner pins

The Checkbox CHB-C-N inspects the inner pins and controls the entire feed process, e.g. a subsequent turning station for rotating incorrectly oriented good parts and a blow-off nozzle for filtering out bad parts.

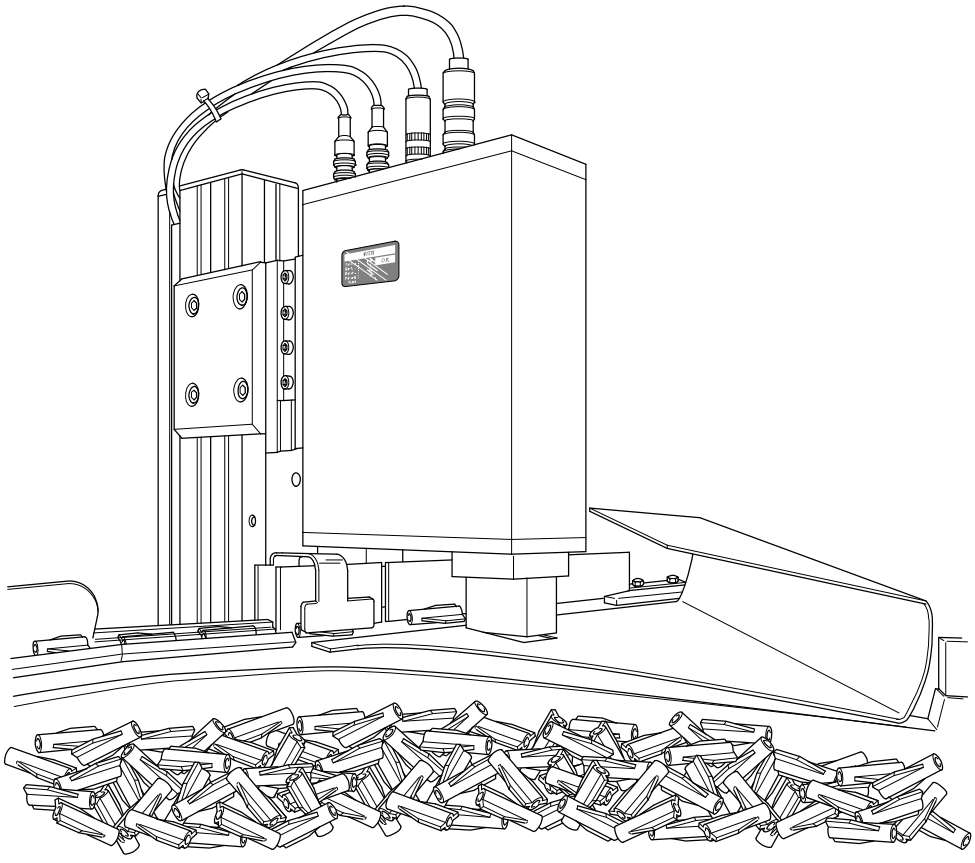
The following features are checked:
- Orientation
- Diameter
- Length
- Shape



Position and quality inspection of fibre-optic cables

The Checkbox CHB-C-N inspects the transparent display components, controls the parts flow and removes incorrectly oriented or faulty parts reliably with the use of blow-off nozzles.

The following features are checked:
- Orientation
- Shape
- Diameter
- Trapped air



Product Range and Company Overview

A Complete Suite and Company Overview

Our experienced engineers provide complete support at every stage of your development process, including: conceptualization, analysis, engineering, design, assembly, documentation, validation, and production.

Custom Automation Components
Complete custom engineered solutions

Custom Control Cabinets
Comprehensive engineering support and on-site services

Complete Systems
Shipment, stocking and storage services

The Broadest Range of Automation Components

With a comprehensive line of more than 30,000 automation components, Festo is capable of solving the most complex automation requirements.

Electromechanical
Electromechanical actuators, motors, controllers & drivers

Pneumatics
Pneumatic linear and rotary actuators, valves, and air supply

PLCs and I/O Devices
PLC's, operator interfaces, sensors and I/O devices

Supporting Advanced Automation... As No One Else Can!
Festo is a leading global manufacturer of pneumatic and electromechanical systems, components and controls for industrial automation, with more than 16,000 employees in 60 national headquarters serving more than 180 countries. For more than 80 years, Festo has continuously elevated the state of manufacturing with innovations and optimized motion control solutions that deliver higher performing, more profitable automated manufacturing and processing equipment. Our dedication to the advancement of automation extends beyond technology to the education and development of current and future automation and robotics designers with simulation tools, teaching programs, and on-site services.

Quality Assurance, ISO 9001 and ISO 14001 Certifications
Festo Corporation is committed to supply all Festo products and services that will meet or exceed our customers' requirements in product quality, delivery, customer service and satisfaction.

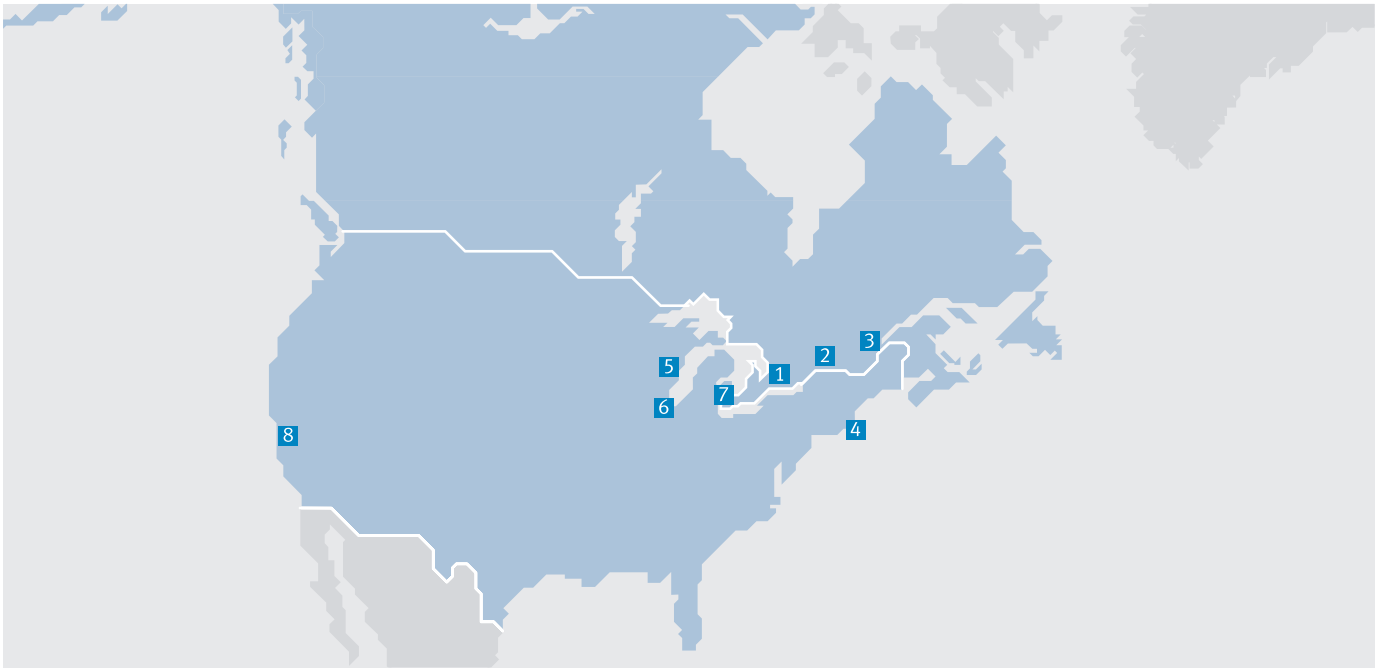
To meet this commitment, we strive to ensure a consistent, integrated, and systematic approach to management that will meet or exceed the requirements of the ISO 9001 standard for Quality Management and the ISO 14001 standard for Environmental Management.

9001:CERTCS-16248-2006-AQ-ESN-TGA
ISO 9001
ISO 14001
DNV
Certified Company
14001:CERTCS-16248A-2006-AQ-ESN-TGA

UL REGISTERED FIRM

Printed on recycled paper at New Horizon Graphic, Inc., FSC certified as an environmental friendly printing plant.

Festo North America



1 Festo Canada Headquarters
Festo Inc.
5300 Explorer Drive
Mississauga, ON
L4W 5G4

2 Montréal
5600, Trans-Canada
Pointe-Claire, QC
H9R 1B6

3 Québec City
2930, rue Watt#117
Québec, QC
G1X 4G3

4 Festo United States Headquarters
Festo Corporation
395 Moreland Road
Hauppauge, NY
11788

5 Appleton
North 922 Tower View Drive, Suite N
Greenville, WI
54942

6 Chicago
85 W Algonquin - Suite 340
Arlington Heights, IL
60005

7 Detroit
1441 West Long Lake Road
Troy, MI
48098

8 Silicon Valley
4935 Southfront Road, Suite F
Livermore, CA
94550

Festo Regional Contact Center

Canadian Customers
Commercial Support:
Tel: 1 877 GO FESTO (1 877 463 3786)
Fax: 1 877 FX FESTO (1 877 393 3786)
Email: festo.canada@ca.festo.com

Technical Support:
Tel:1 866 GO FESTO (1 866 463 3786)
Fax:1 877 FX FESTO(1 877 393 3786)
Email: technical.support@ca.festo.com

USA Customers
Commercial Support:
Tel:1 800 99 FESTO (1 800 993 3786)
Fax:1 800 96 FESTO (1 800 963 3786)
Email: customer.service@us.festo.com

Technical Support:
Tel:1 866 GO FESTO (1 866 463 3786)
Fax:1800 96 FESTO(1 800 963 3786)
Email: product.support@us.festo.com

Subject to change

Internet: **www.festo.com/us**