

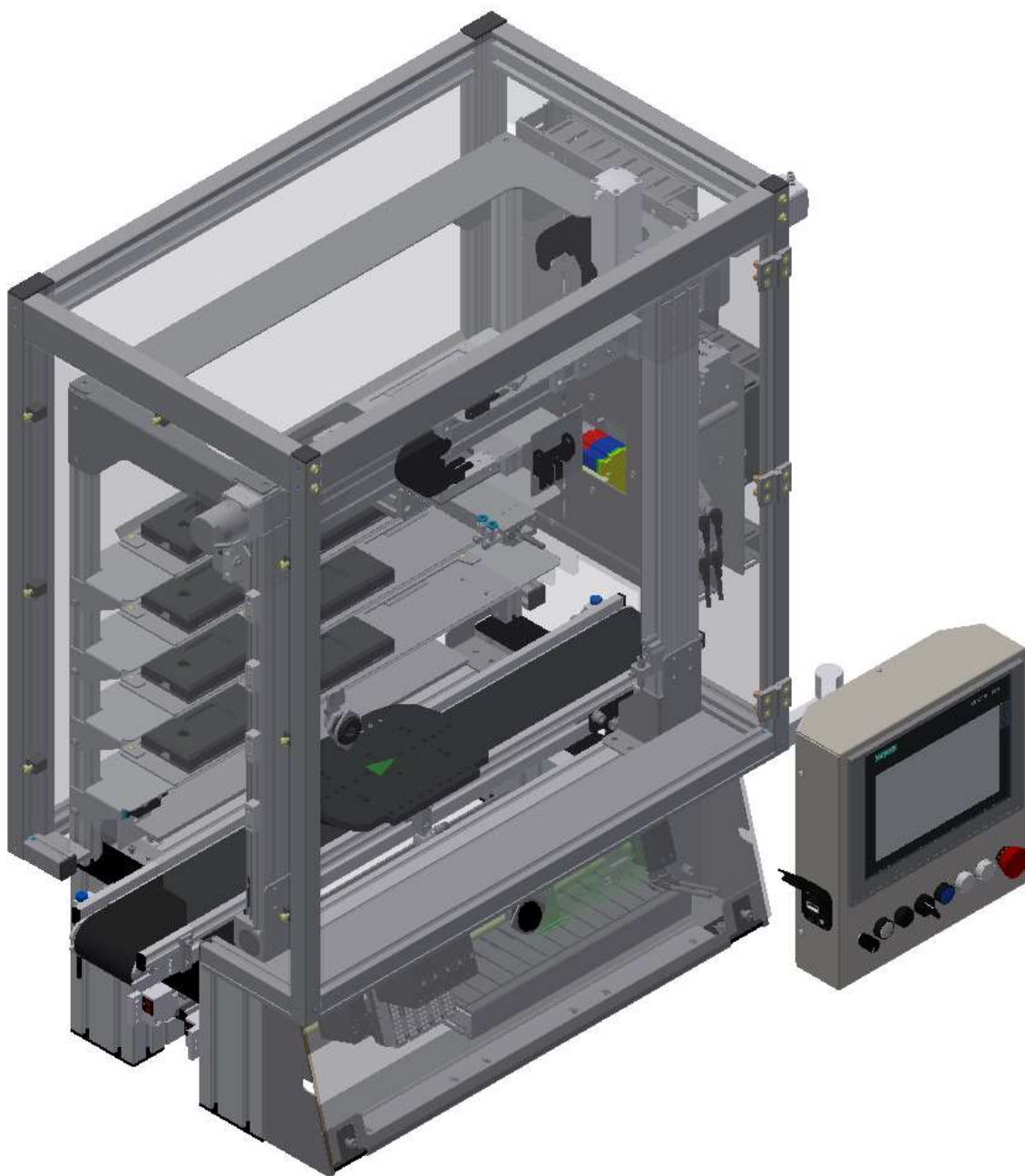
8071937

High bay rack for workpieces

FESTO

CP Factory/CP Lab

original operating
instructions



Festo Didactic
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05/2022

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Original operating instructions

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Where only pronouns such as he and him are used in these operating instructions, these pronouns are of course intended to refer to both male and female persons. The use of a single gender (e.g. he, him) should not be construed as gender discrimination; it is intended solely to make the manual easier to read and the formulations easier to understand.

	 CAUTION
	<p>These operating instructions must be available to the user at all times. The operating instructions must be read before commissioning. The safety instructions must be observed. Non-observance may result in severe personal injury or damage to property.</p>

Main document

Associated documents attached:

Safety instructions concerning transport (print/electronic)

Component datasheets (print/electronic)

Circuit diagram (print/electronic)

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1 Safety instructions



1.1 Warning notice system



These operating instructions contain notes that must be observed for your personal safety and in order to prevent property damage. The notes concerning your personal safety are indicated by a safety symbol.


Notes that only concern property damage are not indicated by a safety symbol.

The notes below are listed in order of hazard level.

	 DANGER
	... indicates an imminently hazardous situation that will result in fatal or severe personal injury if not avoided.

	 WARNING
	... indicates a potentially hazardous situation which may result in fatal or severe personal injury if not avoided.

	 CAUTION
	... indicates a potentially hazardous situation that may result in moderate or slight personal injury or severe property damage if not avoided.

	NOTE
	... indicates a potentially hazardous situation that may result in property damage or loss of function if not avoided.

In cases where more than one hazard level applies, the safety note with the highest hazard level will be shown. A safety note may concern both personal injury and property damage.

Hazards that will only result in property damage are indicated with the word "Note".

1.2 Pictograms

This document and the hardware described in it include warnings concerning possible hazards which may arise if the system is used incorrectly.

The following pictograms are used:



Hazard warning



Warning - dangerous electric voltage



Read and observe the operating and safety instructions prior to commissioning.



Warning – hot surface



Warning – hand injuries



Warning – lifting heavy loads



Electrostatically sensitive devices



Information and/or references to other documentation

1.3 General prerequisites for installing the product

- Festo Didactic products must only be used for the applications specified in their respective operating instructions. Products or components supplied by other manufacturers must only be used if recommended or approved by Festo.
- The products must be transported, stored, installed, assembled, commissioned, operated and maintained properly in order to ensure their safe operation.
- The approved ambient conditions must be observed. The specifications in the relevant operating instructions must be observed.
- The safety equipment must be tested every working day.
- Connecting cables must be checked for damage before each use. In case of damage, they must be replaced.

Connecting cables must correspond to the minimum specifications.

1.4 General prerequisites for operating the devices

General requirements for safe operation of the system:

- In industrial facilities, the national accident prevention regulations must be observed.
- The laboratory or classroom must be overseen by a supervisor.
 - A supervisor is a qualified electrician or a person who has been trained in electrical engineering, knows the respective safety requirements and safety regulations, and whose training has been documented accordingly.

The laboratory or the classroom must be equipped with the following devices:

- An emergency-off device must be provided.
 - At least one emergency-off device must be located inside the laboratory or the classroom, and at least one outside it.
- The laboratory or classroom must be secured so that the operating voltage and compressed air supply cannot be activated by any unauthorized persons, for example by means of:
 - e.g. a keyswitch
 - e.g. lockable shut off valves
- The laboratory or classroom must be protected by residual current devices (RCDs).
 - RCDs with a differential current of ≤ 30 mA, Type B. When operating machinery with unavoidable leakage current, suitable measures must be implemented and documented in the corresponding workplace risk assessment.
- The laboratory or classroom must be protected by overcurrent protection devices.
 - Fuses or circuit breakers
- Devices must not be used if they are damaged or defective.
 - Damaged devices must be barred from further use and removed from the laboratory or classroom.
 - Damaged connecting cables, pneumatic tubing and hydraulic hoses represent a safety risk and must be removed from the laboratory or classroom.
- Safety devices must be checked every working day to ensure that they are fully functional.
- Connecting cables and accessories must be checked for damage before each use.

2 Intended use

Festo Didactic systems and components must only be used:

- For their intended use in teaching and training applications
- When their safety functions are in perfect condition

The components and systems are designed in accordance with the latest technology and recognized safety rules. However, life and limb of the user and third parties may be endangered and the components may be impaired if they are used incorrectly.

The Festo Didactic learning system has been developed and produced exclusively for education and training in the field of automation technology. The training company and/or trainers must ensure that all trainees observe the safety precautions described in these operating instructions.

Training with complex machinery is a highly hazardous activity. The operating company must draw up and document a workplace risk assessment. The trainees must be briefed on all the relevant safety aspects before work commences.

Festo Didactic hereby excludes any and all liability for damages suffered by apprentices, the training company and/or any third parties, which occur during use of the device in situations which serve any purpose other than training and/or vocational education, unless such damages have been caused by Festo Didactic due to malicious intent or gross negligence.

All extensions and accessories must be approved by Festo Didactic, and are only permitted for use for their intended purpose.

The machine fulfils the requirements of the European directives that applied when it was commissioned. Any modification to the machine shall render the manufacturer's CE Declaration of Conformity null and void. The CE Declaration of Conformity must be renewed following each major modification.



3 For your safety

3.1 Important information

Knowledge of the basic safety instructions and safety regulations is a fundamental prerequisite for safe handling and trouble-free operation of Festo Didactic components and systems.

These operating instructions include the most important instructions for safe use of the components and systems. In particular, the safety instructions must be adhered to by all persons who work with these components and systems. Furthermore, all pertinent accident prevention rules and regulations that are applicable at the respective place of use must be adhered to.

	 WARNING
	<ul style="list-style-type: none">• Malfunctions which could impair safety must be eliminated immediately!

	 CAUTION
	<ul style="list-style-type: none">• Improper repairs or modifications may result in unforeseeable operating statuses. Do not carry out any repair or alternation work on components or systems that is not described in these operating instructions.

3.2 Qualified persons

- The product described in these operating instructions is only permitted for operation by persons who are qualified for the task in question in accordance with the operating instructions, especially the safety instructions.
- Qualified persons are defined as persons whose training and experience enables them to recognize risks and avoid potential dangers when working with this product.

3.3 Obligations of the operating company

It is the responsibility of the operating company to ensure that the station is operated safely.

The operating company undertakes to allow only those persons to work with the components and systems who:

- Are familiar with the basic regulations regarding occupational safety, with the safety instructions, and with the accident prevention regulations, and who have been instructed in the use of the components and systems
- Have read and understood the safety chapter and warnings in these operating instructions
- Are qualified to operate the components and systems in question
- Are governed by and trained in suitable organizational measures to ensure safe training

Personnel should be tested at regular intervals to ensure that they are safety-conscious in their work habits.



3.4 Obligations of the trainees

All persons who have been entrusted to work with the components and systems undertake to complete the following steps before beginning work:



- Read the chapter concerning safety and the warnings in these operating instructions
- Familiarize themselves with the basic regulations regarding occupational safety and accident prevention



4 Basic safety instructions

4.1 General information



	 CAUTION
	<ul style="list-style-type: none"> • Trainees must be supervised by an instructor at all times when working with the components and systems. • Observe the specifications included in the technical data for the individual components, and in particular all the safety instructions! • Wear your personal protective equipment (safety goggles, safety shoes). • Never leave objects lying on the top of protective enclosures. Vibrations could cause such objects to fall off.



4.2 Mechanical components



	 WARNING
	<ul style="list-style-type: none"> • Switch off the power supply! <ul style="list-style-type: none"> – Switch off both the operating power and the control power before commencing work on the circuit. – Never reach into the setup unless it is at a complete standstill. – Be aware of potential overtravel times for the actuators. • Risk of injury during troubleshooting! <ul style="list-style-type: none"> – Use a tool such as a screwdriver for actuating sensors.

	 CAUTION
	<ul style="list-style-type: none"> • Risk of burns due to hot surfaces <ul style="list-style-type: none"> – Devices can reach high temperatures during operation, as a result of which they can cause burns if touched. • Measures to take when maintenance is required. <ul style="list-style-type: none"> – Allow the device to cool off before commencing work. – Use suitable personal protective clothing, e.g. safety safety gloves.



4.3 Electrical components



	 WARNING
	<ul style="list-style-type: none"> • Disconnect from all sources of electrical power! <ul style="list-style-type: none"> – Switch off the power supply before working on the circuit. – Please note that electrical energy may be stored in individual components. Further information on this issue is available in the datasheets and operating instructions included with the components. – Warning! Capacitors inside the device may still be charged even after being disconnected from all sources of voltage. • Danger due to malfunction <ul style="list-style-type: none"> – Never place or leave liquids (e.g. drinks) on the station in open containers. – The machine must not be switched on if there is condensation (moisture) on its surface. – Never lay pipes/hoses designed to carry liquid media near the machine. • Electric shock due to connection to unsuitable power supply! <ul style="list-style-type: none"> – When devices are connected to an unsuitable power supply, exposed components can cause dangerous electrical voltage that can lead to severe or fatal injury. – Always use power supplies that provide SELV (safety extra-low voltage) or PELV (protective extra-low voltage) output voltages for all the connections and terminals on the electronics modules. • Electric shock when there is no protective grounding in place <ul style="list-style-type: none"> – If there is no protective grounding terminal in place for a Protection Class I device, or if the protective grounding terminal has not been installed correctly, exposed, conductive parts may carry high voltages, thus causing severe or fatal injury if touched. – Ground the device in accordance with the applicable regulations.

	 WARNING
	<ul style="list-style-type: none"> • Risk of fire due to use of unsuitable power supply <ul style="list-style-type: none"> – If a device is connected to an unsuitable power supply, this can cause components to overheat, leading to a breakout of fire. – Always use limited power supplies (LPSs) for all the connections and terminals on the electronics modules.

	 CAUTION
	<ul style="list-style-type: none">• Always ensure that your connecting cables are designed for use with the electrical connections in question.• When laying connecting cables, make sure they are not kinked, sheared or pinched. Cables laid on the floor must be covered with a cable bridge to protect them.• Do not lay cables over hot surfaces.<ul style="list-style-type: none">– Hot surfaces are identified with a corresponding warning symbol.• Make sure that connecting cables are not subjected to continuous tensile loads.• Devices with a grounding terminal must always be grounded.<ul style="list-style-type: none">– If a ground connection (green-yellow laboratory socket) is available, it must always be connected to the protective grounding. The protective grounding must always be connected first (before voltage) and disconnected last (after disconnecting the voltage).– Some devices have high leakage current. These devices must be fitted with a grounding conductor for additional grounding.• When replacing fuses, always use specified fuses with the correct current rating and tripping characteristics.• The device is not equipped with a built-in fuse unless otherwise specified in the technical data.• Safe operation of the device is not possible in the event of any of the following circumstances:<ul style="list-style-type: none">– Visible damage– Malfunction– Inappropriate storage– Incorrect transportSwitch off the power supply immediately.• Protect the device to prevent it from being restarted accidentally.

4.4 Pneumatic components

	 WARNING
	<ul style="list-style-type: none">• Depressurize the system!<ul style="list-style-type: none">– Switch off the compressed air supply before working on the circuit.– Check the system using pressure gauges to make sure that the entire circuit is fully depressurized.– Please note that energy may be stored in reservoirs. Further information on this issue is available in the datasheets and operating instructions included with the components.• Risk of injury when switching on compressed air!<p>Cylinders may advance and retract automatically.</p>• Risk of accident due to advancing cylinders!<ul style="list-style-type: none">– Always position pneumatic cylinders so that the piston rod's working space is unobstructed along its entire stroke range.– Make sure that the piston rod cannot collide with any of the rigid components in the setup.• Risk of accident due to pneumatic tubing slipping off!<ul style="list-style-type: none">– Use shortest barbed tubing connectors possible.– If pneumatic tubing slips off, switch off the compressed air supply immediately.• Do not exceed the maximum permissible pressure of 600 kPa (6 bar).• Do not switch on the compressed air until all the barbed tubing connectors have been connected and secured.• Do not disconnect pneumatic tubing while it is under pressure.<ul style="list-style-type: none">– Do not attempt to seal or plug pneumatic tubing or plug connectors with your hands or fingers.• Check the condition of the condensate in the service unit regularly. If necessary, drain the condensate and dispose of it properly.

	 CAUTION
	<ul style="list-style-type: none">• Setting up pneumatic circuits<ul style="list-style-type: none">– Connect the devices with plastic tubing with an outside diameter of 4 or 6 mm.– Push the pneumatic tubing into the push-in connector as far as it will go.• Dismantling pneumatic circuits<ul style="list-style-type: none">– Switch off the compressed air supply before dismantling the circuit.– Press the blue release ring down so that the tubing can be pulled out.• Noise due to escaping compressed air<ul style="list-style-type: none">– Noise caused by escaping compressed air may damage your hearing. Reduce noise by using mufflers, or wear hearing protection if the noise cannot be avoided.– All of the exhaust ports on the components included in the equipment set are equipped with mufflers. Do not remove these mufflers.

4.5 Guarantee and liability for application examples



The application examples are not legally binding, and we cannot guarantee their completeness in terms of their configuration, their equipment or any events that may occur. The application examples are not representations of any specific customer solution; they are merely intended to illustrate typical tasks for which the product in question could be used. You bear the responsibility for ensuring that the products described here are operated properly. These application examples do not in any way relieve you of your responsibility to ensure that the system is handled safely when it is being used, installed, operated or maintained.

4.6 Cyber security

Note

Festo Didactic offers products with industrial security functions that aid the safe operation of plants, systems, machines and networks. In order to protect plants, systems, machines and networks from cyber threats, a comprehensive industrial security concept must be implemented and continuously updated. Festo's products and services only constitute one part of such a concept.

The customer is responsible for preventing unauthorized access to their plants, systems, machines and networks. Systems, machines and components should only be connected to a company's network or the Internet if and as necessary, and only when the suitable security measures (e.g. firewalls and network segmentation) are in place. Furthermore, Festo's guidelines on suitable security measures should be observed. Festo products and solutions are constantly being developed further in order to make them more secure. Festo strongly recommends that customers install product updates as soon as they become available and always use the latest versions of its products. Any use of product versions that are no longer supported or any failure to install the latest updates may render the customer vulnerable to cyber attacks.

	 WARNING
	<ul style="list-style-type: none"> • Unsecure operating conditions due to software tampering <ul style="list-style-type: none"> – Forms of software tampering (e.g. viruses, Trojans, malware and worms) can lead to unsecure operating conditions in your system, which may in turn lead to severe or fatal injury or property damage. – Keep your software up to date. – Integrate the automation and actuator components into an overarching and comprehensive industrial security concept for the installation or machine in question that is in line with the latest technological developments. – Make sure that all the products you have installed are incorporated into your overarching industrial security concept. – Use suitable measures, such as a virus scanner, to protect files save on exchangeable storage media from malware.

4.7 Additional safety instructions

General requirements for safe operation of the devices:

- Do not lay cables over hot surfaces.
 - Hot surfaces are identified with a corresponding warning symbol.
- Maximum permissible current loads for connector cables and devices must not be exceeded.
 - Always compare the current ratings of the device, the cable and the fuse to ensure that they match.
 - If they do not match, use a separate upstream fuse in order to provide appropriate overcurrent protection.
- Devices with a grounding terminal must always be grounded.
 - If a ground terminal (green-yellow laboratory socket) is available, it must always be connected to protective ground. The protective grounding must always be connected first (before voltage) and disconnected last (after disconnecting the voltage).
- The device is not equipped with a built-in circuit unless otherwise specified in the technical data.



	<p data-bbox="756 792 1027 853" style="text-align: center;"> WARNING</p> <ul style="list-style-type: none">• This product is designed for use in industrial environments, and may cause malfunctions if used in domestic or small commercial environments.
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4.8 Guarantee and liability

Our General Terms and Conditions of Sale and Delivery shall apply at all times. These shall be made available to the operating company no later than upon conclusion of the sales contract. Guarantee and liability claims resulting from personal injury and/or property damage are excluded if they can be traced back to one or more of the following causes:

- Use of the equipment for purposes other than its intended use
- Improper installation, commissioning, operation or maintenance of the system
- Operation of the system with defective safety equipment, or with improperly attached or non-functional safety equipment and protective guards
- Non-compliance with directions included in the operating instructions with regard to transport, storage, installation, commissioning, operation, maintenance and setup of the system
- Unauthorized modifications to the system
- Improperly executed repairs
- Disasters resulting from the influence of foreign bodies and acts of God
- Dust generated during construction work must be kept away from the system (use coverings).
See the Environmental Requirements section (contamination level) for more details.

4.9 Transport

	 WARNING
	<ul style="list-style-type: none">• Danger due to tipping over<ul style="list-style-type: none">– Suitable packaging and transport equipment must be used when transporting the station. The station can be lifted from underneath using a forklift truck. Please note that eccentric centers of gravity can cause the station to tip over.– Stations with attachments at height will have a high center of gravity.– Take care to avoid tipping over during transportation.

	NOTE
	<ul style="list-style-type: none">• Station contains delicate components!<ul style="list-style-type: none">– Take care not to shake during transportation• The station is only permitted for installation on solid, non-vibrating surfaces.<ul style="list-style-type: none">– Make sure that the ground underneath the station has sufficient load-bearing capacity.



4.10 Name plates



Name plate example



Position	Description
1	Type code
2	Material number
3	Production code
4	Technical data
5	Technical data
6	Technical data
7	Safety note
8	Manufacturer address
9	UK importer address
10	Country of origin
11	Internet address service portal
12	CE Mark
13	UKCA mark
14	Warning mark
15	Symbol read manual
16	WEEE Marking
17	QR Code (Type-and serial number)

4.11 product safety

	 WARNING
	<ul style="list-style-type: none">• General product safety, CE conformity<ul style="list-style-type: none">– Product safety for the CP-Lab conveyor was evaluated as part of a risk assessment.– As a consequence of Changes (hardware / software) Additions or improper use– Product safety can no longer be guaranteed by the operator.– In this case, the manufacturer's CE declaration of conformity expires. The operator must re-evaluate the safety and determine the CE conformity.

4.12 Protective devices

In order to reduce risks, this machine contains guards to prevent access to dangerous areas. These guards must not be removed or tampered with.

	 WARNING
	<ul style="list-style-type: none">• Damage to the safety window<ul style="list-style-type: none">– Windows must not be cleaned using aggressive or alcoholic cleaning agents. Risk of brittleness and breakage!– This protective device must be replaced if it shows any signs of damage. Please contact our Service department to arrange this.

4.12.1 Storage enclosure fixed elements

Transparent, impact-resistant polycarbonate pane on sides and tops.

4.12.2 Storage enclosure service door

Transparent, impact-resistant polycarbonate panels.

Can be opened for service purposes, there is no safety check. Only open the door when the warehouse is at a standstill and it is ensured that no third party can operate it.

4.12.3 Emergency stop

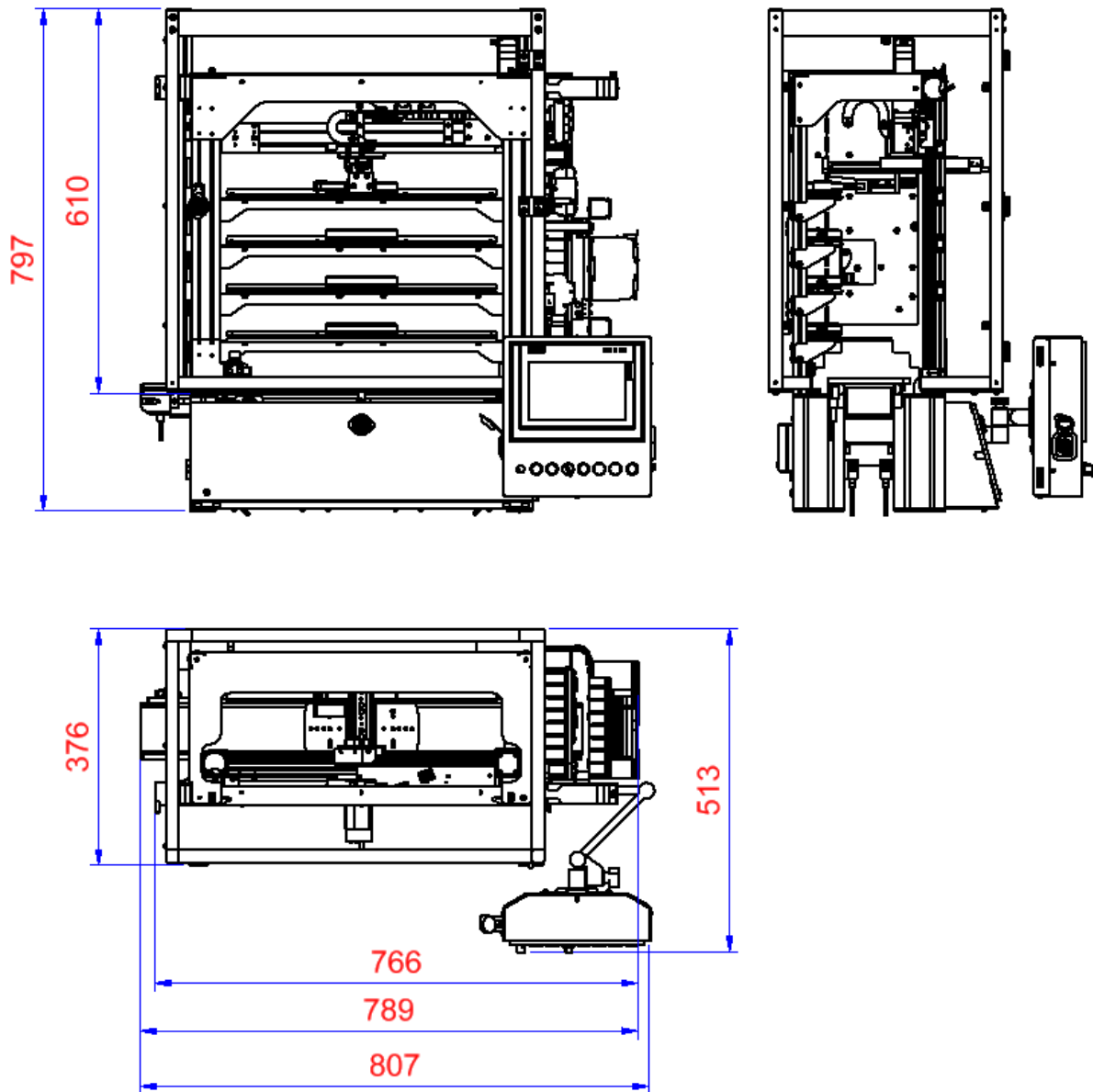
Every station contains an emergency stop mushroom actuator. All the emergency stop actuators in the system are interconnected. The emergency stop signal shuts off all the actuators. Operator confirmation is required to restart the system; there is no automatic restart.

4.12.4 Additional protective devices

The individual components, such as the power supplies and the controllers, possess built-in safety functions such as short-circuit protection, overcurrent protection, overvoltage protection and thermal monitoring. If necessary, consult the instruction manual for the device in question for more information.

5 Technical Data



Parameter	Value
Electrics	
Power supply	24 V DC, 0,8 A safe low voltage (PELV)
Digital inputs	14
Digital outputs	8
Compressed air	
Supply pressure	6 bar, 90 psi
Supply rate	≥ 40 l/min
Compressed air quality	EN ISO 8573-1
Pressure dew point (Class 4)	$\leq +3^{\circ}\text{C}$
Ambient conditions	
Operating environment	Use inside building only
Ambient temperature	$5^{\circ}\text{C} \dots 40^{\circ}\text{C}$
Rel. air humidity	80% up to 31°C
Pollution degree	2, Dry, non-conductive contamination
Operating height	Up to 2000 m above NN (sea level)
Noise emission level	$L_{pA} < 70$ dB
Certification	
CE marking in accordance with:	Machinery Directive EMC Directive RoHS Directive
EMC environment	Industrial environment, Class A (in acc. with EN 55011)
Measurements	
Length	766 mm without conveyor / 789 mm with conveyor / approx. 807 mm with panel
Width	376 mm
Height	610 mm without conveyor / 797mm with conveyor / approx. 513 with panel
Weight	Approx 18,3 kg
Subject to change	







Measurements / illustration similar


6 Design and Function

6.1 Transport

	 WARNING
	<ul style="list-style-type: none"> • Damage to transport equipment when moving heavy machines/machine sections <ul style="list-style-type: none"> – When the stations are shipped out, extra care must be taken to ensure that heavy machines/machine sections are always transported using a suitable forklift truck. A single station can weigh up to 50 kg. – Always use suitable transport equipment. – Always use the lifting points provided to move the machine/machine sections. – Always use the designated load take-up point.

	 WARNING
	<ul style="list-style-type: none"> • Securing transit routes <ul style="list-style-type: none"> – The supply routes must be cleared prior to transport, and must be suitable for the forklift truck to pass through. If necessary, warning signs or barrier tape must be set up to keep the routes clear. • Caution <ul style="list-style-type: none"> – When opening transport boxes, care must be taken to ensure that any additional components delivered in the same box, such as computers, do not fall out.

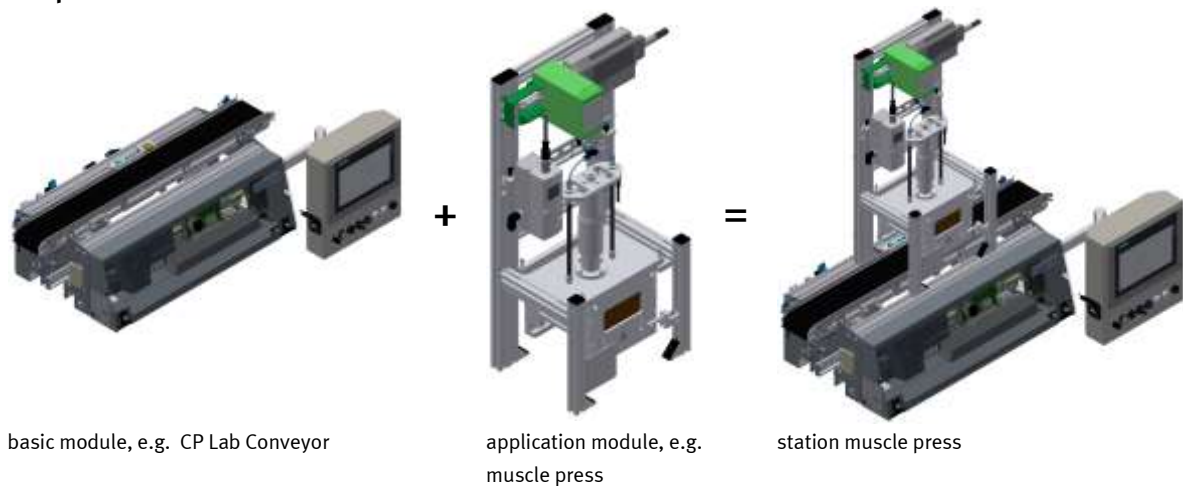
	 WARNING
	<ul style="list-style-type: none"> • Danger of crushing for hands/feet <ul style="list-style-type: none"> – It is not permitted to grip onto or under the feet when handling the machine, as there is an increased risk of hands or feet getting crushed or trapped in these areas. – When setting down the station, make sure no persons have their feet under the machine's feet.

	<i>NOTE</i>
	<ul style="list-style-type: none">– When opening the transport box, any additional components must be secured to prevent them from falling out, and removed first.– Once this is done, the transport box can be removed/opened up fully, and the station can be taken out and moved to its intended location.– Care must be taken with all components projecting from the machine, as sensors and similar small parts can easily be damaged if the machine is not transported correctly.– Check that all the profile connectors are seated correctly using a size 4 – 6 Allen key. Unavoidable vibrations can loosen the connectors during transport.

6.2 Overview of the System

CP Lab Conveyor, CP Factory Linear, CP Factory Shunt and CP Factory Bypass are called basic modules. If an application module, e.g. the CP Application Module muscle press is attached to a basic module, it becomes a station.

Example

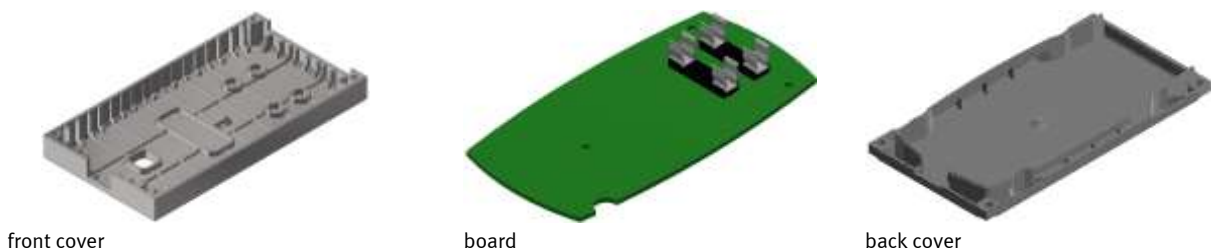


If several stations are put in a row one behind the other, this will form a production line.



Carriers are transported on the conveyors of the basic modules. And on the carriers, there are pallets with a fixed workpiece reception placed. The workpieces are placed on the workpiece reception or taken from it. Pallets can also be placed on a carrier in some stations or gripped from there.

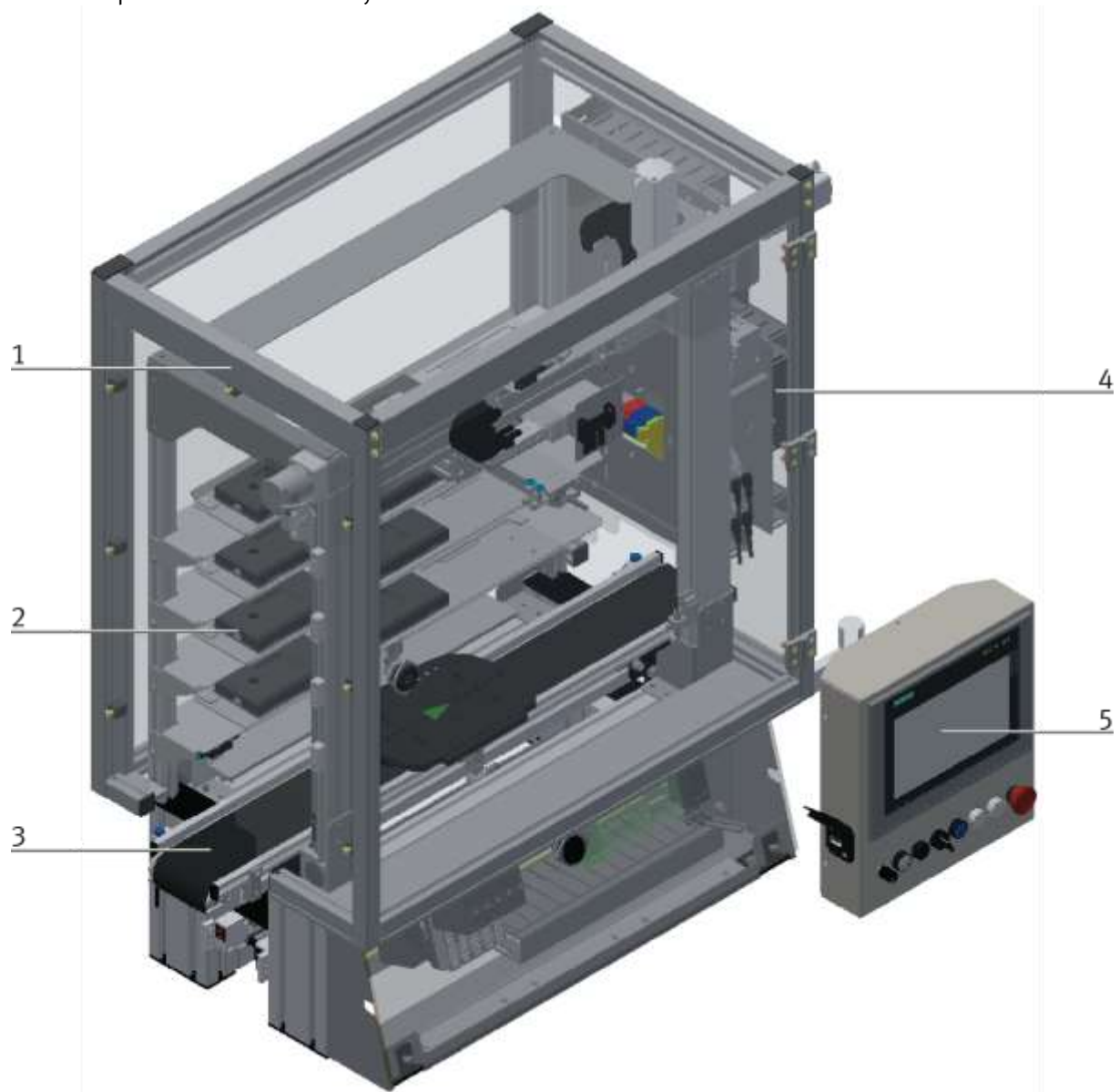
The typical workpiece of a CP Factory/Lab System is the roughly simplified version of a mobile phone. The workpiece consists of a front cover, of a back cover, of a board and of a maximum of two fuses.



6.3 The Application Module ASRS

The Application Module ASRS is designed for

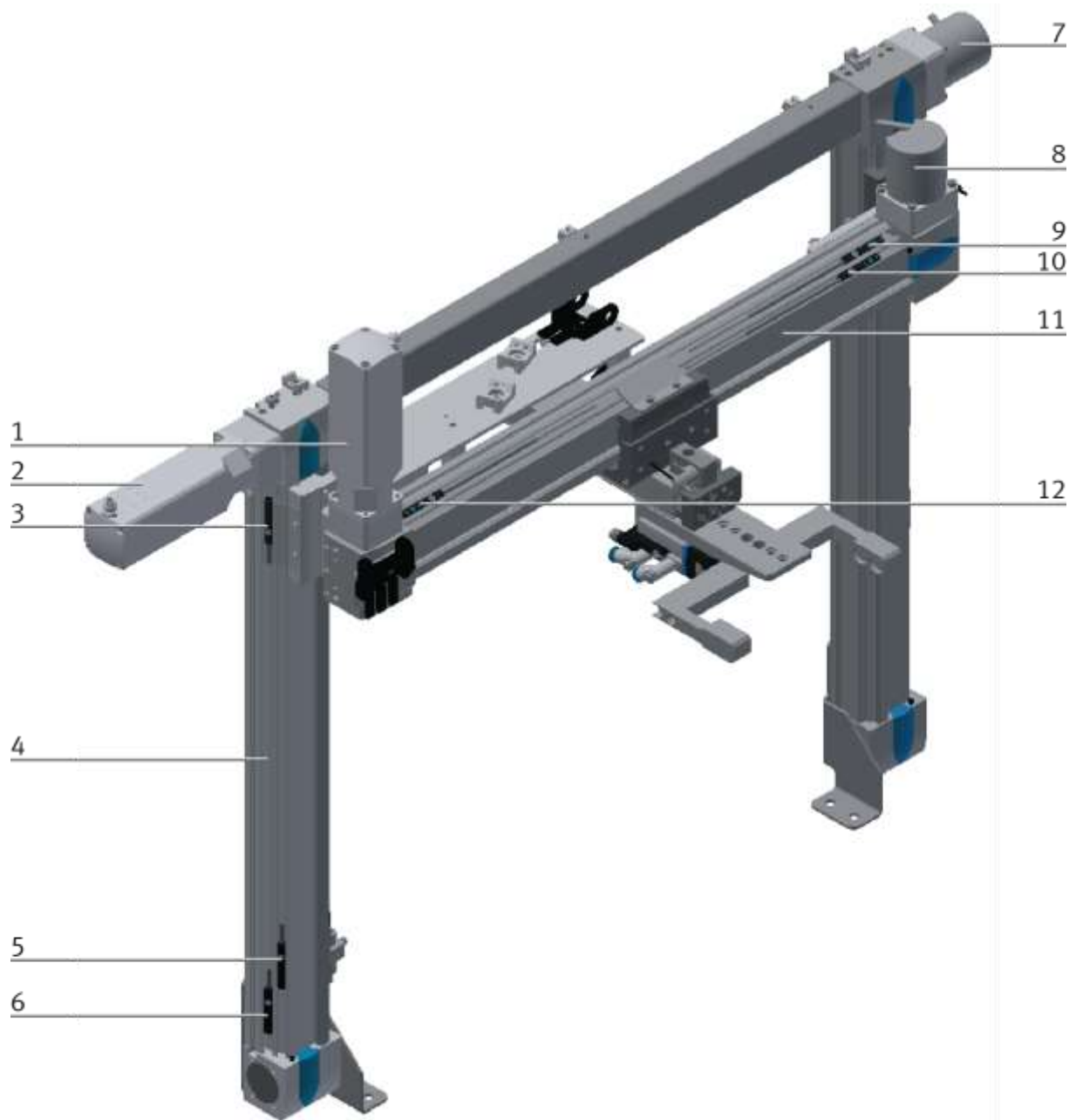
- sorting out workpieces from the conveyor and storing them in storage slots. If required, the workpieces can be put back onto the conveyor.



Application Module ASRS / Illustration similar

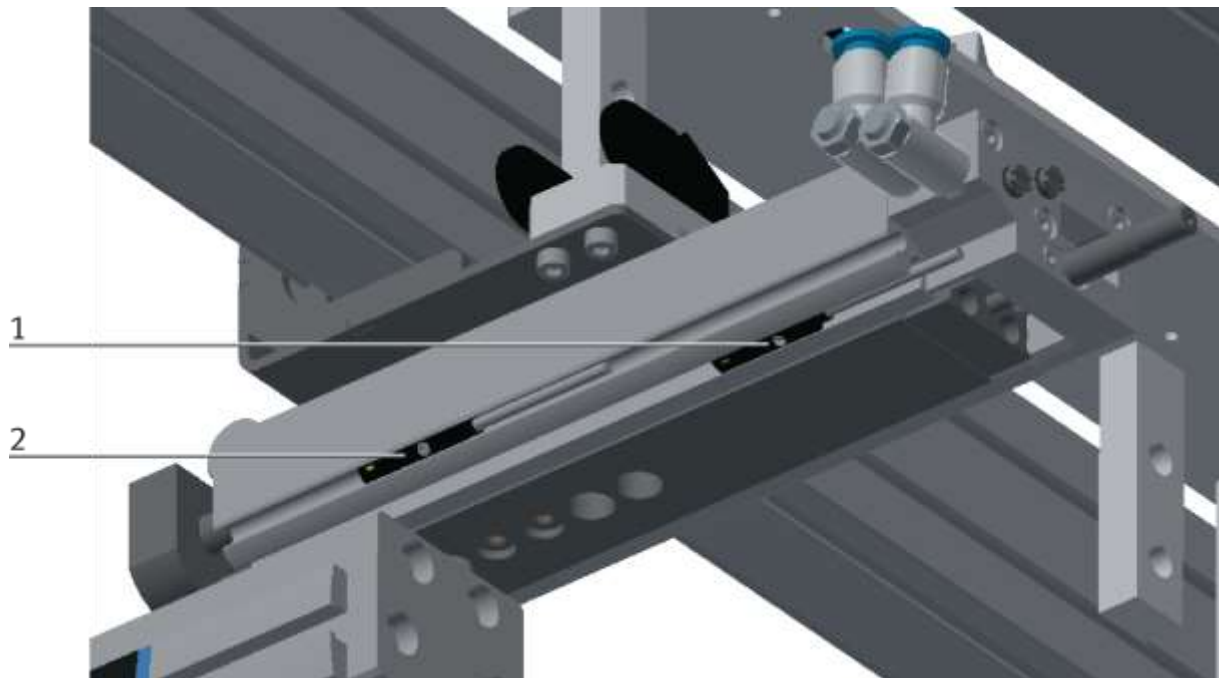
Pos	Description
1	Safety housing
2	Storage
3	CP-Lab conveyor
4	E- board
5	Operation panel

6.3.1 Electric



X/Y axis – illustration similar

Position	Description	Part number	Res.Ident	Use
1	Dunker G30-1 PLG30 -3steps	097-020	MA1	Gear motor for X-axis
2	Dunker G30-1 PLG30 -3steps	097-020	MA2	Gear motor for Y-axis
3	Proximity switch SIES-8M-PO-24V-K-7,5-OE	551391	BG6	Z-axis upper end position
4	Z-axis EGC-50-350-TB-KF-724342	556812		
5	Proximity switch SIES-8M-PS-24V-K-7,5-OE	551386	BG7	Reference position Z-axis
6	Proximity switch SIES-8M-PO-24V-K-7,5-OE	551391	BG5	Z-axis lower end position
7	Incremental encoder IFM	RB 3500	BG4	Incremental encoder Z -axis
8	Incremental encoder IFM	RB 3500	BG8	Incremental encoder X-axis
9	Proximity switch SIES-8M-PO-24V-K-7,5-OE	551391	BG2	X-axis left end position
10	Proximity switch SIES-8M-PS-24V-K-7,5-OE	551386	BG3	Reference position X-axis
11	Z-axis EGC50350TBKF_W	556812		
12	Proximity switch SIES-8M-PO-24V-K-7,5-OE	551391	BG1	X-axis right end position



Y-axis / illustration similar

Position	Description	Part number	Res.Ident	Use
1	Proximity switch SMT-10M-PS-24V-E-2,5-L-OE	551373	BG10	Y-axis in front position
2	Proximity switch SMT-10M-PS-24V-E-2,5-L-OE	551373	BG10	Y-axis in back position

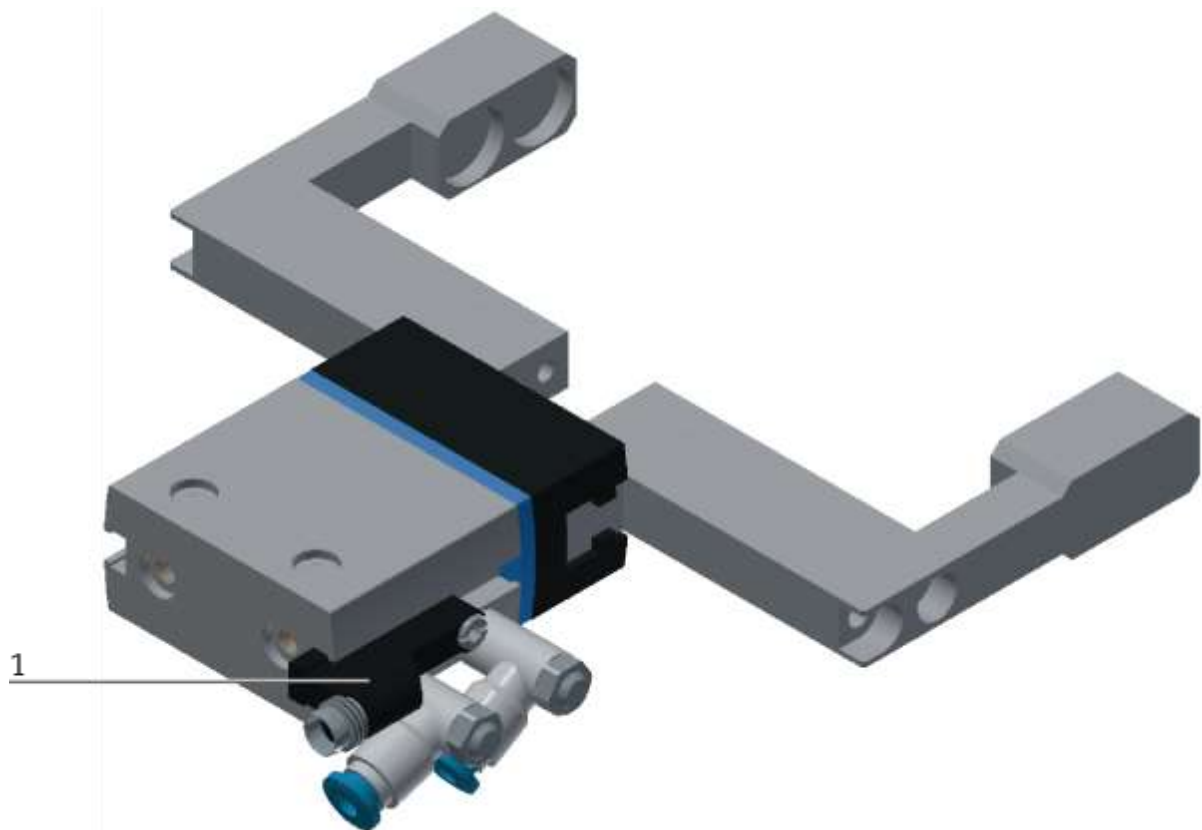


Illustration similar

Position	Description	Part number	Res.Ident	Use
1	Proximity switch SMT-8-SL-PS-LED-24-B	562019	BG11	Gripper closed

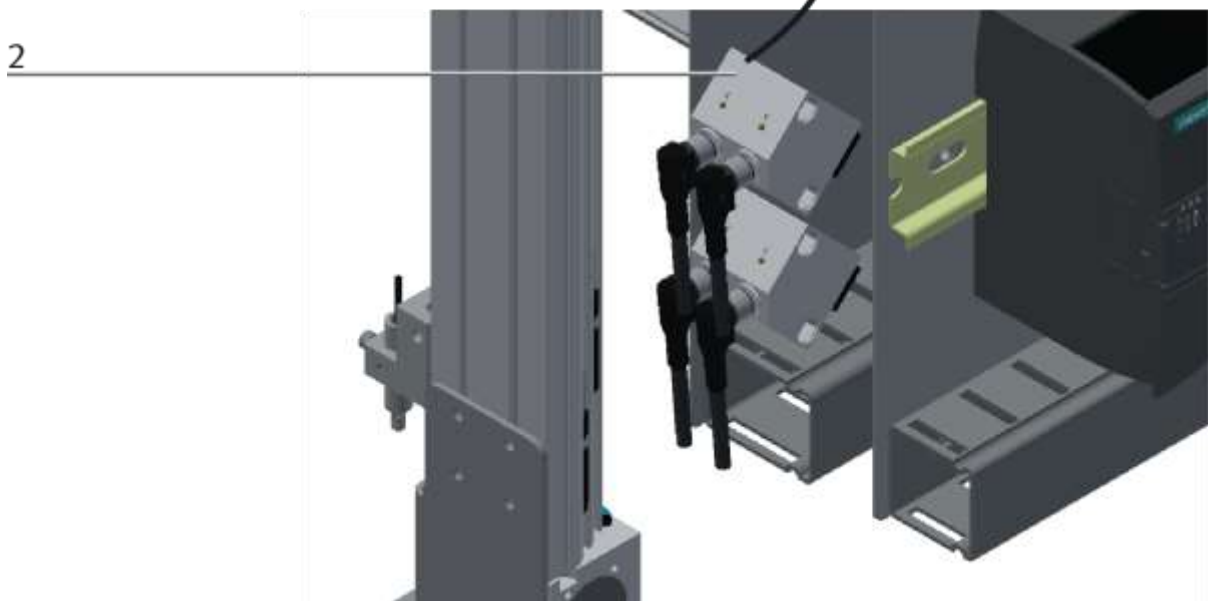
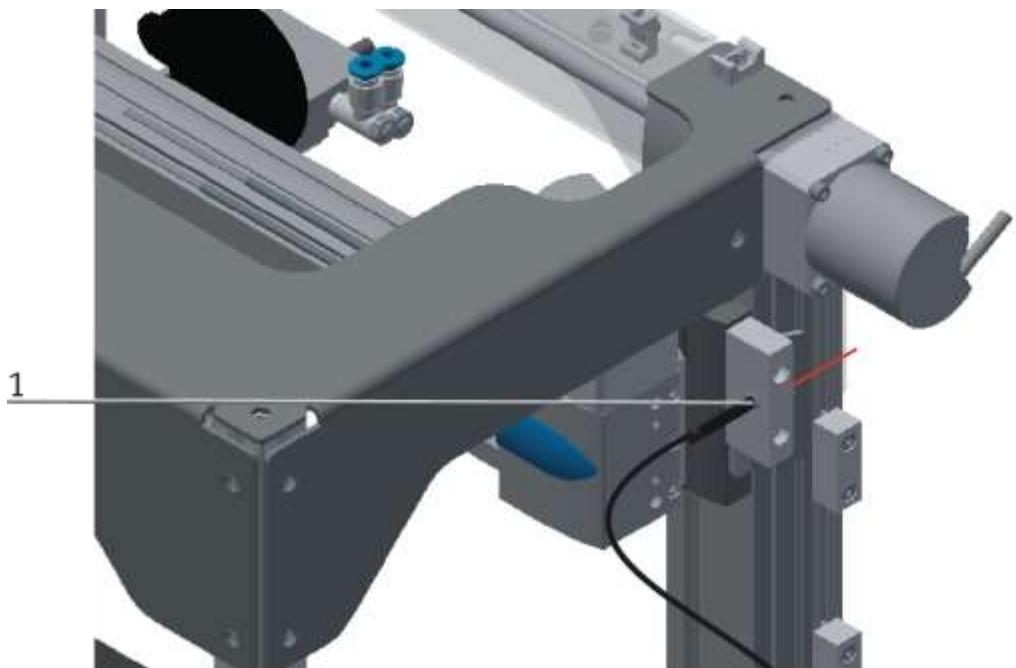


Illustration similar

Position	Description	Partnumber	Res.Ident	Use
1	Light guide SOOC-DS-M6-2-R25	552836	BG12	Switch-off by switching strip
2	Light guide unit D: SOEG-L-Q30-P-A-S-2L	8127556	BG12	Switch-off by switching strip

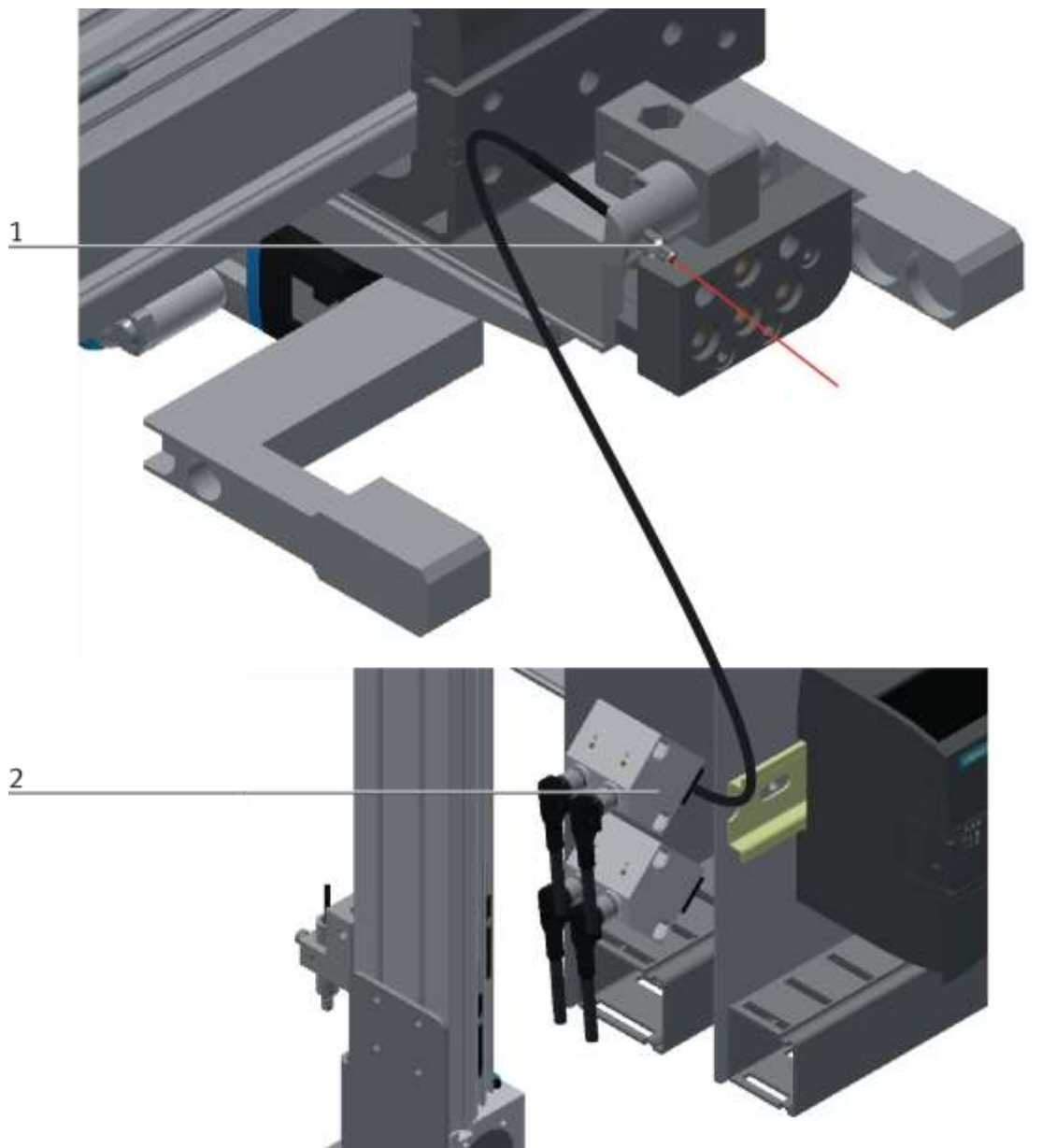


Illustration similar

Position	Description	Part number	Res.Ident	Use
1	Light guide SOOC-DS-M6-2-R25	552836	BG13	Shelf empty
2	Light guide unit D: SOEG-L-Q30-P-A-S-2L	8127556	BG13	Shelf empty

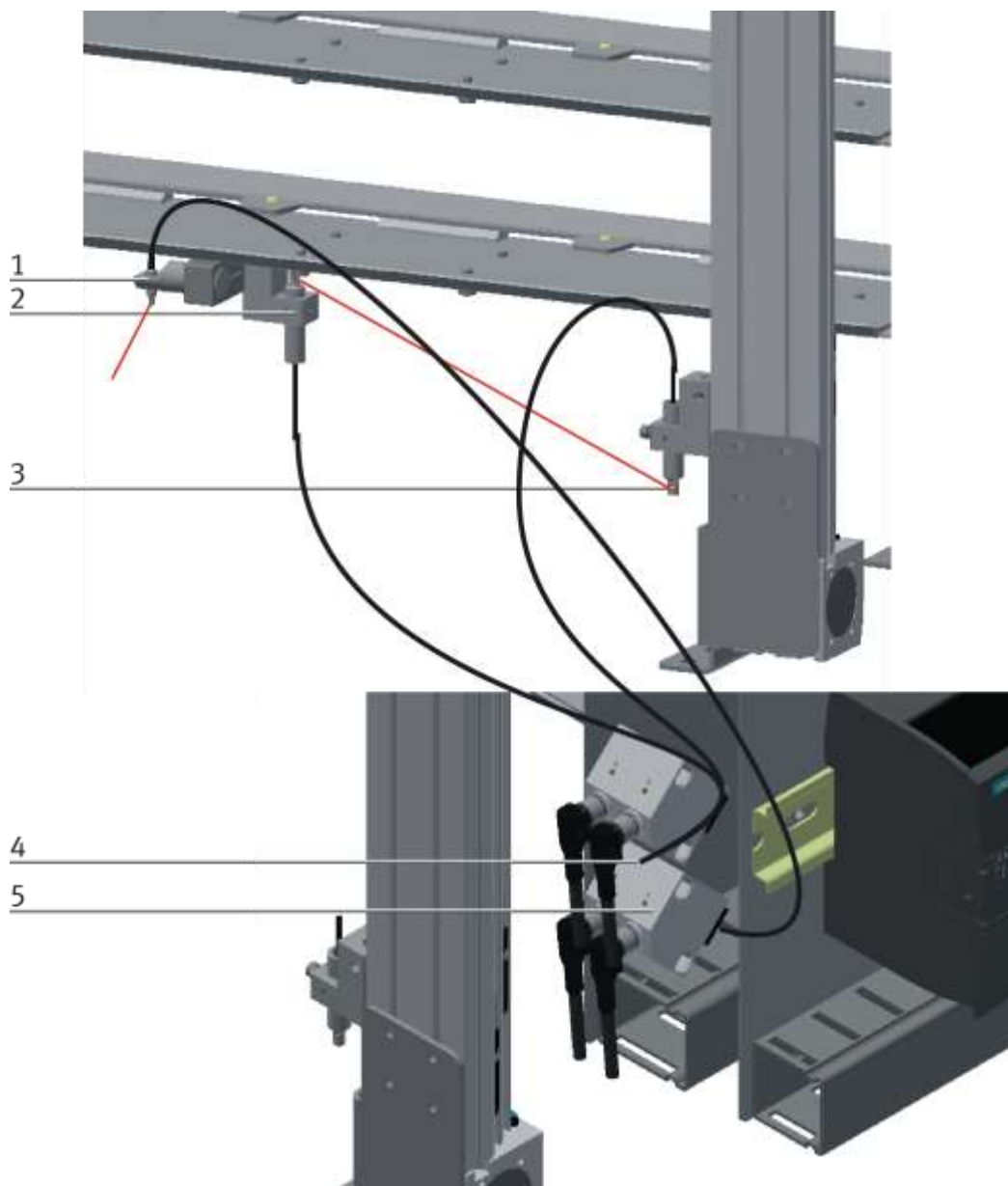


Illustration similar

Position	Description	Part number	Res.Ident	Use
1	Light guide SOOC-DS-M6-2-R25	552836	BG15	Pallet on workpiece carrier
2	Light guide SOOC-TB-M4-2-R25	552812	BG14	Workpiece on pallet
3	Light guide SOOC-TB-M4-2-R25	552812	BG14	Workpiece on pallet
4	Light guide unit D: SOEG-L-Q30-P-A-S-2L	8127556	BG14	Workpiece on pallet
5	Light guide unit D: SOEG-L-Q30-P-A-S-2L	8127556	BG15	Pallet on workpiece carrier

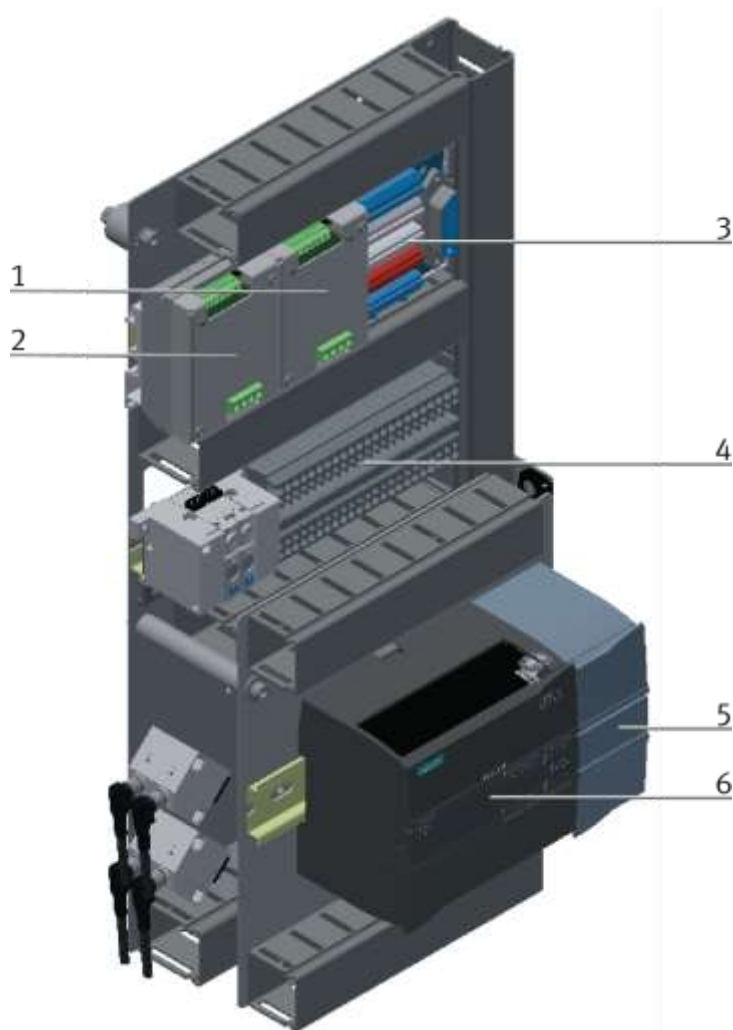


Illustration similar

Position	Description	Part number	Res.Ident	Use
1	Kaleja Motor controller	KALE001	QA1	X-axis
2	Kaleja Motor controller	KALE002	QA2	Z-axis
3	I/O Terminal	2627642	XMA1	
4	Terminal block		XL2	
5	Controller SM1223, 8DE/8DA	6ES7223-1BH32-0XB0	KF2	Controller
6	Controller CPU-1214C	6ES7214-1AE31-0XB0	KF1	Controller

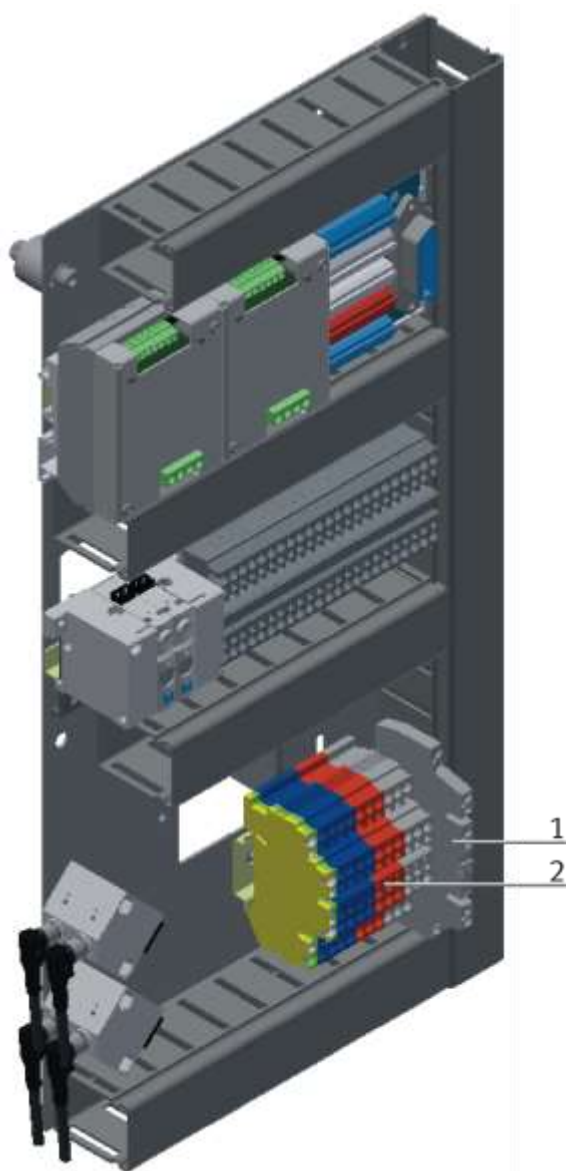
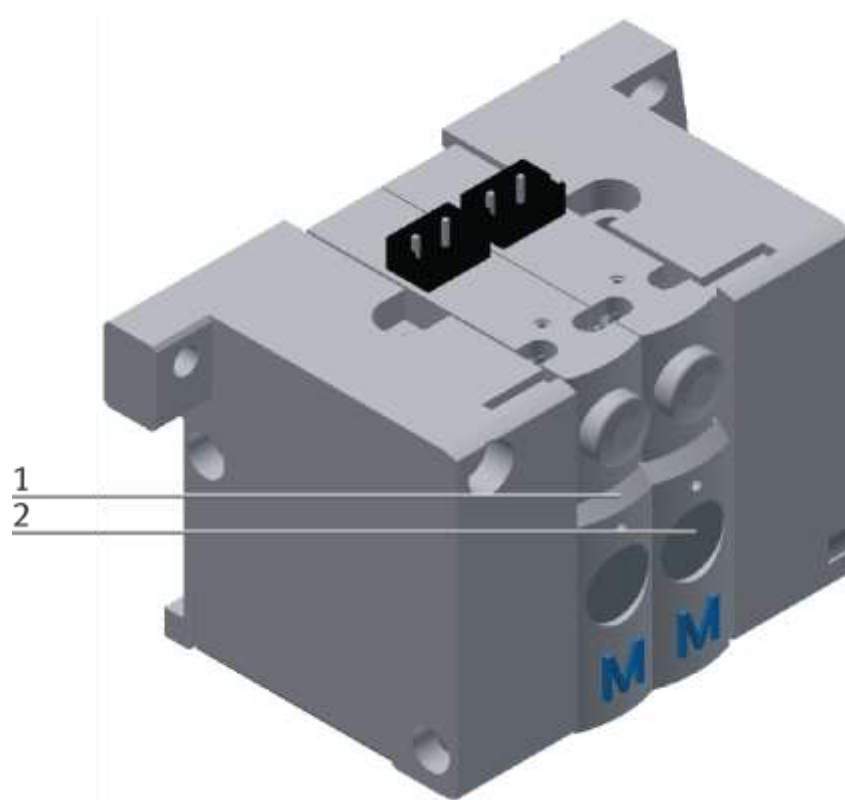


Illustration similar

Position	Description	Part number	Res.Ident	Use
1	Relay module Wago	859-304	KF3	Y-axis release
2	Clamps		XD1	

6.3.2 Pneumatic



Valve terminal CPVSC1 / illustration similar

Description Valves from left to right

Position	Description	Part number	Res.Ident	Use
1	Valve CPVSC1-M-M5	548901	MB 1	Extend Y-axis
2	Valve CPVSC1-M-M5	548901	MB 2	Open gripper

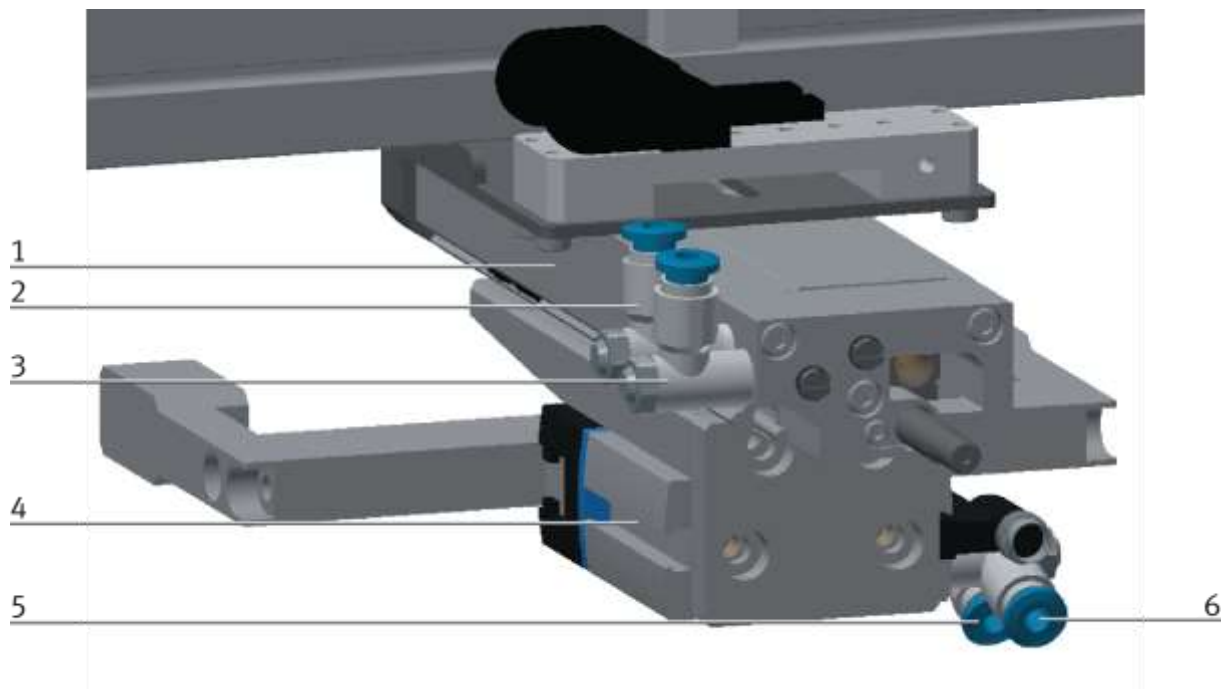


Illustration similar

Position	Description	Part number	Res.Ident	Use
1	Mini slide DGSL-8-80-Y3A	543941		Y-axis
2	One-way flow control valve GRLA-M5-QS-3-LF-C	175053		
3	One-way flow control valve GRLA-M5-QS-3-LF-C	175053		
4	Parallel gripper DHPS-16-A-NC	1254045		Gripper
5	One-way flow control valve GRLA-M5-QS-3-LF-C	175053		
6	One-way flow control valve GRLA-M5-QS-3-LF-C	175053		

6.4 Function

The application module stores pallets with workpieces in storage slots and returns them on request to the conveyor. The pallet carrier is stopped when running into the application module. A sensor checks the presence of a workpiece on the pallet carrier. In case there is one, the handling of the ASRS moves over the workpiece carrier and the workpiece is grabbed by a gripper.

Now the handling moves to the next free storage slot and puts down the workpiece there. Therefore the Y axis is extended. Once the workpiece has been put down, the handling moves to its initial position and the workpiece is released.

If a workpiece is required from the ASRS, the procedure is the same, but in reverse order.

6.5 Process description

Start conditions

- All connections have been established correctly

Starting position

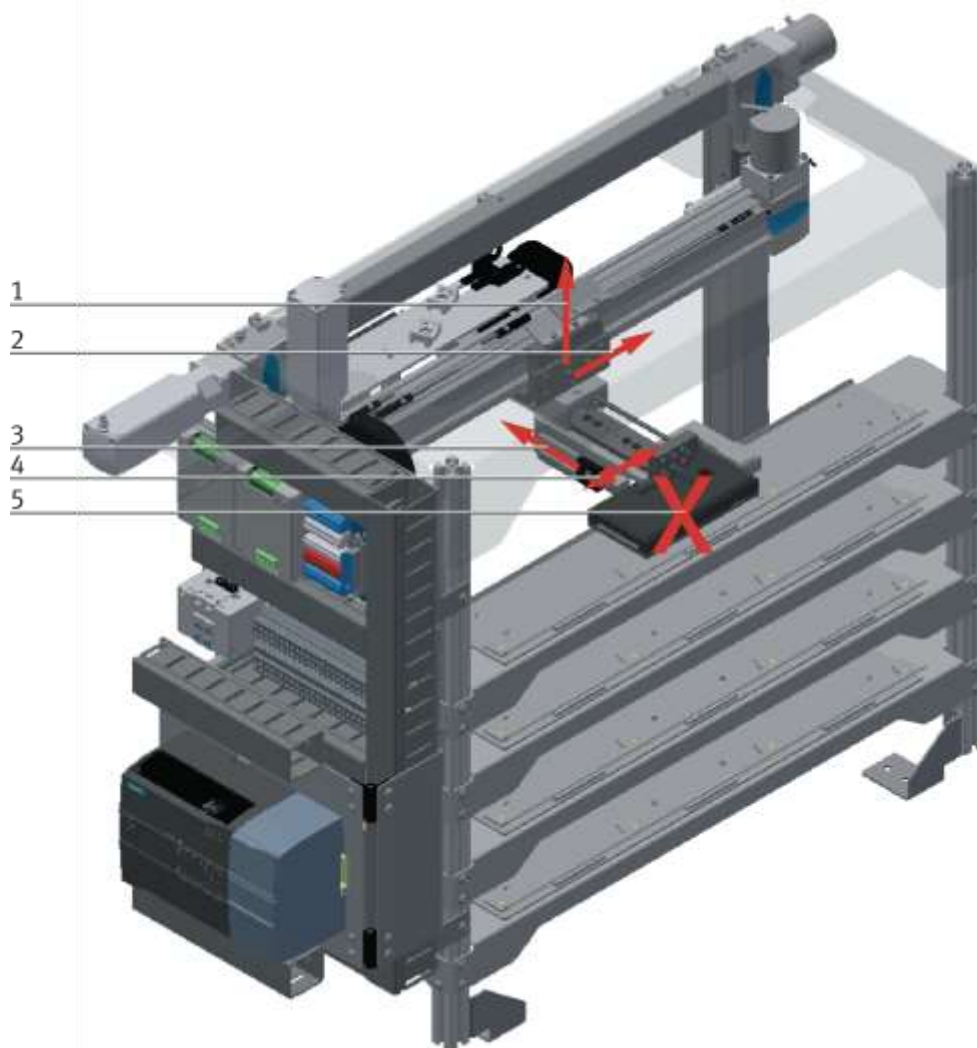


Illustration similar

1. the handling unit is in its upper basic position
2. the handling unit is in its left basic position
3. the Y-axis is in its rear position
4. the gripper is open
5. there are no workpieces in the storage application module

Procedure

1. The workpiece carrier is stopped when running into the application module.
2. A sensor checks the presence of a workpiece on the carrier.
3. The handling of the ASRS moves over the carrier, and the workpiece is grabbed by the gripper.
4. The handling moves to the next free storage slot, the Y axis is extended and the workpiece is put down there.
5. The Y axis is retracted. The ASRS is ready for a new task.
6. If a workpiece is required for outsourcing, the procedure is the same, but in reverse order.

6.6 Electrical connections


Inputs KF1

Description	Input CPU1214C	Equipment identifier
X axis incremental encoder	I0.0 / DLa:7	BG4_A
Reference position X axis	I0.1 / DLa:8	BG3
Gripper closed	I0.2 / DLa:9	BG11
Z axis incremental encoder	I0.3 / DLa:10	BG8_A
Reference position Z axis	I0.4 / DLa:11	BG7
Y axis back	I0.5 / DLa:12	BG9
Y axis front	I0.6 / DLa:13	BG10
Storage slot occupied	I0.7 / DLa:14	BG13
X axis incremental encoder B channel	I1.0 / DLa:15	BG4_B
Workpiece on pallet	I1.1 / DLa:16	BG14
Z axis incremental encoder B channel	I1.2 / DLa:17	BG8_B
Disconnection by switch strip	I1.3 / DLa:18	BG12
Pallet on carrier	I1.4 / DLa:19	BG15
Emergency Stop	I1.5 / Dia:20	


Outputs 5K1

Description	Output CPU1214C	Equipment Identifier 1 Input	Equipment Identifier 1 Output	Equipment Identifier
X axis to the right	Q0.0 / DQa:3	BG1 + / X axis right end position	BG1:2	QA1/A1right
X axis to the left	Q0.1 / DQa:4	BG2 + / X axis left end position	BG2:2	QA1/A2left
X axis creep speed	Q0.2 / DQa:5	Not available		QA1/A3slow
Z axis downwards	Q0.3 / DQa:6	BG5 + / Z axis lower end position	BG5:2	QA2/A1right
Z axis upwards	Q0.4 / DQa:7	BG6 + / Z axis upper end position	BG6:2	QA2/A1left
Z axis creep speed	Q0.5 / DQa:8	Not available		QA2/A1right
Extend Y axis	Q0.6 / DQa:9			MB1
Z axis downwards	Q0.7 / DQa:10			MB2

7 Commissioning

	NOTE
	<ul style="list-style-type: none"> – The following applies to the start-up as well as to the restart.

- The CP Application Module is delivered pre-assembled.
- All attachment parts are individually packaged.
- All components, tubings and cabling have been clearly marked in order to guarantee a problem-free retrieving of all connections.
- For the operation within a CP Factory/Lab System, the CP Application Module has to be put on and attached to a basic module.

	NOTE
	<ul style="list-style-type: none"> – You can read the general installation instructions in the manual of your basic module. The following instructions apply particularly to the CP Application Module.

7.1 Workplace

The commissioning of the CP Application Module requires:

- a CP Application Module
- a basic module CP Factory or a basic module CP Lab Conveyor for the installation of the CP Application Module
- a SysLink cable for the connection between the I/O terminal of the CP Application Module and the basic module CP Factory
- an Ethernet cable for the connection of the motor controller (option)
- an on-site electrical connection in the room, see data sheet basic module
- an on-site pneumatically connection in the room, see data sheet basic module

7.2 Visual Inspection

	 WARNING
	<ul style="list-style-type: none"> • Any damages must always be repaired instantly.

Visual inspection has to be carried out prior to every commissioning!

Before you start the CP Application Module, you must always inspect the following parts regarding visual damages and function:

- Electrical connections
- Mechanical components and connections
- Emergency Stop devices

7.3 Safety Regulations

	 WARNING
	<ul style="list-style-type: none"> • Any damages must always be repaired instantly.

The CP Application Module may only be operated on the following conditions:

- The technical condition – mechanically and electrically – of the CP Application Module is perfect.
- The CP Application Module is used in accordance with the regulations.
- The operating instructions have been read and understood.
- All safety devices are available and active.

7.4 Assembly

The application module is mounted on the basic module with the following distance (see picture): the distance between the stopper edge and the profile edge is the same with a CP-Lab conveyor as with a CP-Factory basic module.

The assembly process is explained in the following chapter as an example. The displayed dimension is an approximation, it is possible that a fine adjustment is necessary for error-free processing.

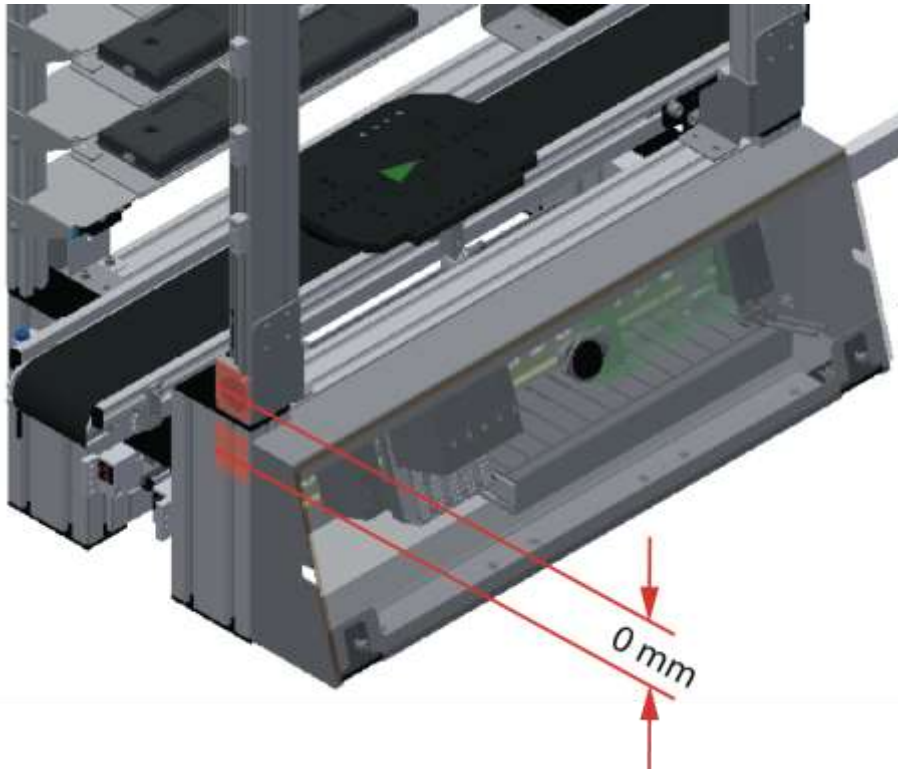



Illustration similar

7.4.1 Assembly of an CP application module to basic module CP Lab Conveyor

	NOTE
<p>The procedure of attaching the CP application module to a basic module is the same as with all basic modules. The following description for the attachment to a basic module CP Lab Conveyor is an example for all basic modules and all application modules.</p>	

Positioning slot nuts in the cross profiles of the basic module CP Lab Conveyor

Mounting the CP application module is very easy:

- Two M5-slot nuts (2) have to be put into the inner front slot of the cross profile (4) of the basic module CP Lab Conveyor.
- Then put two additional M5-slot nuts (2) into the inner back slot of the cross profile (3) of the basic module CP Lab conveyor.
- Then you have to position the slot nuts (2) approximately to the distance of the vertical cross profiles of the CP application module.




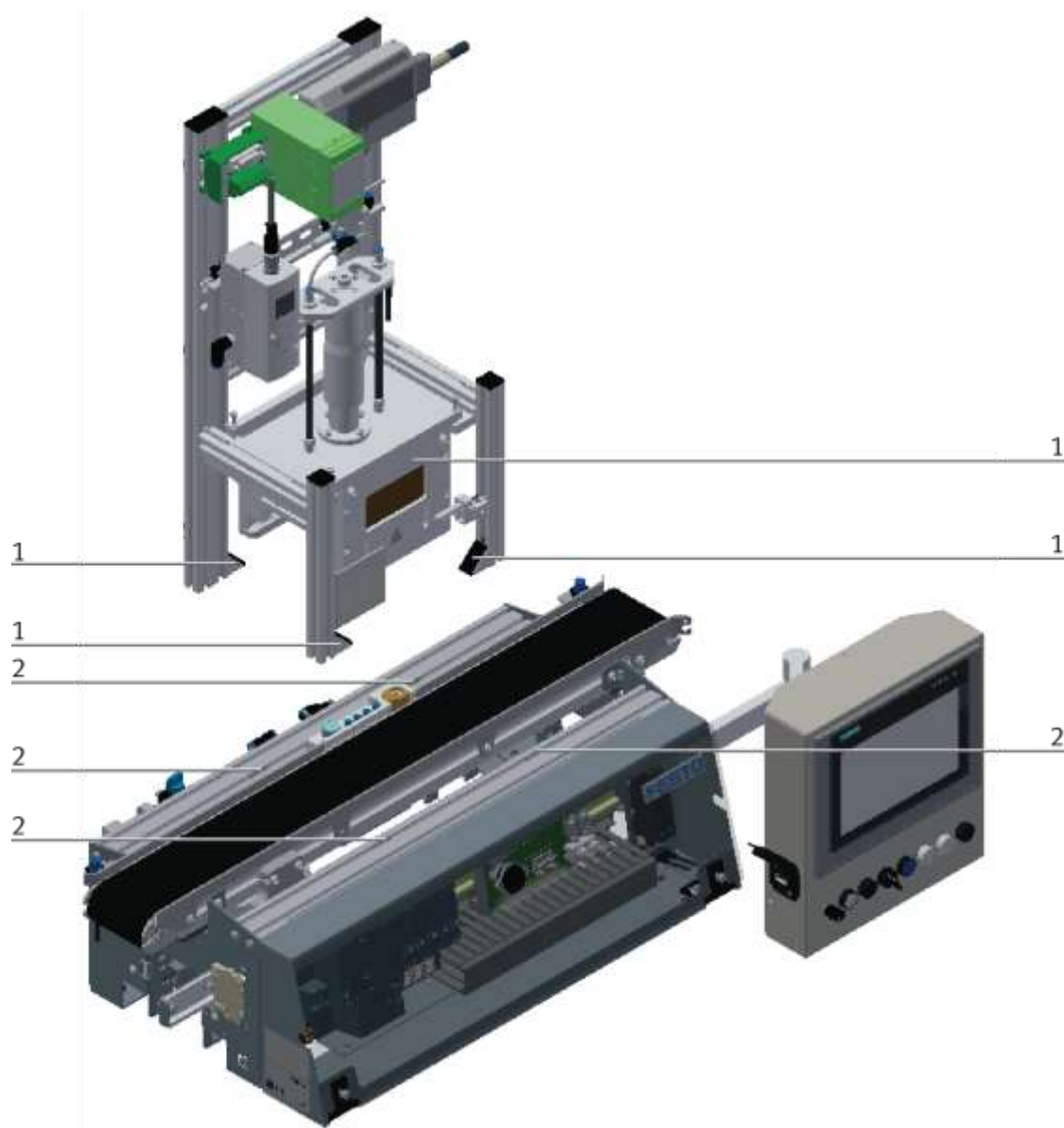
Positioning slot nuts / illustration similar

Position	Description
1	back cross profile
2	slot nut
3	Inner slot (back cross profile)
4	Inner slot (front cross profile)
5	front cross profile

Attaching the application module to the basic module CP Lab Conveyor

- Put the CP application module on the basic module CP Lab Conveyor.
- Position the slot nuts (2) underneath the mounting brackets (1) of the CP application module so that the internal threads of the slot nuts are visible underneath the elongated holes of the mounting brackets.

	NOTE
Use Allen keys for lateral adjustment of the slot nuts.	

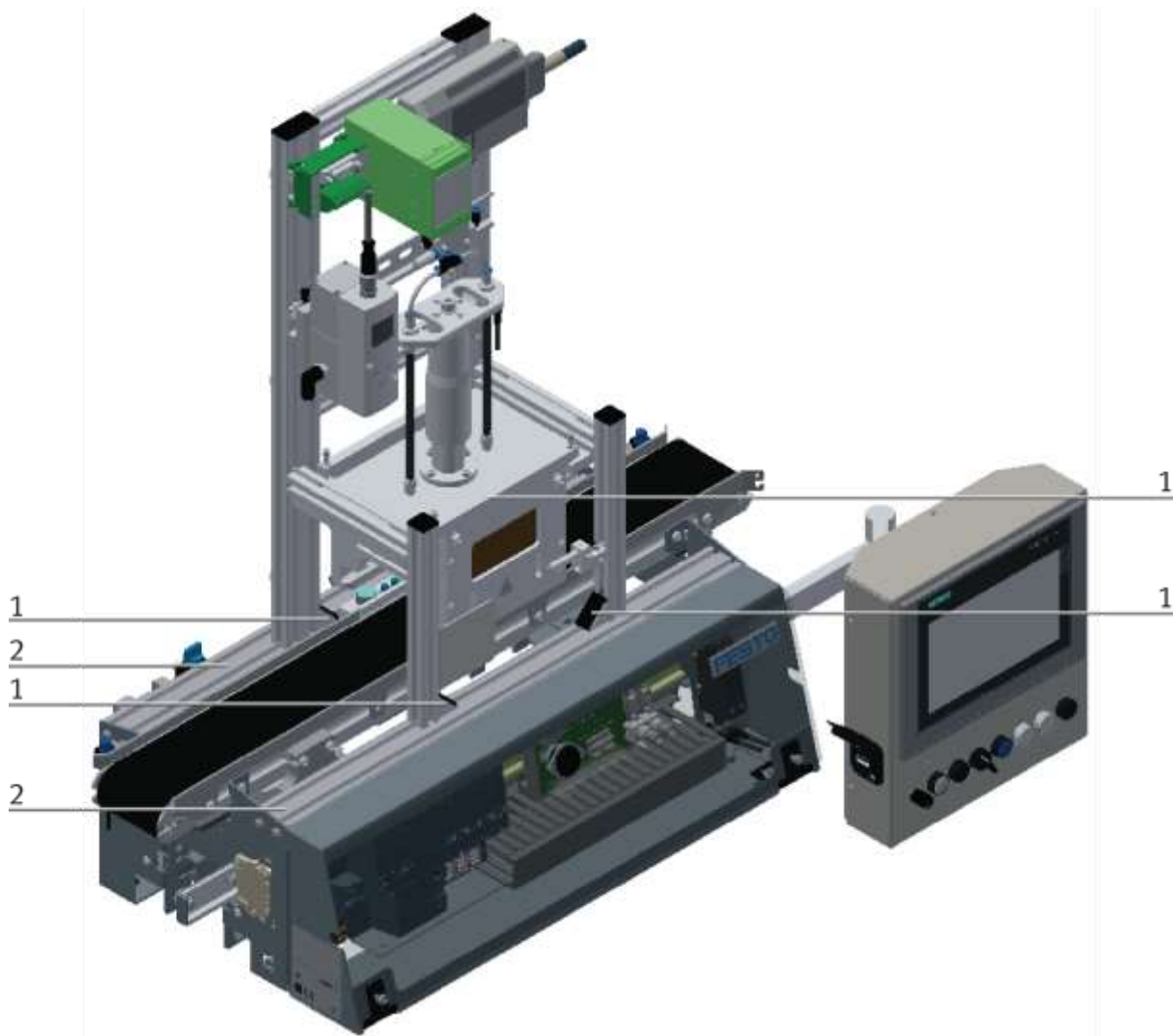


How to put on the CP application module / illustration similar

Position	Description
1	CP application module: mounting bracket
2	slot nut

Adjusting the CP application module and fixing it on the basic module CP Lab Conveyor


- Use raised head screws M5x8, in order to connect the mounting brackets (1) of the CP application module Measuring, at first loosely, with the cross profiles (2) of the basic module CP Lab Conveyor.
- After setting all raised head screws, you can still move the CP application module to the position required.
- Push a carrier with pallet and front cover to the stopper position. The front cover points with its inside upwards. The drilled hole of the front cover is on the left side.
- Have a visual inspection to make sure that the two distance sensors are capable of registering the front cover more or less in medium range.
- Now tighten the raised head screws.
- Then put the black covers onto the mounting brackets.



Tightening the CP application module / illustration similar

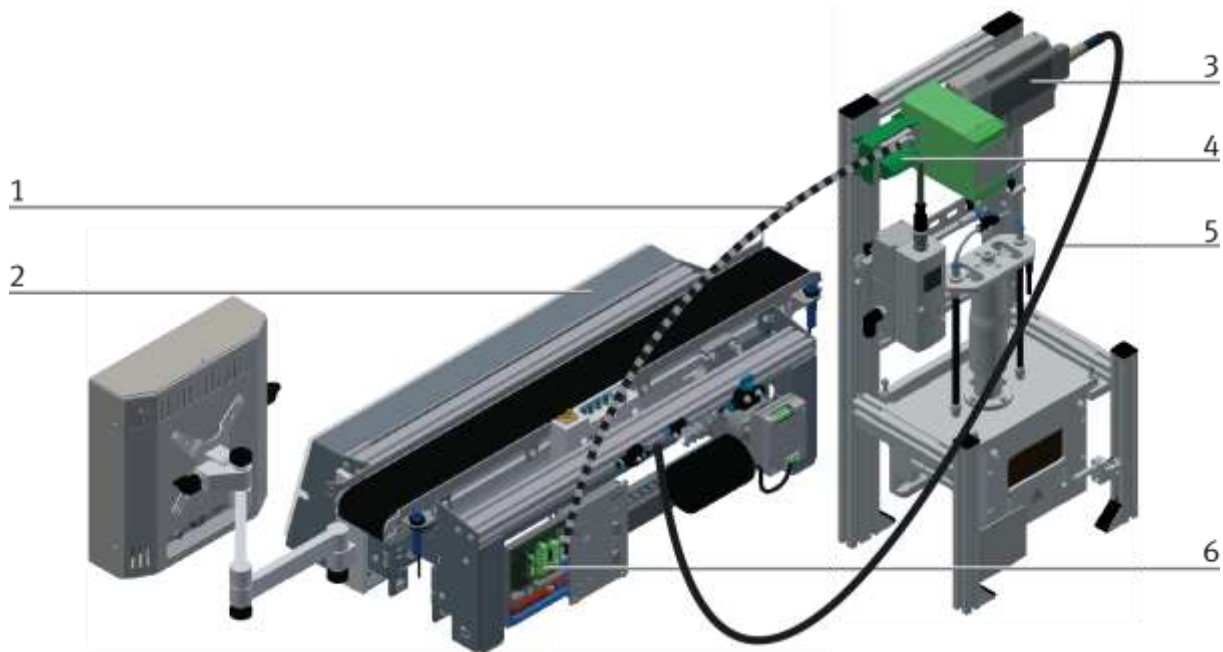
Position	Description
1	CP application module: mounting bracket with cover
2	basic module CP Lab Conveyor: cross profile

7.4.2 Connecting the CP application module electrically to basic module CP Lab Conveyor SysLink-interface for digital signals

	NOTE
<p>With special variants of the basic module CP Lab Conveyor, you absolutely have to observe the corresponding operation instructions of the basic module CP Lab Conveyor!</p>	

The CP application module exchanges digital input and output signals with the basic module via the SysLink interface:

- Connect the I/O terminal (3) of the CP application module with the control (1) of the basic module CP Lab Conveyor. Therefore use the connecting cable with SysLink plugs (5) which has already been attached to the control and is led out on the back side of the basic module CP Lab Conveyor.



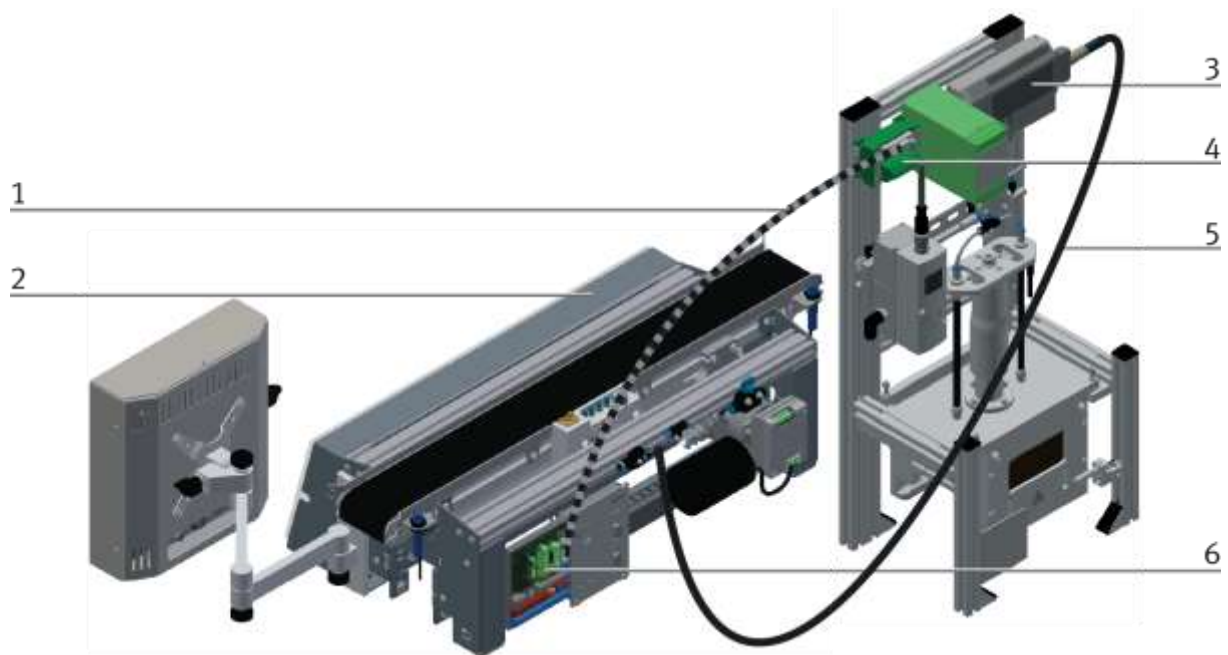
Electrical connections / illustration similar

Position	Description
1	connecting cable with 15-pin standard D-Sub-plugs
2	basic module CP Lab Conveyor: control or decentralized periphery
3	CP application module: I/O terminal (+BG-XD1)
4	CP application module: analogue terminal (+BG-XD2A)
5	connecting cable with a SysLink-plug (SysLink-cable)
6	basic module CP Lab Conveyor: board at the back (+G1-XZ2)

D-Sub-interface for analogue signals (option – not available at all application modules)

The CP application module produces a analogue output signal. These is put on the analogue terminal (4) and must be connected with the analogue inputs of the basic module:

- Connect the analogue terminal (4) of the CP application module with the D-Sub-interface for analogue signals (6) on the rear board of the basic module CP Lab Conveyor. Therefore use the provided connecting cable (1) with standard D-Sub plugs: 15-pin, two-rowed.

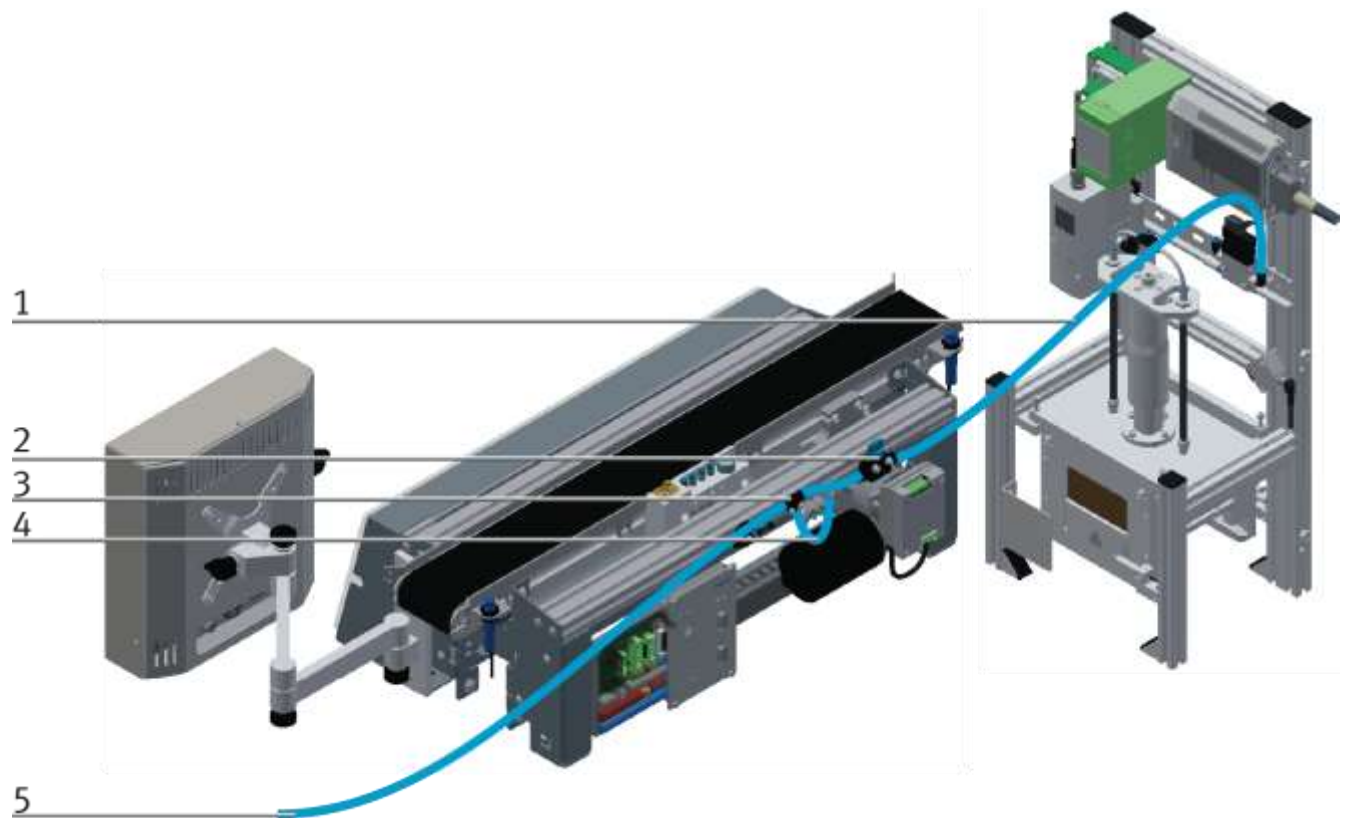


Electrical connections / illustration similar

Position	Description
1	connecting cable with 15-pin standard D-Sub-plugs
2	basic module CP Lab Conveyor: control or decentralized periphery
3	CP application module: I/O terminal (+BG-XD1)
4	CP application module: analogue terminal (+BG-XD2A)
5	connecting cable with a SysLink-plug (SysLink-cable)
6	basic module CP Lab Conveyor: board at the back (+G1-XZ2)


7.4.3 Pneumatic connection from application modules to basic module CP Lab Conveyor (option – not available at all application modules)

The pneumatic connection is based on the principle of the following sketch. The application module is connected from the valve terminal to the shut-off valve (2) on the conveyor belt. The hose (1) (nominal width 4) is simply inserted into the QS connector. The supply line (5) is plugged into the T-plug (3). The CP Lab Band is also supplied with a T-connector (4).



Pneumatically connect application module / illustration similar

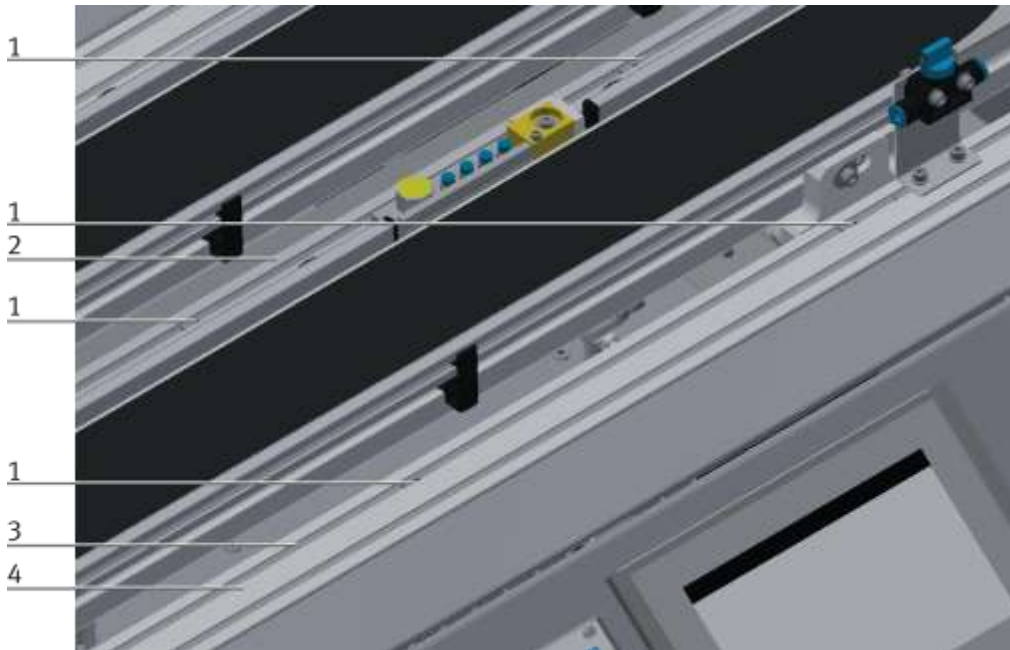
7.4.4 Assembly of an CP application module to a CP Factory basic module

	NOTE
<p>The procedure for installing a CP application module on a basic module is identical for all basic modules. The following example is an example for all basic modules and applications.</p>	

Positioning slot nuts in the cross profiles of the CP Factory basic module

Mounting the CP application module is very easy:

- Two M5-slot nuts (1) have to be put into the inner front slot of the cross profile (4) of the CP Factory basic module.
- Then put two additional M5-slot nuts (1) into the inner back slot of the cross profile (2) of the basic module.
- Then you have to position the slot nuts (1) approximately to the distance of the vertical cross profiles of the CP application module.



Positioning slot nuts / illustration similar

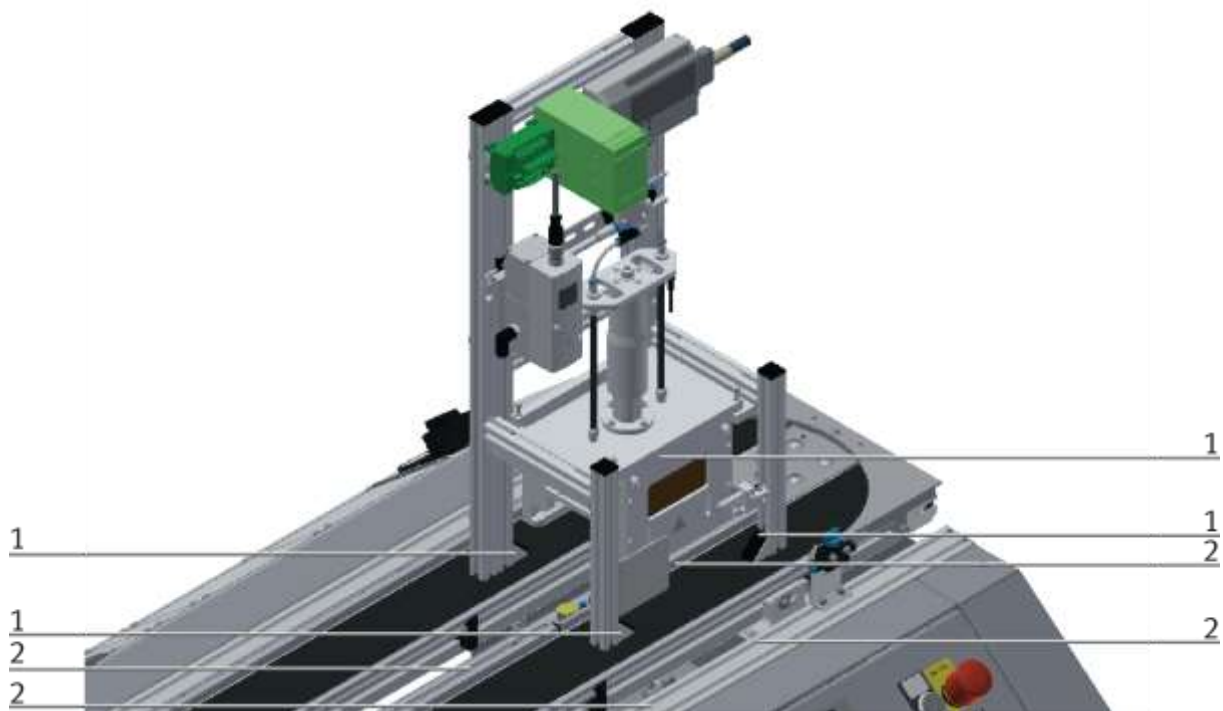
Position	Description
1	slot nut
2	back cross profile
3	Inner slot (front cross profile)
4	front cross profile

Attaching the application module to the CP Factory basic module

- Put the CP application module on the CP Factory basic module.
- Position the slot nuts (2) underneath the mounting brackets (1) of the CP application module so that the internal threads of the slot nuts are visible underneath the elongated holes of the mounting brackets.

**NOTE**

Use Allen keys for lateral adjustment of the slot nuts.

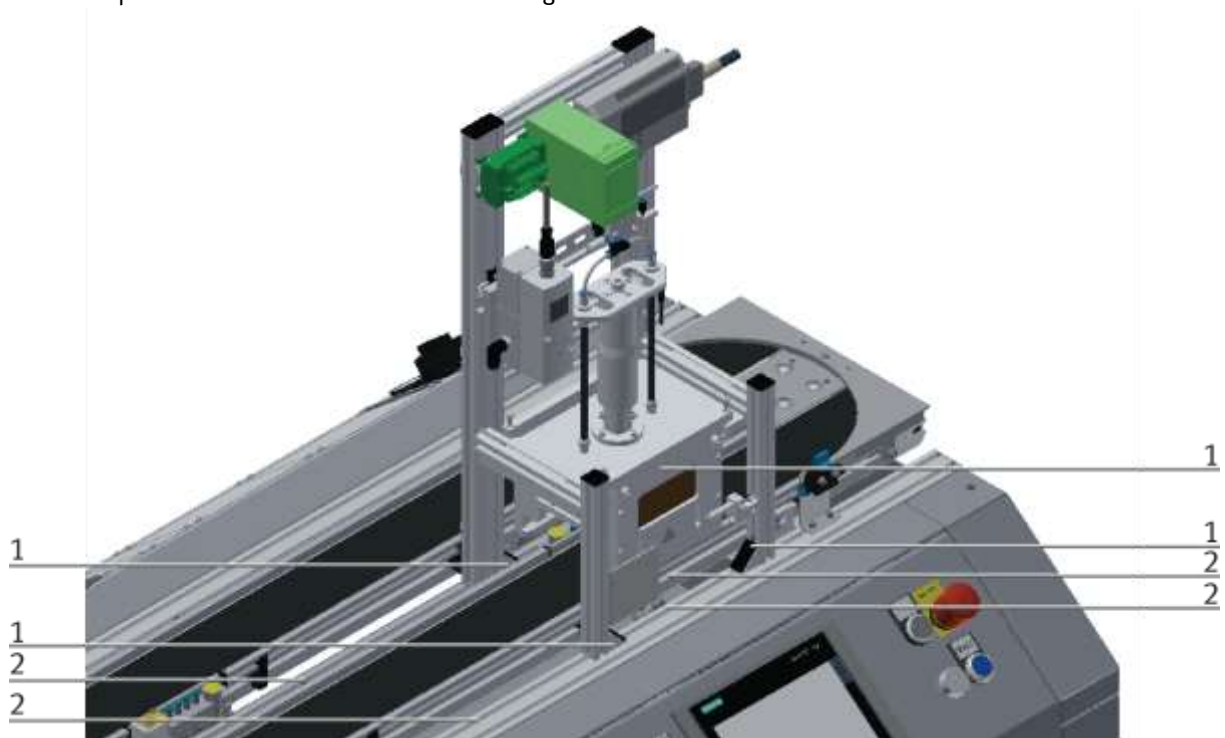


How to put on the CP application module / illustration similar

Position	Description
1	CP application module: mounting bracket
2	slot nut

Adjusting the CP application module and fixing it on the CP Factor basic module

- Use raised head screws M5x8, in order to connect the mounting brackets (1) of the CP application module Measuring, at first loosely, with the cross profiles (2) of the CP Factory basic module.
- After setting all raised head screws, you can still move the CP application module to the position required.
- Push a carrier with pallet and front cover to the stopper position. The front cover points with its inside upwards. The drilled hole of the front cover is on the left side.
- Have a visual inspection to make sure that the two distance sensors are capable of registering the front cover more or less in medium range.
- Now tighten the raised head screws.
- Then put the black covers onto the mounting brackets.



Tightening the CP application module / illustration similar

Position	Description
1	CP application module: mounting bracket with cover
2	CP Factory basic module: cross profile

7.4.5 Connecting the CP application module electrically to the CP Factory basic module

SysLink-interface for digital signals

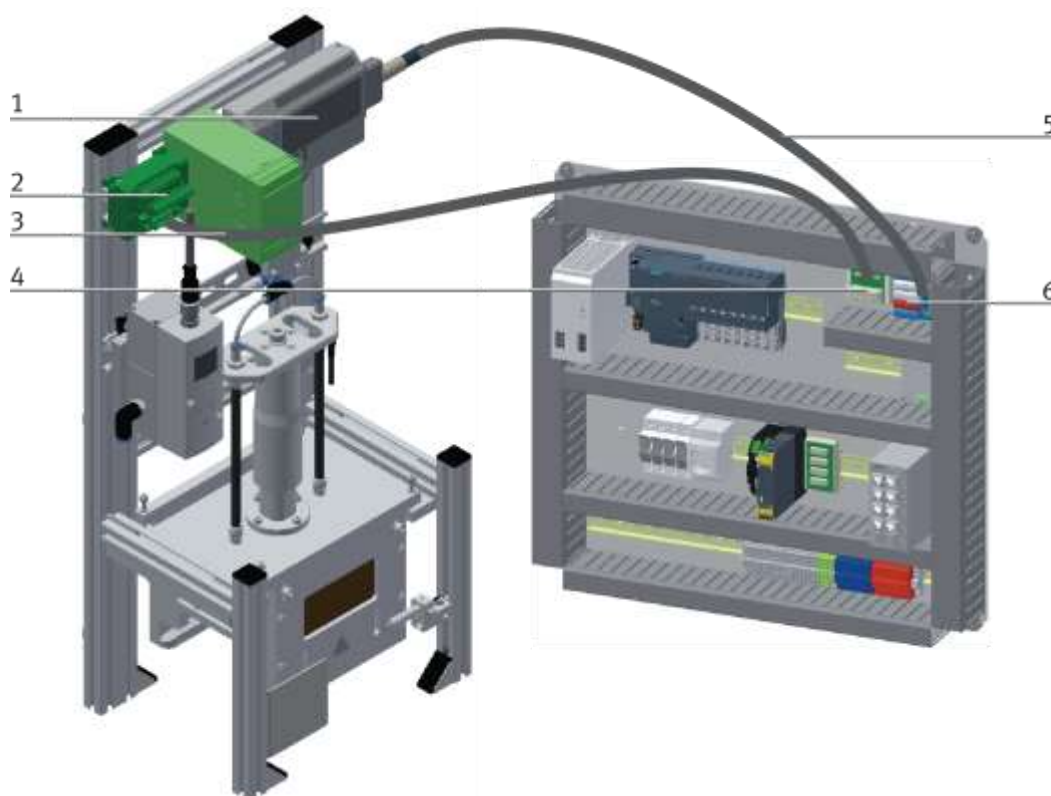
The CP application module exchanges digital input and output signals with the basic module via the SysLink interface:

- Connect the I/O terminal (1) of the CP application module with the I/O terminal (6) on the electric board of the CP Factory basic module. Therefore use the provided connecting cable with SysLink plugs (5).

D-Sub-interface for analogue signals (option – not available at all CP application modules)

The CP application module produces two analogue output signals with the distance sensors. These are set on the analogue terminal and have to be connected with the analogue inputs of the CP Factory basic module:

- Connect the analogue terminal (2) of the CP application module with the analogue terminal (4) on the electric board of the CP Factory basic module. Therefore use the provided connecting cable (3) with standard D-Sub plugs: 15-pin, two-rowed.



Electrical connections / illustration similar

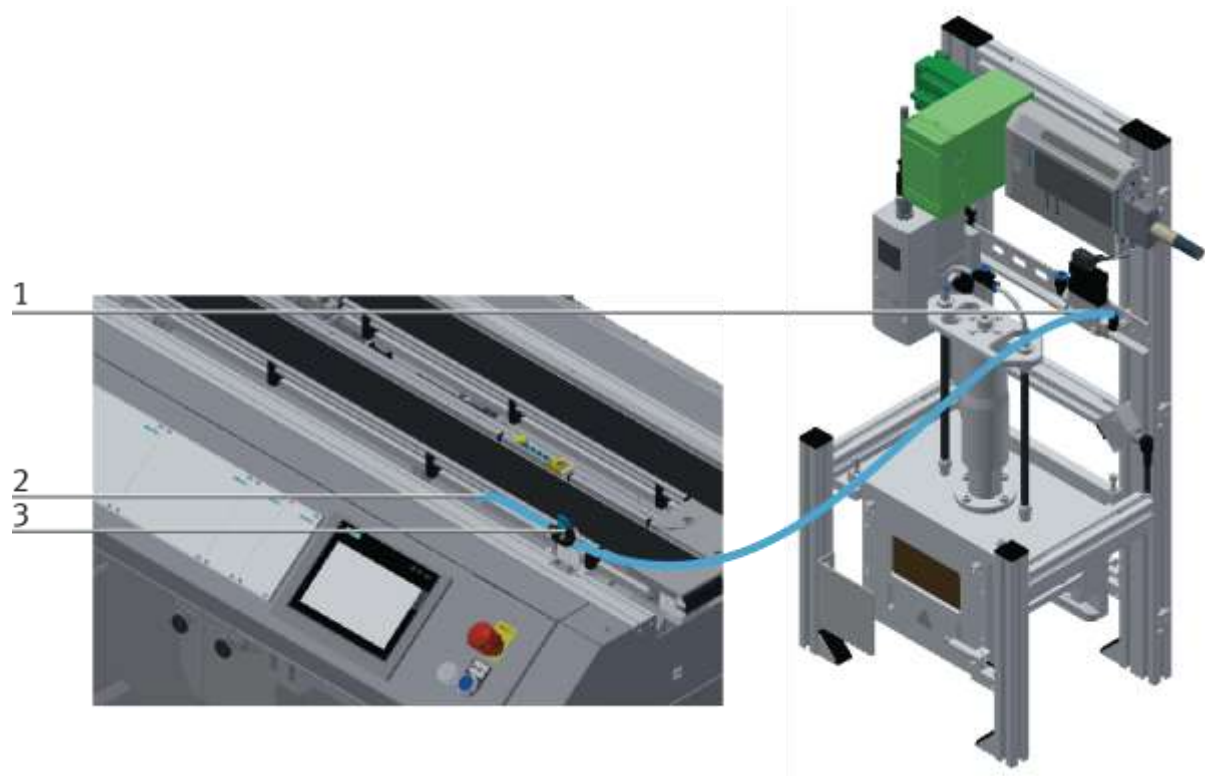
Position	Description
1	CP application module: I/O terminal (+BG-XD1)
2	CP application module: analogue terminal (+BG-XD2A)
3	connecting cable with 15-pin D-Sub-plugs
4	electric board CP Factory basic module: analogue terminal (+K1-XD16A)
5	connecting cable with SysLink-plugs (SysLink-cable)
6	electric board CP Factory basic module: I/O terminal (+K1-XD15)

7.4.6 Pneumatic connection from application modules to CP Factory basic module

The pneumatic connection is based on the principle of the following sketch. The application module is connected from the valve (terminal) to the shut-off valve (3) on the conveyor belt.

The hose (nominal width 4) is simply inserted into the QS connector.

The supply line (2) is plugged into the shut off-valve (3).



Pneumatically connect application module / illustration similar

7.5 Adjusting Sensors

7.5.1 Diffuse Light Sensor

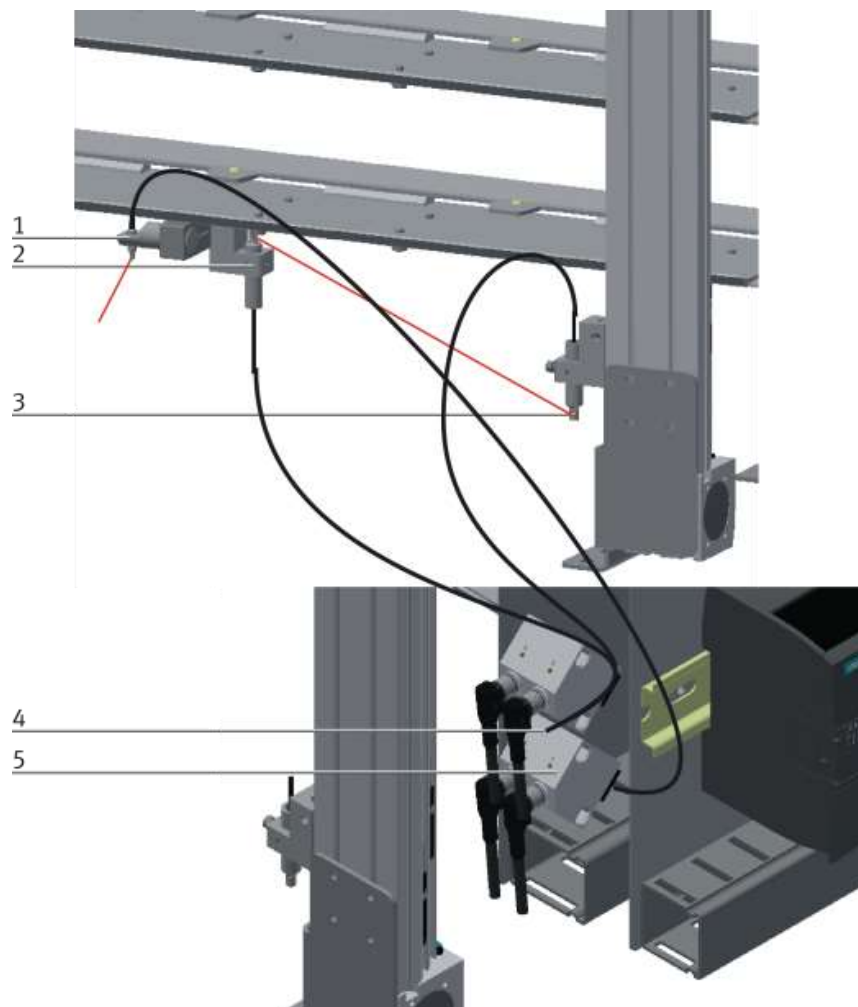


Illustration similar

Pos	Description
1	Diffuse Light Sensor pallet on carrier
2	Diffuse Light Sensor workpiece on pallet
3	Diffuse Light Sensor pallet on carrier
4	Fibre- optic unit BG14 for workpiece on pallet
5	Fibre- optic unit BG15 for pallet on carrier

The Diffuse Light Sensor is used for identifying a workpiece. Flexible fibre-optics are connected to a fibre-optic unit. The fibre-optic unit works with visible infrared. The light reflected by the workpiece is identified. Different surfaces and colours of the workpieces may change the degree of reflection.

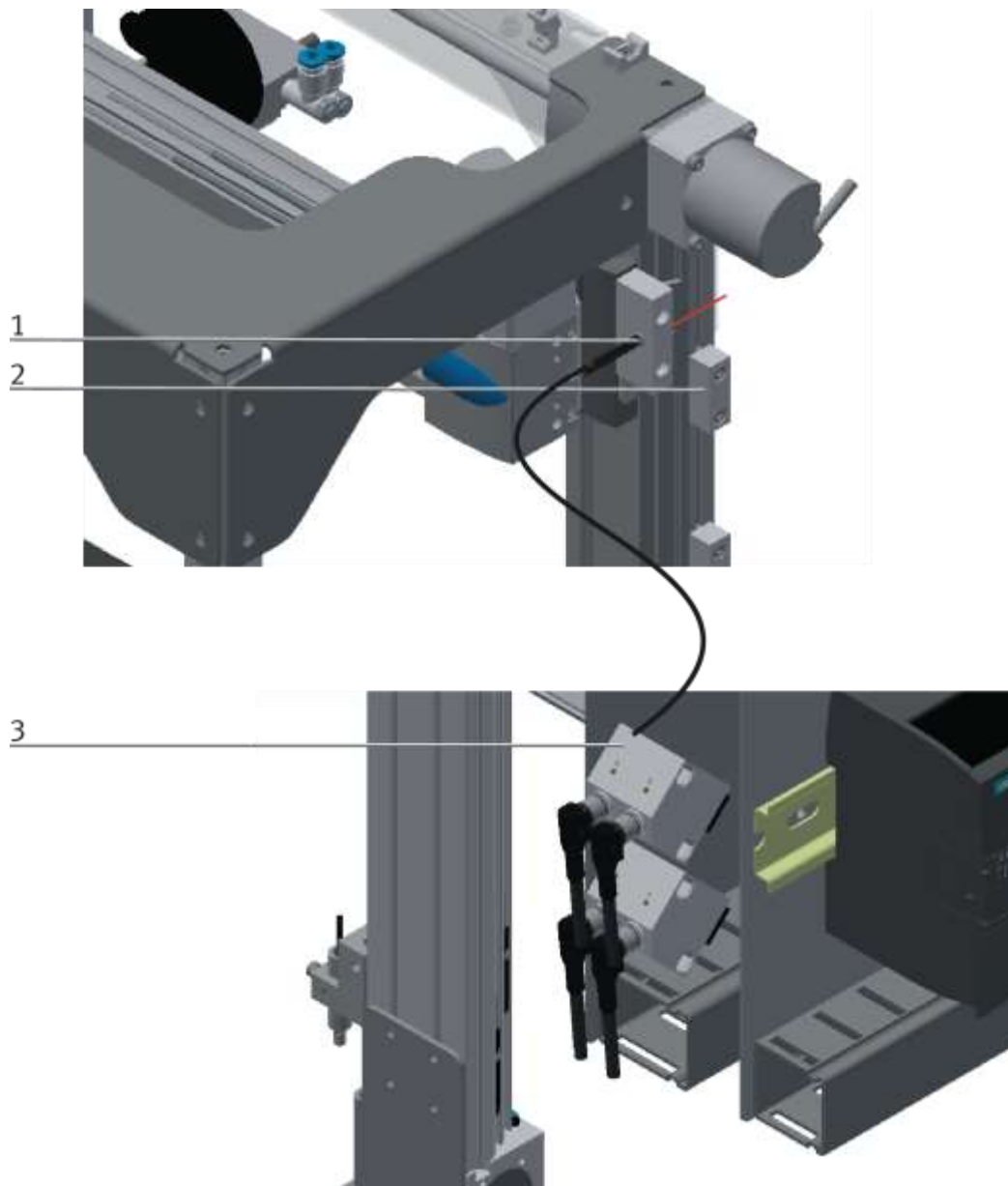


Illustration similar

Pos	Description
1	Diffuse Light Sensor SOOC-DS-M6-2-R25 / 552836
2	Switch strips for Light Sensor
3	Fibre-optic unit (BG12) / 8127556 / D: SOEG-L-Q30-NA-S-2L

The Diffuse Light Sensor is used for the disconnection by the switch strip. Flexible fibre optics are connected to a fibre-optic unit. The fibre-optic unit works with visible infrared. The light reflected by the workpiece is identified. Different surfaces and colours of the workpiece may change the degree of reflection.

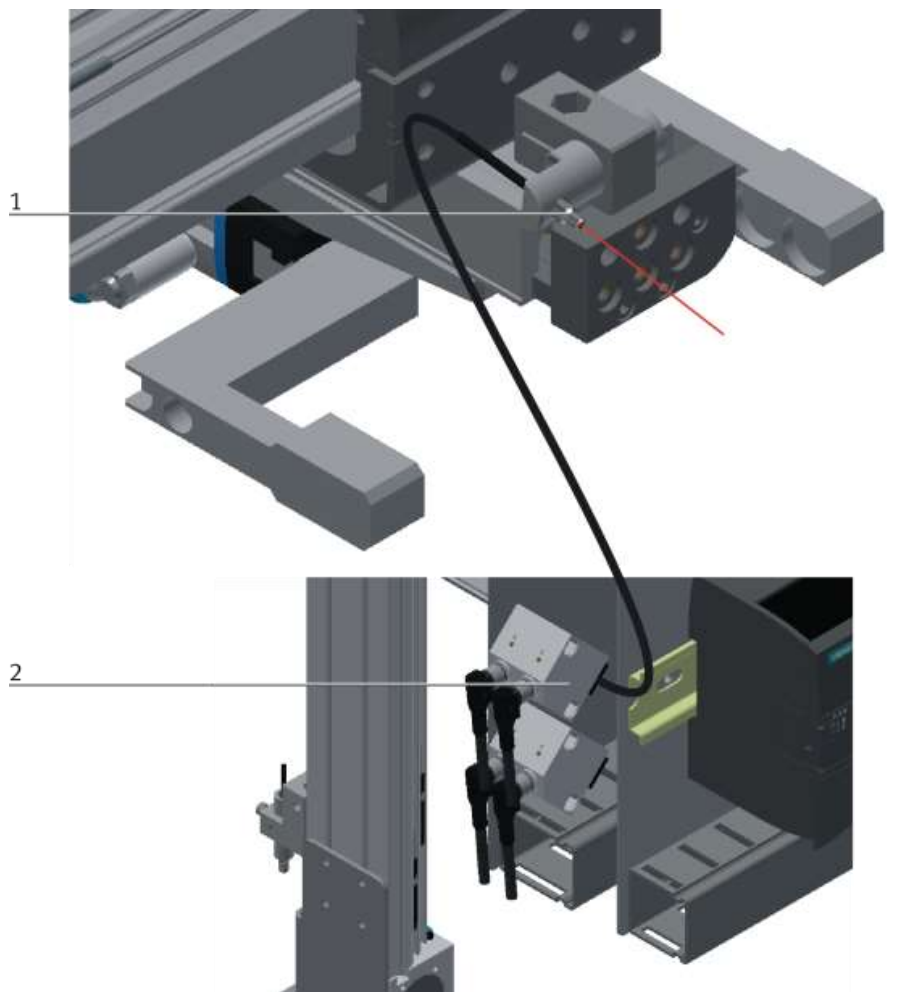


Illustration similar

Pos	Description
1	Diffuse Light Sensor SOOC-DS-M6-2-R25 / 552836
2	Fibre-optic unit (BG13) / 8127556 / D: SOEG-L-Q30-NA-S-2L

The Diffuse Light Sensor is used for checking the storage slots. Flexible fibre-optics are connected to a fibre-optic unit. The fibre-optic unit works with visible infrared. The light reflected by the workpiece is identified. Different surfaces and colours of the workpiece may change the degree of reflection.

Requirements

- Housing and fibre-optic unit have been mounted.
- Electrical connection of the fibre-optic unit has been established.
- Power supply unit has been switched on.

Procedure

1. Screw the fibre-optic head into the housing. The fibre-optic head is flush with the inside of the housing.
2. Attach the two fibre optics to the fibre-optic unit.
3. Put a black workpiece on the workpiece reception.
4. Turn the adjusting screw, if necessary, with a small screwdriver until the operating status display (LED) appears.

Remark

A maximum of 12 turns of the adjusting screw is allowed.

5. Check the adjustment by inserting black, red and silver workpieces.

Remark

A safe recognition of the workpieces must be guaranteed.

Documents

- Data sheets
Fibre-optic unit D: SOEG-L (8127556) and fibre optic reflex SOOC-DS-M6-2-R25 / 552836
- Operating instructions
Fibre-optic unit (8127556)

7.5.2 Proximity Switch (end position control Y axis)

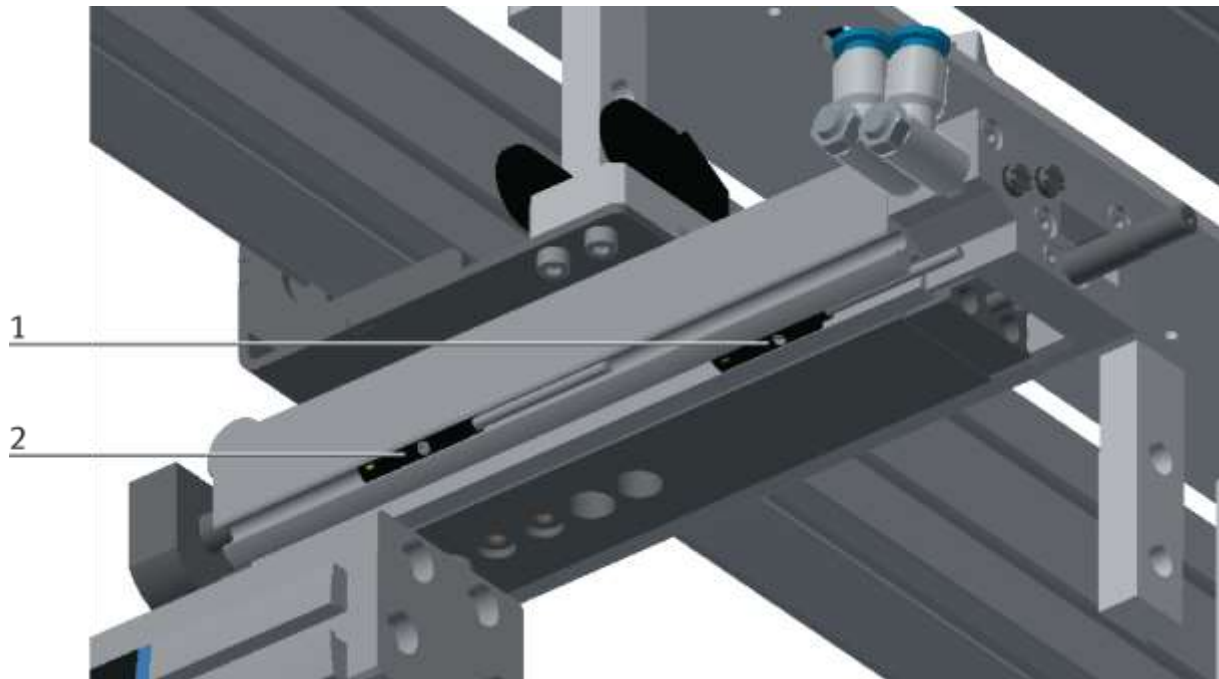


Illustration similar

Pos	Description
1	Sensor Y axis front (BG10) / 551373 / SMT-10M-PS-24V-E-2,5-L-OE
2	Sensor Y axis back (BG9) / 551373 / SMT-10M-PS-24V-E-2,5-L-OE

The proximity switches are used for checking the end position of the Y axis. The proximity switches react to a permanent magnet on the piston of the cylinder.

Requirements

- Cylinder with driver has been attached to the housing.
- Pneumatic connection of the cylinder has been established.
- Compressed air supply has been switched on.
- Electrical connection of the proximity switches has been established.
- Power supply unit has been switched on.

Procedure

1. The cylinder is in the end position to be queried.
2. Move the proximity switch until the operating status display (LED) appears.
3. Move the proximity switch into the same direction by a few millimeters until the operating status display disappears.
4. Move the proximity switch halfway between the switch-on and switch-off position.
5. Adjust the locking screw of the proximity switch with an Allen key (width across flats 1.3).
6. Check the positioning of the proximity switch by repeated test runs of the cylinder.

Documents

- Data sheets / operating instructions
proximity switch SMT-10M

7.5.3 Proximity Switch (end position control gripper)

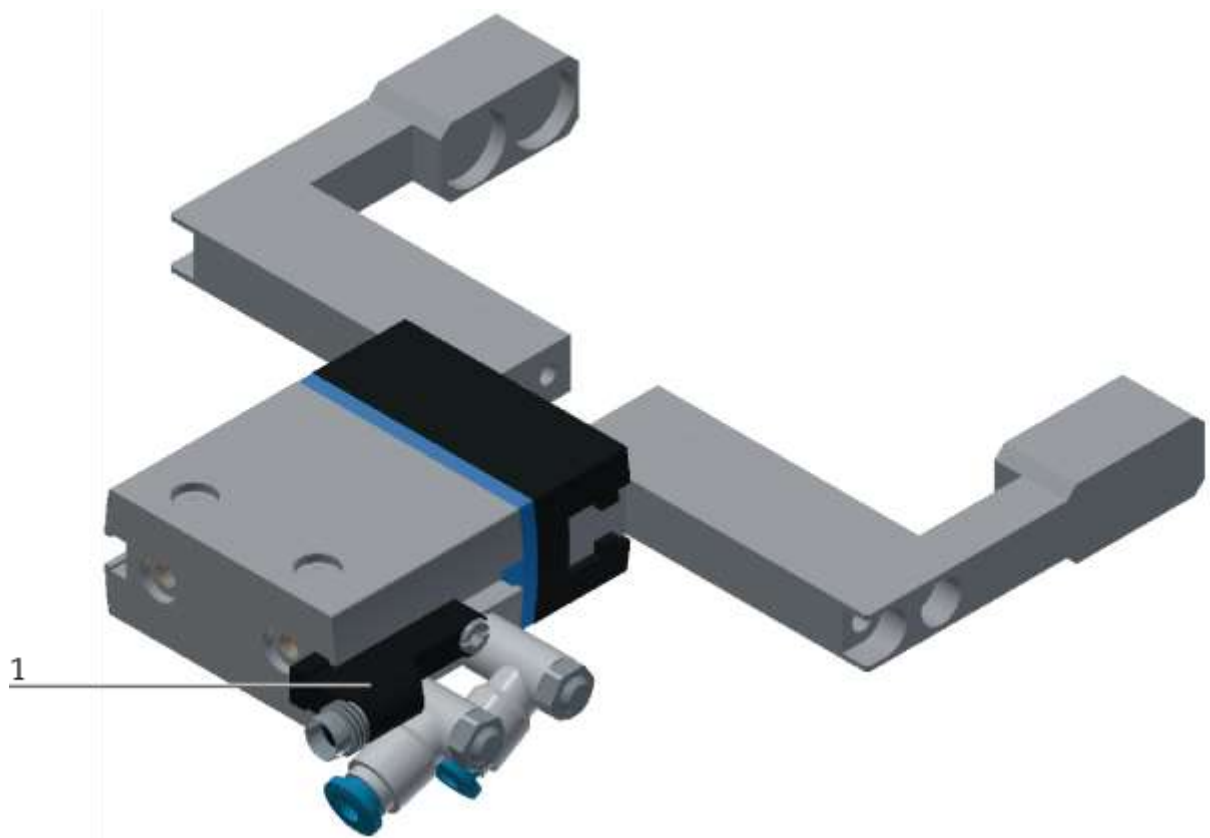


Illustration similar

Pos	Description
1	Sensor gripper closed (BG11) / 574335 / 562019 SMT-8-SL-PS-LED-24-B

The proximity switches are used for checking the end position of the gripper. The proximity switches react to a permanent magnet on the piston of the cylinder.

Requirements

- Gripper has been attached.
- Pneumatic connection of the gripper has been established.
- Compressed air supply has been switched on.
- Electrical connection of the proximity switches has been established.
- Power supply unit has been switched on.

Procedure

1. The gripper is closed and a workpiece is clamped.
2. Move the proximity switch until the operating status display (LED) appears.
3. Move the proximity switch into the same direction by a few millimeters until the operating status display disappears.
4. Move the proximity switch halfway between switch-on and switch-off position.
5. Adjust the locking screw of the proximity switch with an Allen key (width across flats 1.3).
6. Check the positioning of the proximity switch by repeated test runs of the cylinder.

Documents

- Data sheets / operating instruction
proximity switch SMT-8-SL-PS-LED-24-B

7.5.4 Proximity Switch (position control X and Z axis)

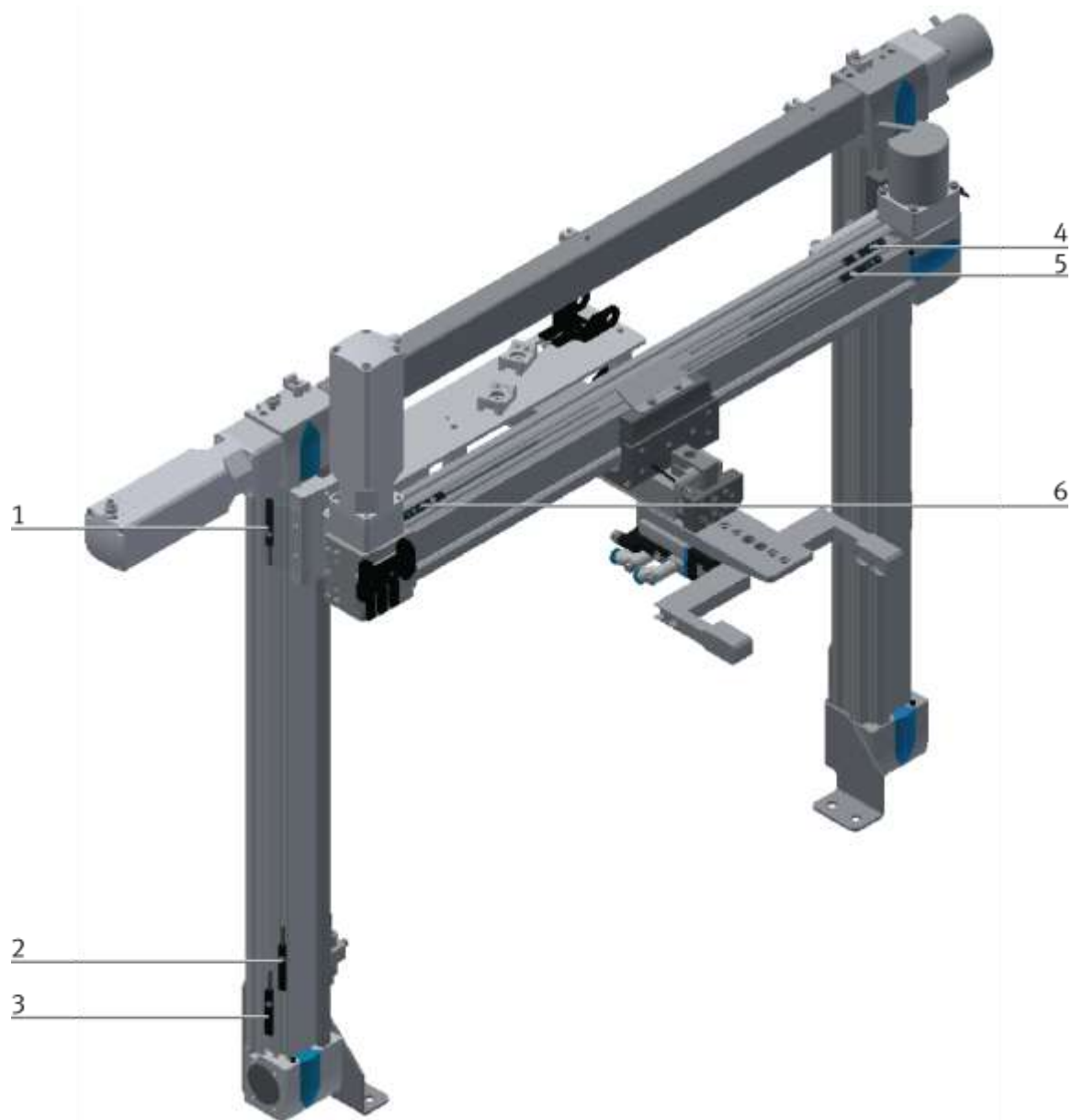


Illustration similar

Pos	Description
1	Sensor Z axis upper end position (BG6) / 551373/ SMT-10M-PS-24V-E-2,5-L-OE
2	Sensor Z axis reference position (BG7) / 551386 / SIES-8M-PS-24V-K-7,5-OE
3	Sensor Z axis lower end position (BG5) / 551373/ SMT-10M-PS-24V-E-2,5-L-OE
4	Sensor X axis left end position (BG2) / 551373/ SMT-10M-PS-24V-E-2,5-L-OE
5	Sensor X axis right end position (BG1) / 551373/ SMT-10M-PS-24V-E-2,5-L-OE
6	Sensor X axis reference position (BG3) / 551386 / SIES-8M-PS-24V-K-7,5-OE

The proximity switches are used for checking the position of the X- and Z axis. The proximity switches react to a permanent magnet on the piston of the cylinder.

Requirements

- Cylinder with driver has been attached to the housing.
- Pneumatic connection of the cylinder has been established.
- Compressed air supply has been switched on.
- Electrical connection of the proximity switches has been established.
- Power supply unit has been switched on.

Procedure

1. The cylinder is in the end position to be queried.
2. Move the proximity switch as long until the operating status display (LED) appears.
3. Move the proximity switch into the same direction by a few millimeters until the operating status display disappears.
4. Move the proximity switch halfway between the switch-on and switch-off position.
5. Adjust the locking screw of the proximity switch with an Allen key (width across flats 1.3).
6. Check the positioning of the proximity switch by repeated test runs of the cylinder.

Documents

- Data sheets / Operating instruction
proximity switch SIES-8M / SMT 10M

7.5.5 Incremental Encoder (X and Z axis)



Illustration similar

Pos	Description
1	Incremental Encoder Z axis (BG8) / RB3500
2	Incremental Encoder X axis (BG4) / RB3500

The incremental encoders are used for positioning the X and Z axis. Since the incremental encoders are programmable, the setting for 100 releases per rotations is required. This is effected over I/O link and has already been set in the factory.

See also data sheets and operating instruction IFM RB3500.

7.6 Adjusting the one-way flow control valves

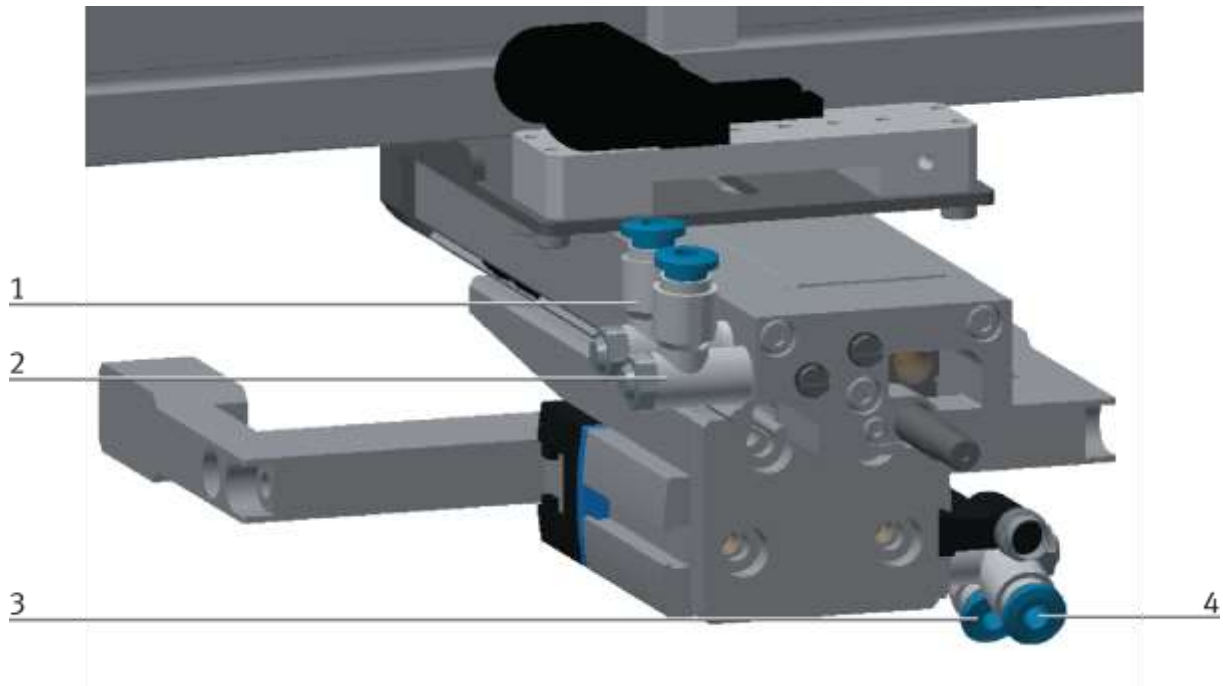


Illustration similar

Pos	Description
1+2	one-way flow control valve gripper
3+4	one-way flow control valve Y axis

One-way flow control valves are used for regulating the exhaust air with double-acting drive units. In the opposite direction the air flows through the one-way flow control valve and has a full cross-sectional flow. The piston is clamped between air cushions by free supply air and throttled exhaust air (improvement of its operating behaviour even if the load changes).

Requirements

- Pneumatic connection of the cylinder has been effected.
- Compressed air supply has been switched on.

Procedure

1. At first, turn off the two one-way flow control valves, then turn them on again by about one turn.
2. Start a test run.
3. Slowly turn on the two one-way flow control valves until you have reached the required piston speed.

Documents

- Data sheets
One-way flow control valve (193138)
- Operating instructions
Pneumatic cylinder (170905)

8 Operation

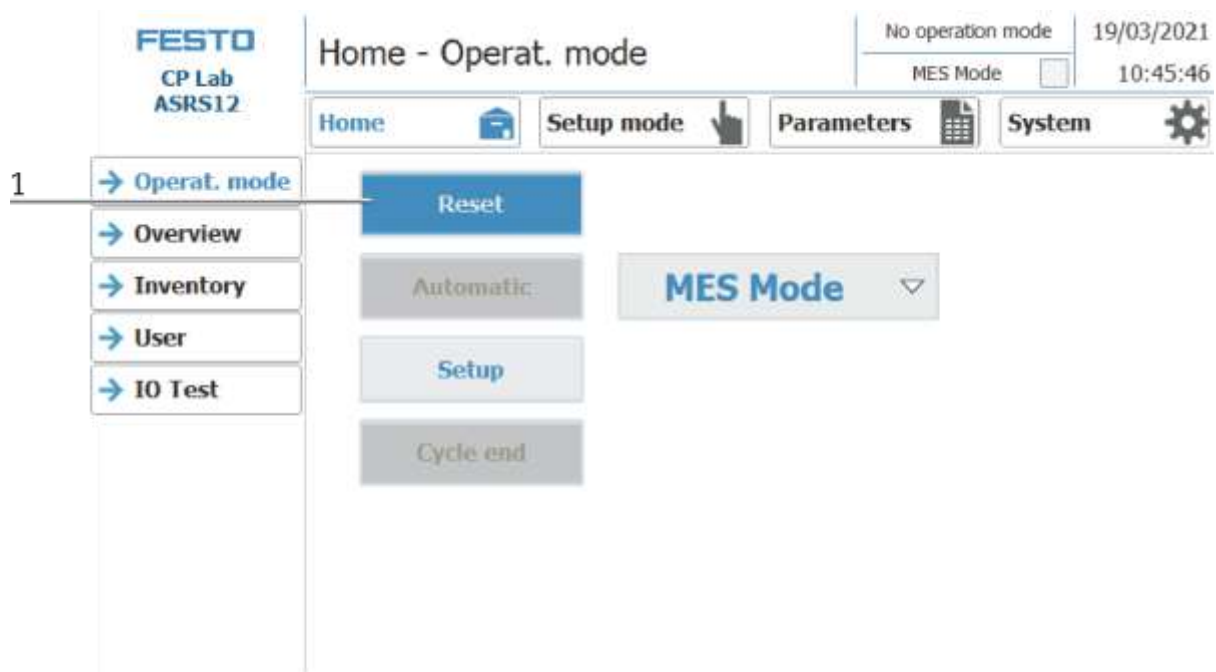
An application module has no control elements. Operation of the application module is only possible when it is mounted on a basic module of the CP-Lab or CP-Factory system.

The operation of the application module can be realized by every customer according to his wishes, the supplied programs are only an operating suggestion with which the application module is on CP-Lab or CP-Factory System can be operated. Own operating concepts or external controls are also possible.

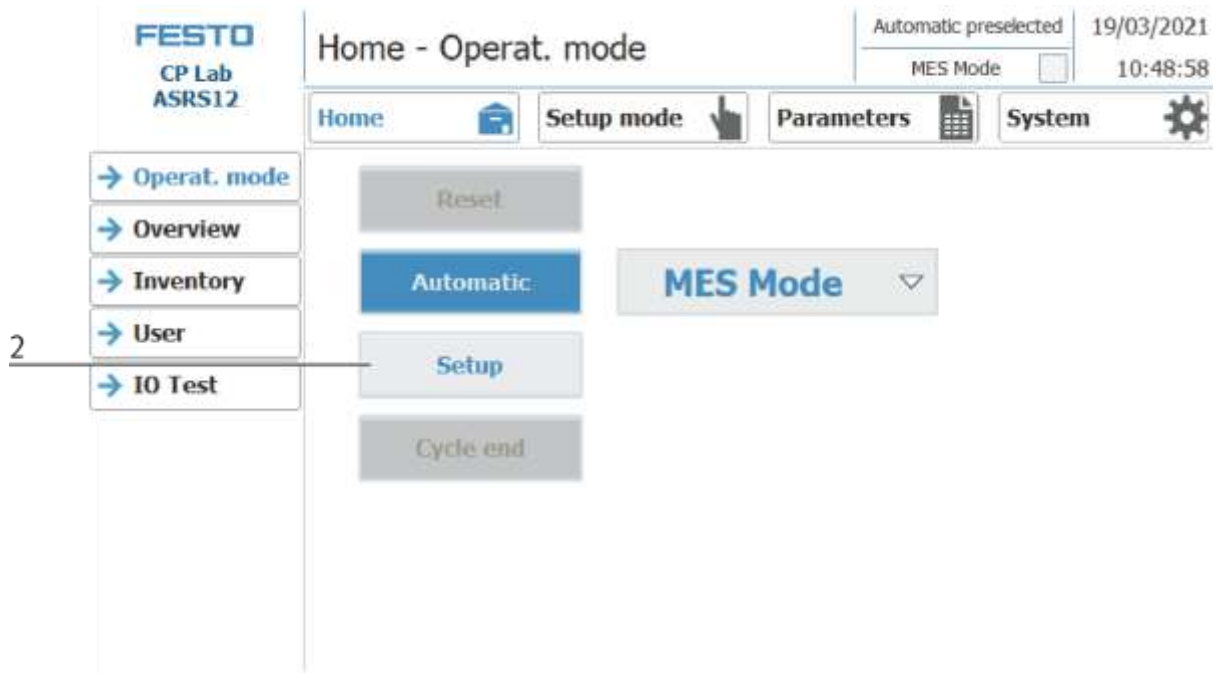
If the application module is mounted on a CP Lab or a CP Factory basic module, the general operation for this is described in the manuals of the CP Lab or CP Factory system. All application-specific information is described in this manual for the application module.

8.1 Setting the application module at HMI

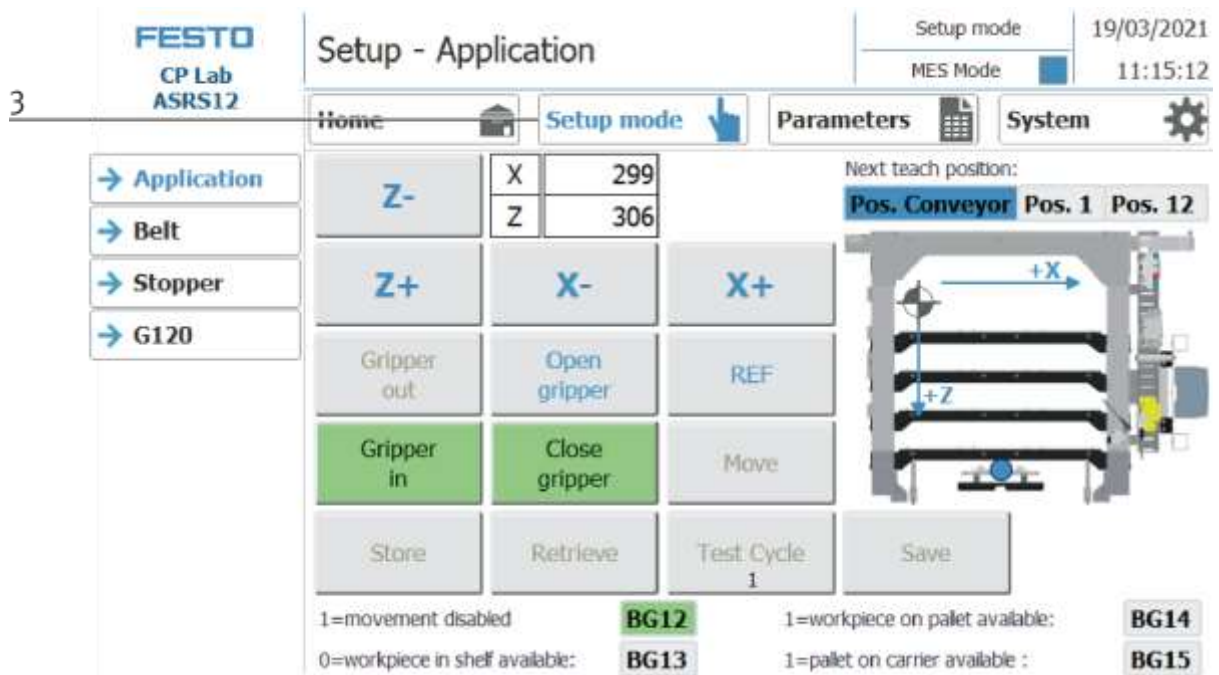
1. If the application module has not yet started, click on the Setup button under Operating mode on the home screen. The application module moves into its basic position



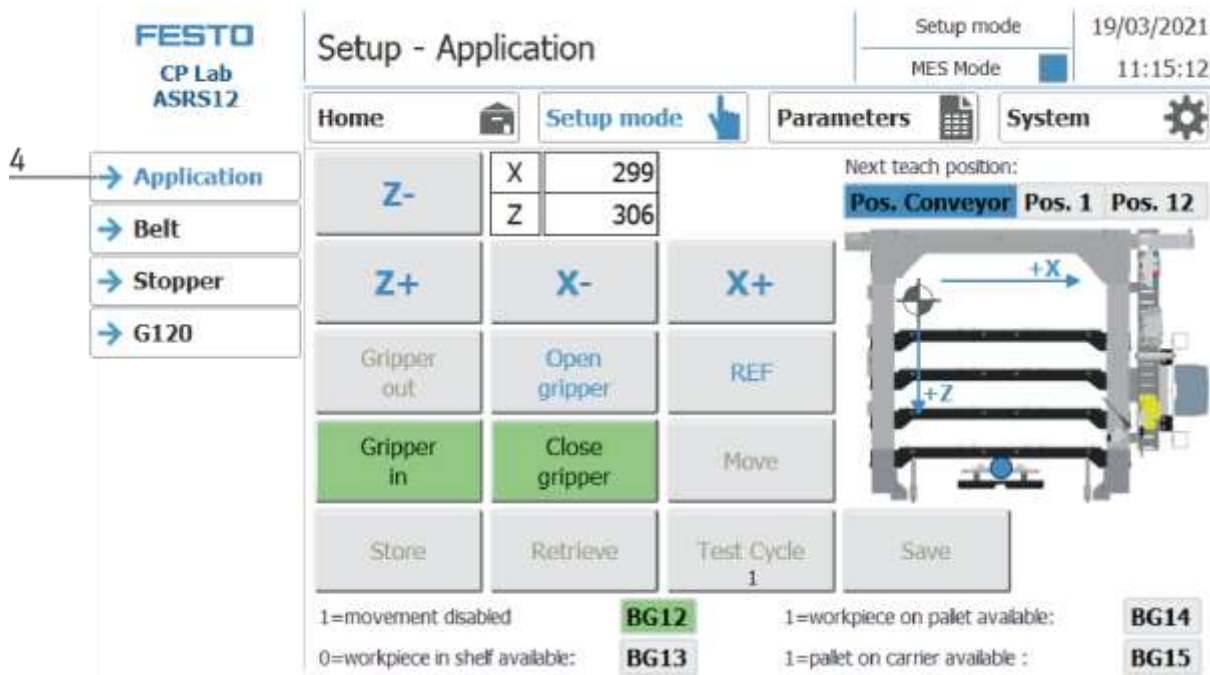
- Then click on Setup, setup mode is active.



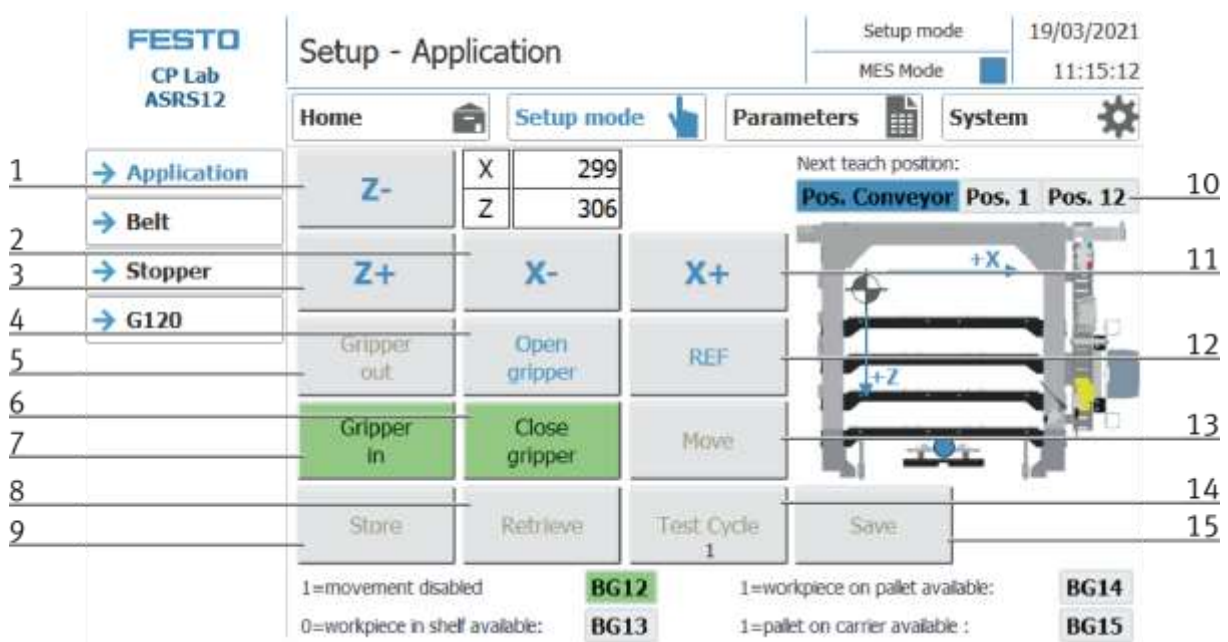
- Change to Setup mode page.



4. Choose application




5. Application is selected to setup the application module. The corresponding actuators can be started by pressing the buttons. The sensors are only for display and cannot be set manually



Position	Description
1	Button Z- / Z-axis move upwards
2	Button X- / X-axis move to the left
3	Button Z- / Z-axis move downwards
4	Button open gripper / opens the gripper
5	Button Extend gripper / Moves the Y-axis with the gripper to the working position
6	Close button / closes the gripper
7	Button gripper in / moves the Y-axis with the gripper to the center position
8	Retrieve button / a new window opens - here you can select the desired target storage shelf in which the workpiece is to be stored
9	Store button / a new window opens - here you can select the desired source storage shelf from which the workpiece is to be collected
10	<p>Next Teach Pos.</p> <p>If the storage positions are to be taught again, the sequence is displayed here.</p> <p>The basic position is always the position on the conveyor (the blue dot serves as a visual aid).</p> <ol style="list-style-type: none"> 1. Move the handling unit manually to the position on the conveyor using the move buttons 2. Press the Save button; this position is saved as the position on the belt. 3. Now the display changes to position 1, the blue dot jumps to storage compartment 1. 4. Move the handling manually to position 1 using the move buttons. Extend and open the gripper. 5. Press the save button, this position is saved as position 1. 6. Move the handling unit manually with the movement buttons to position 12. Extend and open the gripper. 7. Press the Save button, this position is saved as position 12. 8. The teach process is complete - all further positions are calculated.
11	Button X+ / Move X-axis to the right
12	Button REF / the handling executes a reference run
13	Button Move / a new window opens - the desired storage compartment can be selected here and the handling unit then moves to this position.
14	Button Test cycle / When the "Test cycle" button is pressed, a part is picked up from the goods carrier and stored at the storage position. It is then removed from storage and returned to the belt position. This process is repeated for all 12 storage positions. The button shows the compartment that will be approached next.
15	Button Save / saves the taught position and automatically changes to the next position





8.2 Transitions of the application module

The transitions are located in the Parameters submenu



Parameters - Transitions

Automatic mode 19/03/2021
 Default Mode ■ 11:07:43

Home 
Setup mode 
Parameters 
System 

→ Application

→ Transitions

→ Inventory

→ Belt, Stopper

No.	Start condition	Application execute		Function	Parameter Partnumber	End condition
Init	none	<input type="checkbox"/>	<input type="checkbox"/>	0	0	100
1	100	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2	88	200
2	200	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	88	100
3	0	<input type="checkbox"/>	<input type="checkbox"/>	0	0	0
4	0	<input type="checkbox"/>	<input type="checkbox"/>	0	0	0
5	0	<input type="checkbox"/>	<input type="checkbox"/>	0	0	0
6	0	<input type="checkbox"/>	<input type="checkbox"/>	0	0	0
7	0	<input type="checkbox"/>	<input type="checkbox"/>	0	0	0
8	0	<input type="checkbox"/>	<input type="checkbox"/>	0	0	0
9	0	<input type="checkbox"/>	<input type="checkbox"/>	0	0	0
10	0	<input type="checkbox"/>	<input type="checkbox"/>	0	0	0

The transitions can be displayed or changed here. How the transitions are processed is described in the CP-Lab conveyor manual.

8.2.1 Home operating mode

Inventory submenu

The menu item inventory is not explained in the manual of the CP-Lab conveyor, so it is listed here. In the Home operating mode, the inventory of the application module can be viewed. The display depends on the selected mode (MES or Default).

If the shelf is greyed out, it is not occupied; if the shelf is highlighted in blue, there is a workpiece in the storage shelf.

MES Mode

The following data is displayed in the respective storage shelves

- Top right: the number of the storage compartment
- Top centre: part number
- ONo: Displays the order number
- Pos.: Shows the order position

FESTO
CP Lab
ASRS12

Home - Inventory

Automatic mode 19/03/2021
Default Mode ■ 11:06:27

Home Setup mode Parameters System

→ Operat. mode
→ Overview
→ Inventory
→ User
→ IO Test

	0	0
10	11	12
0	0	0
7	8	9
0	0	0
4	5	6
0	0	0
1	2	3

Clear

Default Mode

The following data is displayed in the respective storage shelves

- above: the number of the workpiece
- below: The number of the storage shelf

Delete

With the button Delete all storage shelves can be set to 0, here it must be ensured that the storage shelves are then really emptied.

8.3 8.3 Setting the parameters of the application module on the HMI

Inventory

Identical to the Home / inventory operating mode

8.3.1 Parameter (CP-L-ASRS12-W)

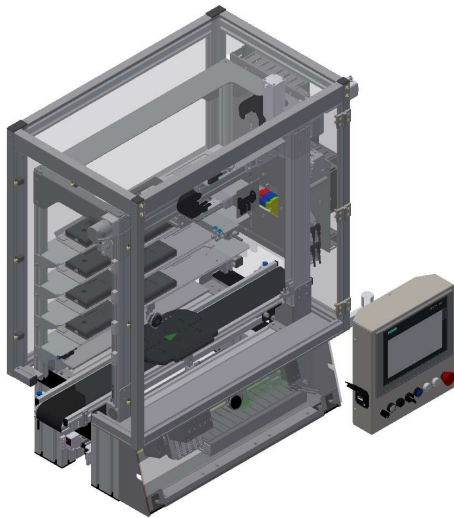


Illustration similar

Default:

Parameter-No.	Description
1	Function [-] 1: store at stopper 1 2: restore at stopper 1 Limitation: No limit to the value in the transition table
2	Partnumber [-] Limitation: No limit to the value in the transition table
3	Not used
4	Not used

MES:

Operation		Parameter	Description
210	Store P1	1	Source Value: 90 (conveyor position P1) Low limit: 0 High limit: 0 Type: constant
		2	Target Value: 0 Low limit: 0 High limit: 0 Type: on runtime
		3	Part number Value: 25 Low limit: 0 High limit: 0 Type: changeable
212	Release P1	1	Source Value: 0 Low limit: 0 High limit: 0 Type: on runtime
		2	Target Value: 90 (conveyor position P1) Low limit: 0 High limit: 0 Type: constant
		3	Part number Value: 0 Low limit: 0 High limit: 0 Type: changeable

9 Message texts and interactive error messages at the HMI

In general, there are three different reporting classes. These are designed as follows

- Message class 0 (displayed red in the message line)
 - the program is immediately stopped and the automatic mode is terminated
 - the cause of the error has to be fixed
 - Then acknowledge the fault and restart the station
- Message class 1 (displayed red in the message line)
 - the program and the automatic mode are stopped at the end of the cycle
 - the cause of the error has to be fixed
 - Then acknowledge the fault and restart the station
- Message class 2 (displayed yellow in the message line)
 - the program and the automatic mode are executed further
 - If the cause of the fault is fixed, the error is automatically acknowledged
- Note
 - Displayed on the HMI but not processed in MES

9.1 Message texts

Not available.

9.2 Interactive error messages

9.2.1 Default operation

Interactive messages are displayed via a pop-up window on the HMI.

(Default operation: Local warehouse management in the PLC, not in the MES!)

Return value 50

Interactive Error Message		
Requested Part number in Stock not available !		
act. State code	100	Repeat
State after Ingnore	200	Ignore
State after Abort	<input type="text" value="100"/>	Abort

Return value 51

Interactive Error Message		
No empty shelf in Stock available !		
act. State code	100	Repeat
State after Ingnore	200	Ignore
State after Abort	<input type="text" value="100"/>	Abort

Return value 54

Interactive Error Message		
Workpiece already available on pallet!		
act. State code	100	Repeat
State after Ingnore	200	Ignore
State after Abort	<input type="text" value="100"/>	Abort

Return value 55

Interactive Error Message		
No workpiece available on pallet!		
act. State code	100	Repeat
State after Ingnore	200	Ignore
State after Abort	<input type="text" value="100"/>	Abort

Return value 56

Interactive Error Message		
No pallet on workpiece carrier available !		
act. State code	100	<input type="button" value="Repeat"/>
State after Ignore	200	<input type="button" value="Ignore"/>
State after Abort	<input type="text" value="100"/>	<input type="button" value="Abort"/>

9.2.2 MES Operation

Interactive messages are displayed via a pop-up window at HMI

Return value 56 (NoPallet)

Interactive Error Message	
The carrier is assigned to a order, but there is no pallet on the carrier!	
Order number (ONo)	2086
Order position (OPos)	2
Repeat: check carrier again, if pallet present	Abort: Order is aborted with error. Please remove any workpiece from the carrier!
<input type="button" value="Repeat"/>	<input type="button" value="Abort"/>

No return value (NoPNInStorageAv), is checked before application execution.

Interactive Error Message

The carrier is assigned to an order, but the part number is not available in the storage !

Order number (ONo)	2086
Order position (OPos)	2

Repeat: Check again, if workpiece is available in storage .

Abort: Order is aborted with error. Remove any workpiece from carrier!

Repeat **Abort**

No return value (ParFailure), is checked before application execution.

Interactive Error Message

Parameters of order are not valid. Impossible to start order.

Order number (ONo)	2086
Order position (OPos)	2

Repeat: check parameter again

Abort: Order will be aborted with error!

Repeat **Abort**

Return value 55 (NoWorkpiece)

Interactive Error Message

The carrier is assigned to a order, but there is no workpiece on the pallet!

Order number (ONo)	2086
Order position (OPos)	2

Repeat:
Check again, if workpiece is available.

Abort:
Order will be aborted.
Please remove workpiece, if present!

Repeat **Abort**

No return value (StoragesAlreadyFull), is checked before application execution.

Interactive Error Message

The carrier is assigned to a order, but the storage is already full!

Order number (ONo)	2086
Order position (OPos)	2

Repeat:
Check again, if free storage shelf available.

Abort:
Order will be aborted.
Please remove workpiece from pallet!

Repeat **Abort**

Return value 56 (WpAlreadyAv)

Interactive Error Message

**The carrier is assigned to a order, but
a workpiece is already on the carrier available!**

Order number (ONo)	2086
Order position (OPos)	2

Repeat:
Check again, if workpiece
is available on pallet.

Abort:
Order will be aborted.
Please remove workpiece from pallet!

Repeat **Abort**

10 Spare part list

10.1 Electrical parts

Description	Part number	Res.Ident	Use
Proximity sensor SIES-8M-PO-24V-K-7,5-OE	551391	BG6	Z-axis in upper end position
Z-axis EGC-50-350-TB-KF-724342	556812		
Proximity sensor SIES-8M-PS-24V-K-7,5-OE	551386	BG7	Reference position Z-axis
Proximity sensor SIES-8M-PO-24V-K-7,5-OE	551391	BG5	Z-axis lower end position
Incremental encoder IFM	RB 3500	BG4	Incremental encoder Z-Achse
Incremental encoder IFM	RB 3500	BG8	Incremental encoder X-Achse
Proximity sensor SIES-8M-PO-24V-K-7,5-OE	551391	BG2	X-axis left end position
Proximity sensor SIES-8M-PS-24V-K-7,5-OE	551386	BG3	Reference position X-axis
Z-axis EGC50350TBKF_W	556812		
Proximity sensor SIES-8M-PO-24V-K-7,5-OE	551391	BG1	X-axis right end position
Light guide SOOC-DS-M6-2-R25	552836	BG15	Pallet on workpiece carrier
Light guide SOOC-TB-M4-2-R25	552812	BG14	Workpiece on pallet
Light guide SOOC-TB-M4-2-R25	552812	BG14	Workpiece on pallet
Light guide unit D: SOEG-L-Q30-P-A-S-2L	8127556	BG14	Workpiece on pallet
Light guide unit D: SOEG-L-Q30-P-A-S-2L	8127556	BG15	Pallet on workpiece carrier
Light guide SOOC-DS-M6-2-R25	552836	BG13	Shelf free
Light guide unit D: SOEG-L-Q30-P-A-S-2L	8127556	BG13	Shelf free
Light guide SOOC-DS-M6-2-R25	552836	BG12	Switch-off by switching strip
Light guide unit D: SOEG-L-Q30-P-A-S-2L	8127556	BG12	Switch-off by switching strip
Proximity sensor SMT-8-SL-PS-LED-24-B	562019	BG11	Gripper closed
Proximity sensor SMT-10M-PS-24V-E-2,5-L-OE	551373	BG10	Y-axis in front position
Proximity sensor SMT-10M-PS-24V-E-2,5-L-OE	551373	BG10	Y-axis in back position
Kaleja motor controller	KALE001	QA1	X-axis
Kaleja motor controller	KALE002	QA2	Z-axis
I/O terminal	2627642	XMA1	
Terminal block		XL2	
Controller SM1223, 8DE/8DA	6ES7223-1BH32-0XB0	KF2	Controller
Controller CPU-1214C	6ES7214-1AE31-0XB0	KF1	Controller
Relay modul Wago	859-304	KF3	Release Y-axis
Clamps		XD1	

10.2 Pneumatic parts

Description	Part number	Res.Ident	Use
Valve CPVSC1-M-M5	548901	MB 1	Move out Y-axis
Valve CPVSC1-M-M5	548901	MB 2	Open gripper
Mini slide DGSL-8-80-Y3A	543941		Y-axis
One-way flow control valve GRLA-M5-QS-3-LF-C	175053		
One-way flow control valve GRLA-M5-QS-3-LF-C	175053		
Parallel gripper DHPS-16-A-NC	1254045		Gripper
One-way flow control valve GRLA-M5-QS-3-LF-C	175053		
One-way flow control valve GRLA-M5-QS-3-LF-C	175053		

11 Service and cleaning

The components and systems from Festo Didactic are maintenance-free.

At regular intervals you should have checked:

- the lenses of the optical sensors, fibre optics and reflectors
- the active surface of the proximity switch
- the entire station

can be cleaned with a soft, lint-free cloth or brush.



NOTE

Do not use aggressive or abrasive cleaners.

Protective covers must not be cleaned with alcoholic cleaning agents, there is a risk of embrittlement.


12 Further information and updating

Further information and updates on the technical documentation of Festo Didactic components and systems can be found on the Internet at:

www.ip.festo-didactic.com



13 Disposal

	<p style="text-align: center;"><i>NOTE</i></p> <p>Electronic waste contains recyclable materials and must not be disposed of with the domestic waste. Bring electronic waste to a designated municipal collection point.</p>
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