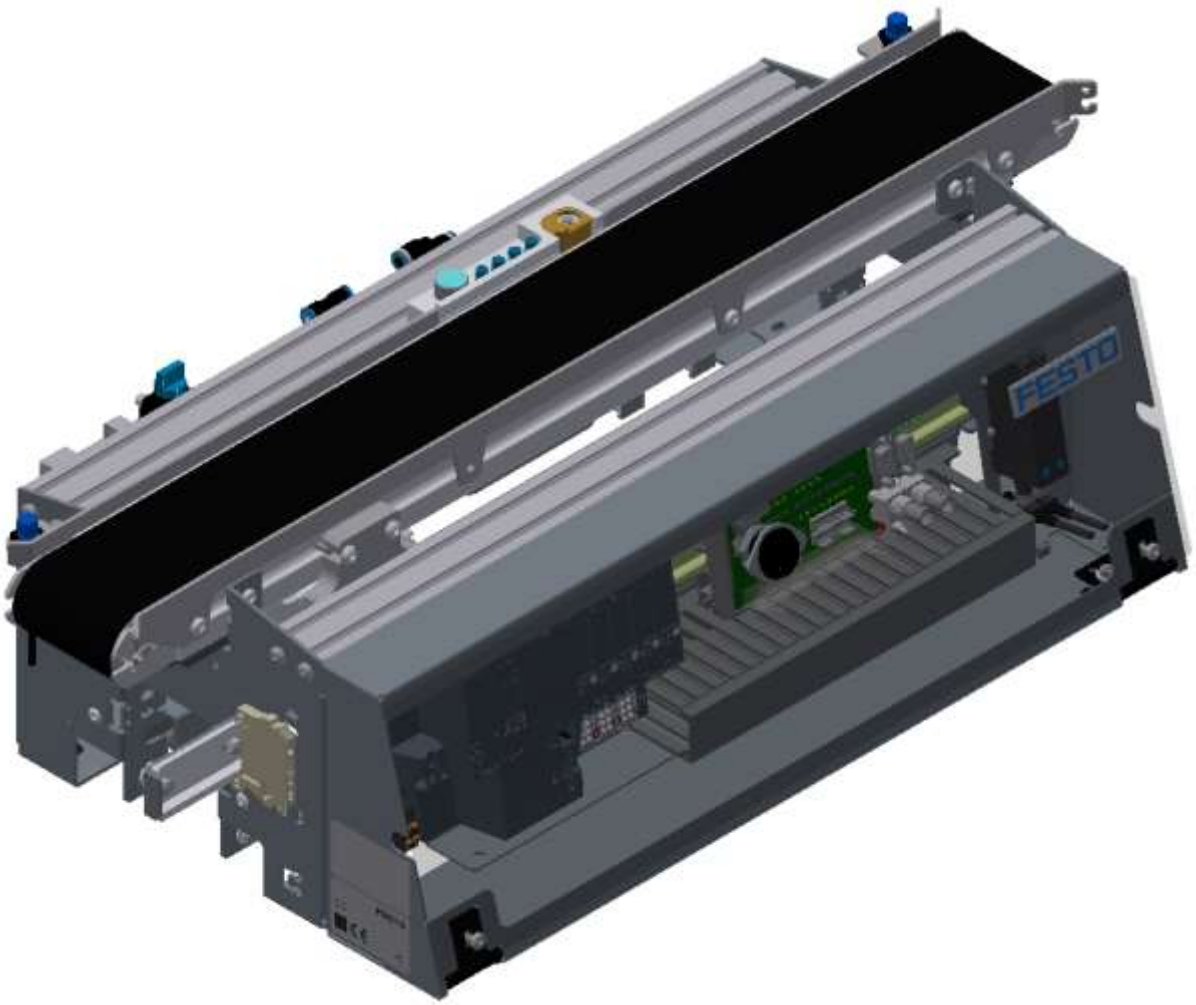
# CP Lab conveyor

CP–L–Linear-C[11/13]-M[0/1/6]-V2

FESTO

**CP Factory/CP Lab**

Original operating instructions




Festo Didactic
05/2022
CP–L–Linear-C[11/13]-M[0/1/6]

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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.

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**CAUTION**

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.

**Main document**
Associated documents attached:

Safety instructions concerning transport (print/electronic)
Component datasheets (print/electronic)
Circuit diagram (print/electronic)

# Contents

# 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.

Switch off the device and unplug the connection for power supply from the plug socket before commencing installation, repair, maintenance or cleaning work.

Warning – hand injuries

Warning – risk of entanglement

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**

- **Malfunctions which could impair safety must be eliminated immediately!**

**CAUTION**

- **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**

- **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**

- **Switch off the power supply!**
  - 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!**
  - Use a tool such as a screwdriver for actuating sensors.

**CAUTION**

- **Risk of burns due to hot surfaces**
  - 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.**
  - Allow the device to cool off before commencing work.
  - Use suitable personal protective clothing, e.g. safety safety gloves.

### 4.3 Electrical for general product safety

Valid for (see chapter type code)
CP-L-LINEAR-C11-M0-V2
CP-L-LINEAR-C13-M0-V2

**WARNING**

- **Disconnect from all sources of electrical power!**
  - 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**
  - 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!**
  - 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**
  - 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**

- **Risk of fire due to use of unsuitable power supply**
  - If a device i 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**

- **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.**
  - 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.**
  - 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:**
  Visible damage
  Malfunction
  Inappropriate storage
  Incorrect transport
  - Switch off the power supply immediately.
- **Protect the device to prevent it from being restarted accidentally.**

### 4.4 Electrical for general machine safety

Valid for (see chapter type code)
CP-L-LINEAR-C11-M1-V2
CP-L-LINEAR-C13-M1-V2
CP-L-LINEAR-C11-M6-V2
CP-L-LINEAR-C13-M6-V2

**DANGER**

- **Risk of fatal injury in case of interrupted protective grounding conductor!**
  - The protective grounding conductor (yellow-green) must not be interrupted, either inside or outside of the device.
  - The insulation of the protective grounding conductor must never be damaged or removed.
- **Risk of death from connecting power supply units in series!**

  Contact voltages of greater than 25 V AC or 60 V DC are not permissible.
  Contact with voltages of greater than 50 V AC or 120 V DC may be fatal.
  - Do not connect power supplies in series.
- **Risk of death due to electric shock!**

  Protect the outputs of the power supplies (output sockets/terminals) and cables connected to them from direct contact.
  - Always use connector cables with adequate insulation and electric strength.
  - Use safety sockets with fully shrouded contact points.

**WARNING**

- **Disconnect from all sources of electrical power!**
  - 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**
  - 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!**
  - 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**
  - 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**

- **Risk of fire due to use of unsuitable power supply**
  - If a device i 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**

- **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.**
  - 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.**
  - 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:**
  - Visible damage
  - Malfunction
  - Inappropriate storage
  - Incorrect transport
- **Switch off the power supply immediately.**
- **Protect the device to prevent it from being restarted accidentally.**

### 4.5 Pneumatic components

**WARNING**

- **Depressurize the system!**
  - 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!**
  Cylinders may advance and retract automatically.
- **Risk of accident due to advancing cylinders!**
  - 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!**
  - 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.**
  - 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**

- **Setting up pneumatic circuits**
  - 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**
  - 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**
  - 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.

### 4.6 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.

### 4.7 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**

- **Unsecure operating conditions due to software tampering**
  - 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.

### 4.8 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.

**WARNING**

- **This product is designed for use in industrial environments, and may cause malfunctions if used in domestic or small commercial environments.**

### 4.9 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.

### 4.10 Transport

**WARNING**

- **Danger due to tipping over**
  - 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***

- **Station contains delicate components!**
  - Take care not to shake during transportation
- **The station is only permitted for installation on solid, non-vibrating surfaces.**
  - Make sure that the ground underneath the station has sufficient load-bearing capacity.

### 4.11 Type code

| Part number | Type code | Controller | Motor |
|---|---|---|---|
| 8132970 | D:CP-L-LINEAR-C11-M0-V2 | Siemens CPU 1512SP-F | DC 24V |
| 8146023 | D:CP-L-LINEAR-C13-M0-V2 | Siemens IM 155-6 PN HF | DC 24V |
| On demand | D:CP-L-LINEAR-C11-M1-V2 | Siemens CPU 1512SP-F | AC 230V |
| On demand | D:CP-L-LINEAR-C13-M1-V2 | Siemens IM 155-6 PN HF | AC 230V |
| 8146024 | D:CP-L-LINEAR-C11-M6-V2 | Siemens CPU 1512SP-F | AC 400V |
| On demand | D:CP-L-LINEAR-C13-M6-V2 | Siemens IM 155-6 PN HF | AC 400V |

## 4.12 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) |

## 4.13 CE Declaration of Conformity

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(DE) Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller. Der beschriebene Gegenstand der Erklärung erfüllt die einschlägigen Harmonisierungsrechtsvorschriften der Union.

(EN) This declaration of conformity is issued under the sole responsibility of the manufacturer. The object of the declaration described is in conformity with the relevant Union harmonisation legislation.

(BG) Настоящата декларация за съответствие е издадена на отговорността на производителя. Предметът на описаната декларация отговаря на съответното законодателство на Съюза за хармонизация.

(CS) Toto prohlášení o shodě se vydává na výhradní odpovědnost výrobce. Popsaný předmět prohlášení je ve shodě s příslušnými harmonizačními právními před-pisy Unie.

(DA) Denne overensstemmelseserklæring udstedes på fabrikantens ansvar. Genstanden for erklæringen, som beskrevet, er i overensstemmelse med den relevante EU-harmoniseringslovgivning.

(EL) Η παρούσα δήλωση συμμόρφωσης εκδίδεται με αποκλειστική ευθύνη του κατασκευαστή. Ο περιγραφόμενος στόχος της δήλωσης είναι σύμφωνος με τη σχετική ενωσιακή νομοθεσία εναρμόνισης.

(ES) La presente declaración de conformidad se expide bajo la exclusiva responsabilidad del fabricante. El objeto de la declaración descrita es conforme con la legislación de armonización pertinente de la Unión.

(ET) Käesolev vastavusdeklaratsioon on välja antud tootja ainuvastutusel. Kirjeldatud deklareeritav toode on kooskõlas asjaomaste liidu ühtlustamisaktidega.

(FI) Tämä vaatimustenmukaisuusvakuutus on annettu valmistajan yksinomaisella vastuulla. Kuvattu vakuutuksen kohde on aiaa koskevan unionin yhdenmukaistamislainsäädännön vaatimusten mukainen.

(FR) La présente déclaration de conformité est établie sous la seule responsabilité du fabricant. L'objet décrit de la déclaration est conforme à la législation d'harmonisation de l'Union applicable.

(HU) Ezt a megfelelőségi nyilatkozatot a gyártó kizárólagos felelősségre mellett adják ki. Az ismertetett nyilatko-zat tárgya megfelel a vonatkozó uniós harmonizációs jogszabályoknak.

(IT) La presente dichiarazione di conformità è rilasciata sotto la responsabilità esclusiva del fabbricante. L'oggetto della dichiarazione descritto è conforme alla pertinente normativa di armonizzazione dell'Unione.

(LT) Šį atitikties deklaraciją išduota tik gamintojo atsakomybe. Aprašytas deklaracijos objektas atitinka suderinamuosius Sąjungos teisės aktus.

(LV) Šī atbilstības deklarācija ir izdota vienīgi uz ražotāja atbildību. Aprakstītais deklarācijas objekts atbilst attiecīgajam Savienības saskaņošanas tiesību aktam.

(NL) Deze conformiteitsverklaring wordt verstrekt onder volledige verantwoordelijkheid van de fabrikant. Het beschreven voorwerp is in overeenstemming de diesbetreffende harmonisatiewetgeving van de Unie.

(PL) Niniejsza deklaracja zgodności wydana zostaje na wyłączną odpowiedzialność producenta. Wymieniony przedmiot niniejszej deklaracji jest zgodny z odnośnymi wymaganiami unijnego prawodawstwa harmonizacyjnego.

(PT) A presente declaração de conformidade é emitida sob a exclusiva responsabilidade do fabricante. O objeto da declaração descrito está em conformidade com a legislação aplicável de harmonização da União.

(RO) Prezenta declarație de conformitate este emisă pe răspunderea exclusivă a producătorului. Obiectul descris al declarației este în conformitate cu legislația relevantă de armonizare a Uniunii.

(SK) Toto vyhlásenie o zhode sa vydáva na vlastnú zodpovednosť výrobcu. Uvedený predmet vyhlásenia je v zhode s príslušnými harmonizačnými právnymi predpismi Únie.

(SL) Za izdajo te izjave o skladnosti je odgovoren izključno proizvajalec. Opisani predmet izjave je v skladu z ustrezno zakonodajo Unije o harmonizaciji.

(SV) Denna försäkran om överensstämmelse utfärdas på tillverkarens eget ansvar. Föremålet för försäkran överensstämmer med den relevanta harmoniserade unionslagstiftningen.

(TR) Bu Uygunluk Beigesi tamamen üreticinin sorumluluğu altındadır. Belgede açıklanan obje, ilirliğin ilgili uyum mevzuatına uygundur.

EG-Konformitätserklärung
EU Declaration of Conformity
Декларация за съответствие на ЕС
Prohlášení o shodě ES
EF-overensstemmelseserklæring
Δήλωση συμμόρφωσης ΕΚ
Declaración de conformidad CE
EÜ vastavusdeklaratsioon
EY-vaatimustenmukaisuusvakuutus
Déclaration CE de conformité
EK megfelelőségi nyilatkozat
Dichiarazione di conformità EU
EB atitikties deklaracija
EK atbilstības deklarācija
EG-verklaring van overeenstemming
Deklaracja zgodności WE
Declaração de conformidade CE
Declarație de conformitate CE
Vyhlásenie o zhode ES
Izjava ES o skladnosti
EG-försäkran om Överensstämmelse

The installation instructions according to the manual have to be followed. The person authorized to compile the technical documents is Philippe Drolet, Product conformity, Festo Didactic Ltée/Ltd. Canada.

Festo Didactic Ltée/Ltd. · 675 rue du Carbone · Québec, QC G2N 2K7 · CANADA · www.festo-didactic.com 8101137 – DoC0039

FESTO

2022-03-02

| | |
|---|---|
| 8032510 | CP-AM-DRILL |
| 8032507 | CP-AM-PRESS |
| 8032508 | CP-AM-MAG |
| 8032509 | CP-AM-TURNOVER |
| 8032511 | CP-AM-CAM |
| 8038567 | CP-AM-MPRESS |
| 8043598 | CP-AM-iDRILL-C21 |
| 8050101* | CP-L-LINEAR-C11-M0 |
| 8050102* | CP-L-LINEAR-C13-M0 |
| 8058667* | CP-L-BRANCH-C21 |
| 8061184 | CP-AM-OUT |
| 8068413 | CP-AM-iPICK-C21 |
| 8088783 | CP-AM-OVEN-230V |
| 8091107 | CP Lab HMI Panel |
| 8092833* | SC CP LAB STD CFG 4 |
| 8092834* | SC CP LAB STD CFG 6 |
| 8092835* | SC CP LAB STD CFG 8 |
| 8092836* | SC CP LAB STD CFG 10 |
| 8108237* | CP-L-LINEAR-C11-M6 |
| 8129428 | CP-Lab/MPS HMI Panel |
| 8132970* | CP-L-LINEAR-C11-M0-V2 |
| 8146023* | CP-L-LINEAR-C13-M0-V2 |
| 8146024* | CP-L-LINEAR-C11-M6-V2 |
| 8152450 | CP-AM-LABEL-V2 |
| 8154245 | CP-AM-MEASURE-V2 |
| 8155207 | CP-AM-CAM-V2 |
| 8167762* | CP-L-LINEAR-C11-M0 V2 |
| 8167762* | CP-L-LINEAR-C11-M0 V2 |
| 8167764* | CP-L-LINEAR-C11-M6 V2 |
| 8172797* | CP-L-LINEAR-NO-PLC-M0 |

| | |
|---|---|
| 2006/42/EC | EN 60204-1:2018 |
| 2014/30/EU | EN 61326-1:2013-01 |
| 2011/65/EU | EN 63000:2016-10 |
| 2014/53/EU* | See Appendix A for details |

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FESTO

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Francis Larrivée, ing.
Engineering

Philippe Drolet, ing.
Product Compliance

**Appendix A:**
Extracted from: Siemens EU-Declaration of Conformity No. A5E50679864A; REV.: 001 /
CE-DoC_A5E50679864A_RF200R_RF300R_RED_RoHS_2020-12-11.pdf (siemens.com)

SIEMENS

Anhang RED & RoHS / *Annex RED & RoHS*
zur EU–Konformitätserklärung / *to EU-Declaration of Conformity*
Nr./No. A5E50679864A; REV.: 001

Produktgruppenbezeichnung/-modell SIMATIC RF200R / RF300R HF RFID READERS
*Product group identification/-model* (13.56 MHz)

Die Übereinstimmung der bezeichneten Produkte (unter Verwendung des Zubehörs) des oben genannten Gegenstandes mit den Vorschriften der angewandten Richtlinie(n) wird nachgewiesen durch die vollständige Einhaltung folgender Normen / Vorschriften (variantenabhängig, siehe Anhang Produkte - Tabelle 1. Angewandt Normen werden durch ein „x" gekennzeichnet, wohingegen nicht angewandte Normen durch ein „-" gekennzeichnet werden.):

*The conformity of the designated products (using the accessory) of the object described above with the provisions of the applied Directive(s) is proved by full compliance with the following standards / regulations (depending on versions, see annex Products - Table 1. Applicable Standards are marked by a "x" whereas not applicable Standards are marked by a "-"):*

Art. 3 (1) a) Schutz der Gesundheit und Sicherheit - Normen / *Health and Safety - standards:*

| Referenznummer / *Reference number* | Ausgabedatum / *Date of issue* | Referenznummer / *Reference number* | Ausgabedatum / *Date of issue* |
|---|---|---|---|
| EN 62368-1 + A11 | 2014/2017 | EN 50364 | 2018 |

Art. 3 (1) b) EMV Normen / *EMC standards:*

| Referenznummer / *Reference number* | Ausgabedatum / *Date of issue* | Referenznummer / *Reference number* | Ausgabedatum / *Date of issue* |
|---|---|---|---|
| ETSI EN 301 489-1 | V2.2.3 | EN IEC 61000-6-1 | 2019 |
| ETSI EN 301 489-3 | V2.1.1 | EN IEC 61000-6-2 | 2019 |
| EN 55011 + A1 + A11 | 2016/2017/2020 | EN 61000-6-3 + A1 | 2007/2011 |
| EN 55032 + A11 Class A/B | 2015/2020 | EN IEC 61000-6-4 | 2019 |
| EN 55035 + A11 | 2017/2020 | EN IEC 61000-6-5 | 2020 |

Art. 3 (2) Effiziente Nutzung des Funkspektrums Harmonisierte Normen / *Efficient usage of spectrum Harmonized standards:*

| Referenznummer / *Reference number* | Ausgabedatum / *Date of issue* | Referenznummer / *Reference number* | Ausgabedatum / *Date of issue* |
|---|---|---|---|
| ETSI EN 300 330 | V2.1.1 | | |

Art. 3 (3) a)-i) Delegierte Rechtsakte für Funkanlagen / *Delegated acts for Radio equipment*

| Referenznummer / *Reference number* | Ausgabedatum / *Date of issue* | Referenznummer / *Reference number* | Ausgabedatum / *Date of issue* |
|---|---|---|---|

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### 4.14 General product safety

Valid for (see chapter type code)
CP-L-LINEAR-C11-M0-V2
CP-L-LINEAR-C13-M0-V2

**WARNING**

- **General product safety, CE conformity**
  - 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.

### 4.15 General machine safety

Valid for (see chapter type code)
CP-L-LINEAR-C11-M1-V2
CP-L-LINEAR-C13-M1-V2
CP-L-LINEAR-C11-M6-V2
CP-L-LINEAR-C13-M6-V2

**WARNING**

- **General machine safety, CE conformity**
  - The individual modules of this system contain control programs for which the safety of the machine has been evaluated.
  - The safety-related parameters and checksums of the safety function are listed in the operating instructions for the respective stations.
  - Changes to programs may impair the safety of the machine. A modified control program may constitute a major change to the machine.
  - In such cases, the manufacturer's CE Declaration of Conformity shall be rendered null and void. The operating company will need to re-evaluate the safety of the machine and confirm its CE conformity.

### 4.16 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**

- **Damage to the safety window**
  - 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.

#### 4.16.1 Panel doors on underground control cabinet

Transparent, impact-resistant, polycarbonate plate with lock.
Can only be accessed with tool (control cabinet key); tool must be kept in a secure place!
Access reserved for qualified electricians.
The safety door is not monitored! Make sure the safety door is always closed.

#### 4.16.2 Emergency stop

If a station has an emergency stop button, the emergency stop signal switches off all actuators. An acknowledgment by the operator is required for a restart, there is no automatic restart.

#### 4.16.3 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

## 5.1 Technical data für 24V variants

Valid for (see chapter type code)

CP-L-LINEAR-C11-M0-V2

CP-L-LINEAR-C13-M0-V2

| Parameter | Value |
|---|---|
| **Electrics** | |
| Power supply | 24 V DC, 4.5 A safety low voltage (PELV) |
| **Ambient conditions** | |
| Operating environment | Use inside building only |
| Ambient temperature | 5°C ... 40°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<br>EMC Directive<br>RoHS Directive |
| EMC environment | Industrial environment, Class A (in acc. with EN 55011) |
| **Measurements** | |
| Length | 810 mm |
| Width | 415 mm |
| Height | 289 mm |
| Weight | Ca. 35 kg |
| **Subject to change** | |

## 5.2 Technical data for 230 V variants

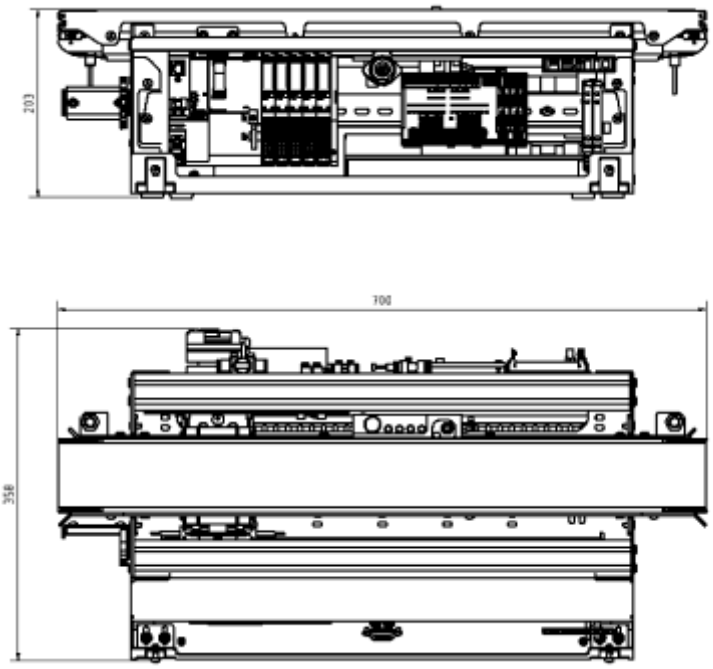
Valid for (see chapter type code)
CP-L-LINEAR-C11-M1-V2
CP-L-LINEAR-C13-M1-V2

| Parameter | Value |
|---|---|
| **Electrics** | |
| Operating voltage | 1-phase 230 V AC±10%, 50 Hz |
| Power supply system | TNC-S, mains conductor L1, neutral conductor N, protective grounding PE |
| Full load power | 1 A |
| Control voltage,<br>Voltage for small actuators | 24 V DC<br>Protective extra-low voltage (PELV) |
| Power supply connection | IEC 60309, CEE 16 A |
| Max. backup fuse for installation | 16 A |
| Leakage current | <= 18 mA |
| Connecting cable between stations | System plug |
| Protection class | I, Operation with protective grounding only.<br>Second protective grounding conductor required due to high leakage current |
| Overvoltage category | CAT II, Operation in building installation only |
| Short circuit current rating (SCCR) | 10 kA |
| **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) | <= +3°C |
| **Ambient conditions** | |
| Operating environment | Use inside building only |
| Ambient temperature | 5°C ... 40°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<br>EMC Directive<br>RoHS Directive |
| EMC environment | Industrial environment, Class A (in acc. with EN 55011) |
| **Subject to change** | |

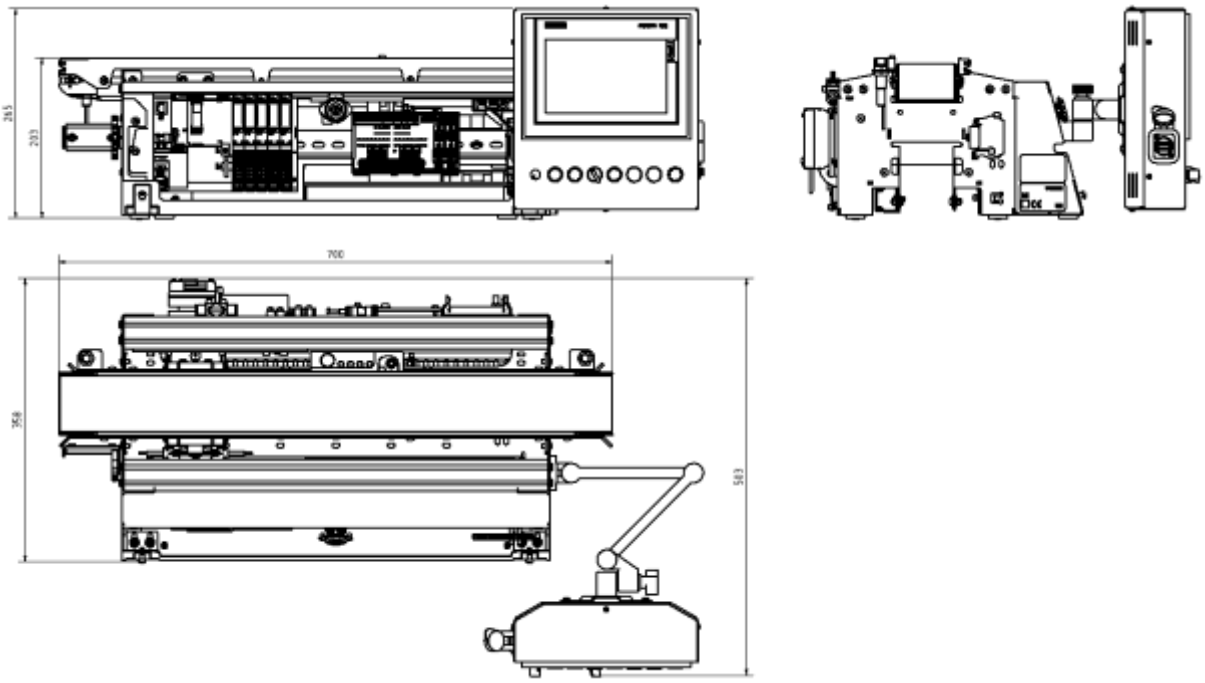
### 5.3 Technical data for 400 V variants

Valid for (see chapter type code)
CP-L-LINEAR-C11-M6-V2
CP-L-LINEAR-C13-M6-V2

| Parameter | Value |
|---|---|
| **Electrics** | |
| Operating voltage | 3-phase 400 V AC±10%, 50 Hz |
| Power supply system | TNC-S, mains conductor L1, L2, L3, neutral conductor N, protective grounding PE |
| Full load power | 1 A |
| Control voltage,<br>Voltage for small actuators | 24 V DC<br>Protective extra-low voltage (PELV) |
| Power supply connection | IEC 60309, CEE 16 A |
| Max. backup fuse for installation | 16 A |
| Leakage current | <= 18 mA |
| Connecting cable between stations | System plug |
| Protection class | I, Operation with protective grounding only.<br>Second protective grounding conductor required due to high leakage current |
| Overvoltage category | CAT II, Operation in building installation only |
| Short circuit current rating (SCCR) | 10 kA |
| **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) | <= +3°C |
| **Ambient conditions** | |
| Operating environment | Use inside building only |
| Ambient temperature | 5°C ... 40°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<br>EMC Directive<br>RoHS Directive |
| EMC environment | Industrial environment, Class A (in acc. with EN 55011) |
| **Subject to change** | |




Without HMI / Illustration similar




With HMI (option) / Illustration similar

# 6 Introduction

### 6.1 General information CP Lab system

The Festo Didactic Learning System is designed to meet a number of different training and vocational requirements. The CP Lab conveyor and the application modules of the system enable training and further education geared to operational reality. The hardware consists of didactically prepared industrial components.
The stations provide an appropriate system for practice-orientated education/classes of the following key qualifications

- Social competence,
- Technical competence and
- Method competence

Moreover, training can be provided to instil team spirit, willingness to cooperate and organizational skills. Actual project phases can be taught by means of training projects, such as:

- Planning,
- Assembly,
- Programming,
- Commissioning,
- Operation,
- Maintenance
- Fault finding and
- Trouble shooting.

This manual describes the handling of the CP Lab conveyor and the application modules. All necessary operations for operation are explained and described. In some cases, the facts are explained with the aid of graphics or pictures, which thus serve to facilitate communication.

The CP Lab system is developed for all apprentices who want to move something. It doesn't matter if the education is for electro- or metal profession, for mechatronics, technician- or engineer education.

**Concept**

During technical lessons for pupils we use our simple models with O-ring drive. In the CP Lab system the material flow is realized with a common industrial belt. In industrial, automated production, special belts are essential part of the production system. Products with different measurements are transported on belts with different widths or on double belts.

**Transfer system with modules**

The transfer system is a modular system which consists of two essential components. First the CP Lab conveyor which can be equipped with different drive concepts and second the constitutive modules for topics like sensors, electrical positioning, handling, assembling, camera inspection, barcode scanning, RFID and many others.

### 6.1.1 Application modules

- CP application module output
  For removing workpieces from the system
  Complexity medium, electro pneumatic module

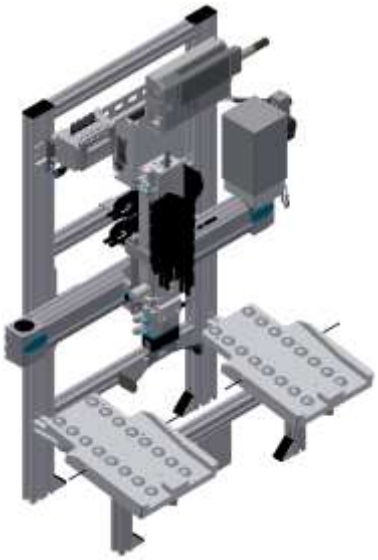


Illustration similar

- CP application module drilling
  For drilling housing parts
  Complexity simple, electro pneumatic module

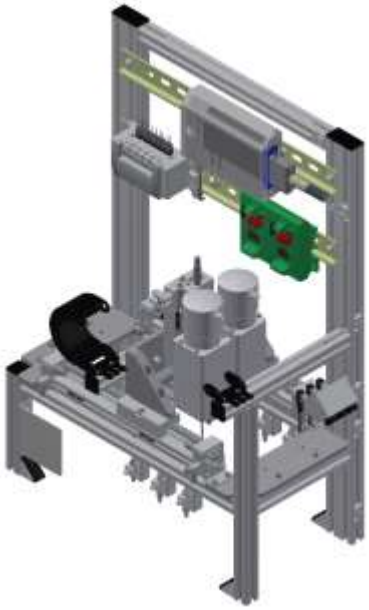


Illustration similar

- CP Factory cobot station
  for assembly of various workpieces / with the help of a worker or without
  High complexity, industrial, collaborative 6-axis robot

Illustration similar

- CP application module dispensing
  to distribute balls in three different colors and diameters
  Complexity high, electro pneumatic module

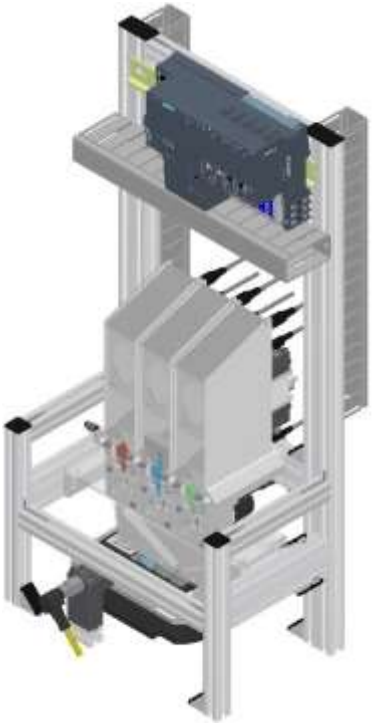


Illustration similar

- CP application module labeling
  In order to label workpieces with a label
  Complexity high, electro pneumatic module

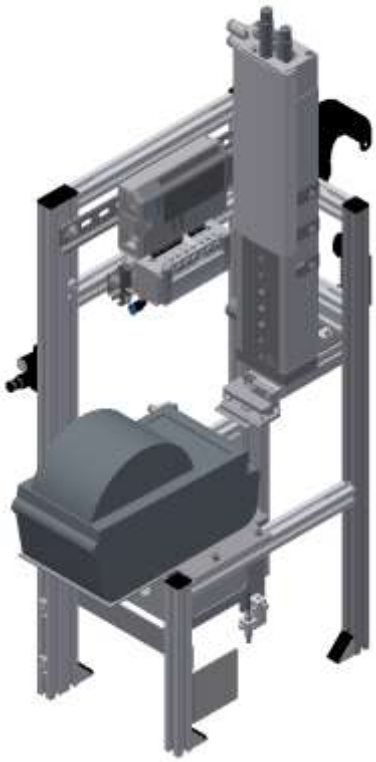


Illustration similar

- CP application module manual work
  For the manual processing of pallets and / or workpieces on a stopper
  Complexity simple, software module

Illustration similar

- CP application module ASRS for workpieces
  for loading / unloading workpieces
  Complexity high, 2 toothed belt axes

Illustration similar

- CP application module ASRS for workpieces
  for loading / unloading workpieces
  Complexity high, 2 toothed belt axes

illustration similar

- CP application module iDrilling
  For drilling housing parts
  Complexity simple, electro-pneumatic module with controller with web interface for cyber-physical system

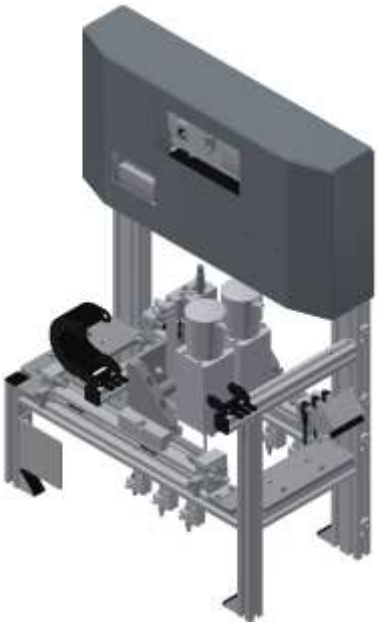


Illustration similar

- CP application module Camera inspection
  With camera for checking object properties
  Complexity high, Festo Camera system with evaluation software

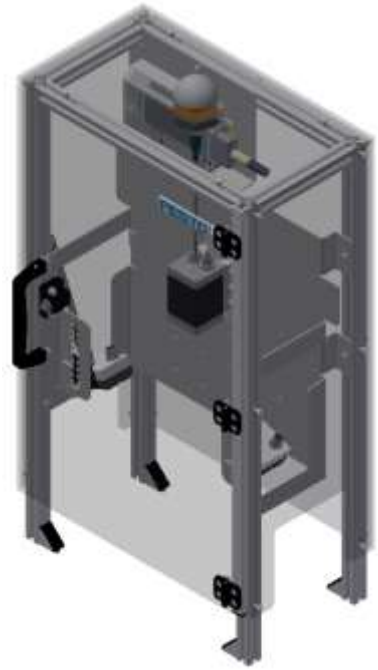


illustration similar

- CP application module magazine
  For feeding housing parts. Different in the magazine rear cover and magazine front cover
  Complexity simple, electro pneumatic module

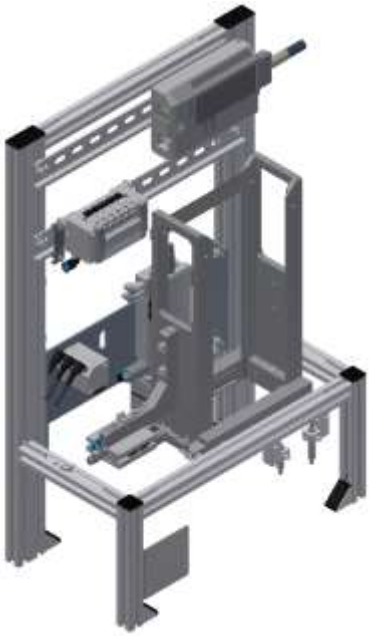


Illustration similar

- CP application module Measuring
  For quality assurance
  Complexity high, processing of analog input signals

Illustration similar

- CP application module Muscle press
  For pressing the housing parts
  Complexity simple, electro pneumatic module (pneumatic muscle)

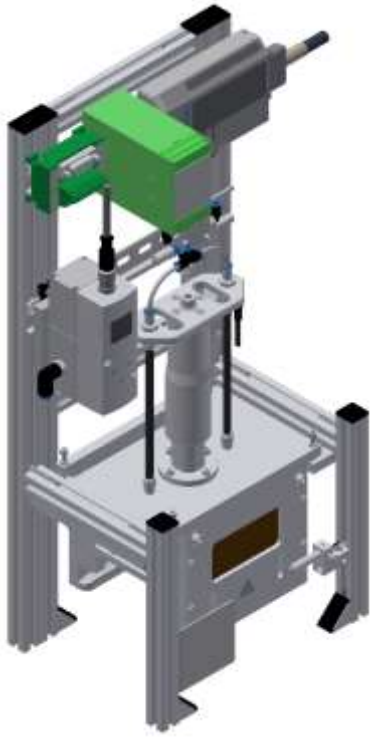


Illustration similar

- CP application module Pick by light
  Hand workplace where workpieces are provided for assembly.
  Complexity, electrical module

Illustration similar

- CP application module press
  For pressing the housing parts
  Complexity simple, electro pneumatic module

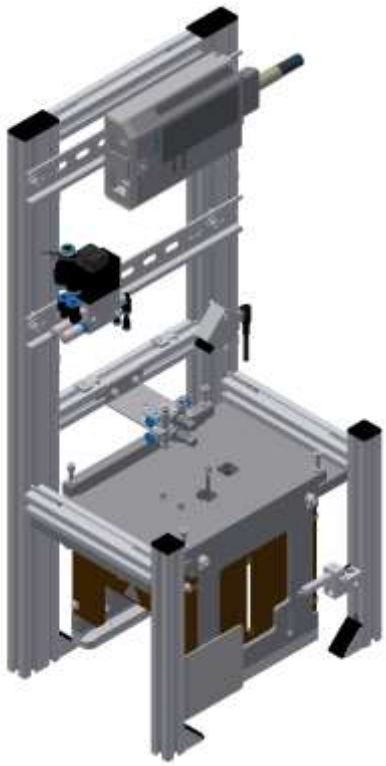


Illustration similar

- CP application module heat tunnel
  For heating workpieces for thermal processing
  Complexity medium to high, control engineering module with analog processing and PWM

Illustration similar

- CP application module turn over
  For turning workpieces
  Complexity medium, electro pneumatic module

Illustration similar

### 6.1.2 Further modules

- Mobil robot Robotino® for workpiece carriers
  The AGV system is used for the transport of workpieces.

Illustration similar

- CP Lab Bridge
  The task of the CP Lab Bridge is to turn off workpiece carriers with and without workpieces on CP Factory Modules or a Robotino. In addition, workpiece carriers from CP Factory modules or from a Robotino can be imported into the CP Lab system.

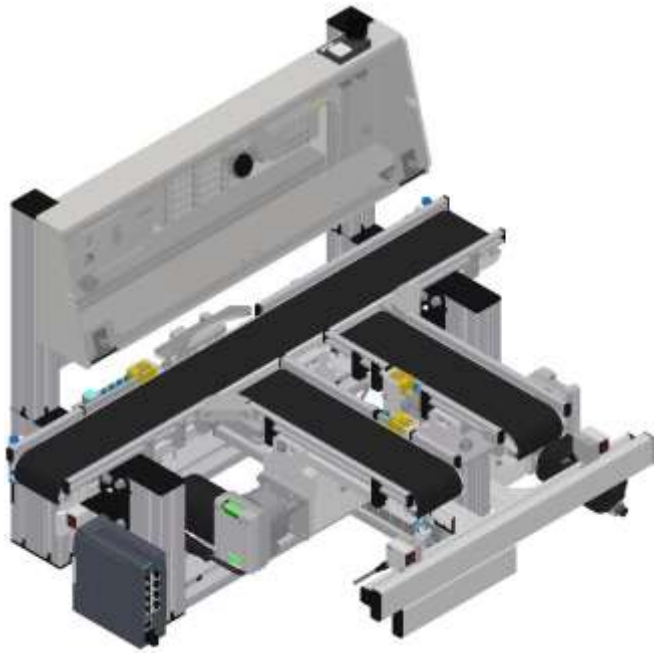


Illustration similar

- MSRS20
  The application module MSRS20 is designed to store goods coming from a robotino. The operation is done with an iPad, a worker is handling the boxes with the goods manually.

Illustration similar

### 6.2 Resources

The training equipment of the system consists of several resources. They are used depending on the process selection.
The following resources are available:


Pallet carrier / illustration similar

These pallet carriers are available for transporting the pallets.
Partnumber in MES - 31

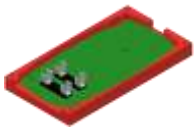
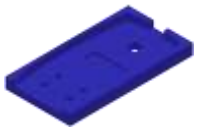
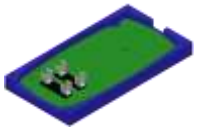
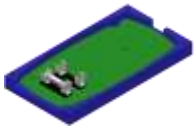
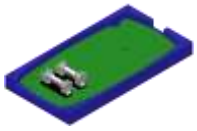
Pallet / illustration similar

These pallets are available for receiving always one workpiece.
Partnumber in MES - 25

## Workpieces

The workpieces are differentiated according to the project into production parts and external production parts.

| Workpieces | Description | Workpieces | Description |
|---|---|---|---|
|  | CP raw material black<br>No. 101 |  | CP back cover blue<br>No. 113 |
|  | CP raw material grey<br>No. 102 |  | CP back cover red<br>No. 114 |
|  | CP raw material blue<br>No. 103 |  | CP – board<br>No. 120 |
|  | CP raw material red<br>No. 104 |  | CP fuse<br>No. 130 |
|  | CP front cover red<br>No. 107 |  | CP front cover black<br>No. 210 – if there is a CNC milling machine integrated in the system, the front cover can also be produced there , thus becoming a production part. |
|  | CP front cover blue<br>No. 108 |  | CP front cover black without fuses<br>No. 211 |
|  | CP front cover grey<br>No. 109 |  | CP front cover black with fuse left<br>No. 212 |
|  | CP front cover black<br>No. 110 |  | CP front cover black with fuse right<br>No. 213 |
|  | CP back cover black<br>No. 111 |  | CP front cover black with both fuses<br>No. 214 |
|  | CP back cover grey<br>No. 112 | | |

| Workpieces | Description | Workpieces | Description |
|---|---|---|---|
|  | CP front cover grey<br>No. 310 – if there is a CNC milling machine integrated in the system, the front cover can also be produced there , thus becoming a production part. |  | CP front cover red<br>No. 510 – if there is a CNC milling machine integrated in the system, the front cover can also be produced there , thus becoming a production part. |
|  | CP front cover grey without fuses<br>No. 311 |  | CP front cover red without fuses<br>No. 511 |
|  | CP front cover grey with fuse left<br>No. 312 |  | CP front cover red with fuse left<br>No. 512 |
|  | CP front cover grey with fuse right<br>No. 313 |  | CP front cover red with fuse right<br>No. 513 |
|  | CP front cover grey with both fuses<br>No. 314 |  | CP front cover red with both fuses<br>No. 514 |
|  | CP front cover blue<br>No. 410 – if there is a CNC milling machine integrated in the system, the front cover can also be produced there , thus becoming a production part. |  | CP black complete without board<br>No. 1200 |
|  | CP front cover blue without fuses<br>No. 411 |  | CP part customer<br>No. 1210 freely selectable |
|  | CP front cover blue with fuse left<br>No. 412 |  | CP part black with no fuse<br>No. 1211 |
|  | CP front cover blue with fuse right<br>No. 413 |  | CP part black with fuse on the left<br>No. 1212 |
|  | CP front cover blue with both fuses<br>No. 414 |  | CP part black with fuse on the right<br>No. 1213 |
| | |  | CP part black with both fuses<br>No. 1214 |

# 7 Design and Function

## 7.1 Transport

**WARNING**

- **Damage to transport equipment when moving heavy machines/machine sections**
  - When the stations are shipped out, extra care must be taken to ensure that heavy machines/machine sections are always transported using a suitable fork-lift 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**

- **Securing transit routes**
  - 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**
  - 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**

- **Danger of crushing for hands/feet**
  - 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.

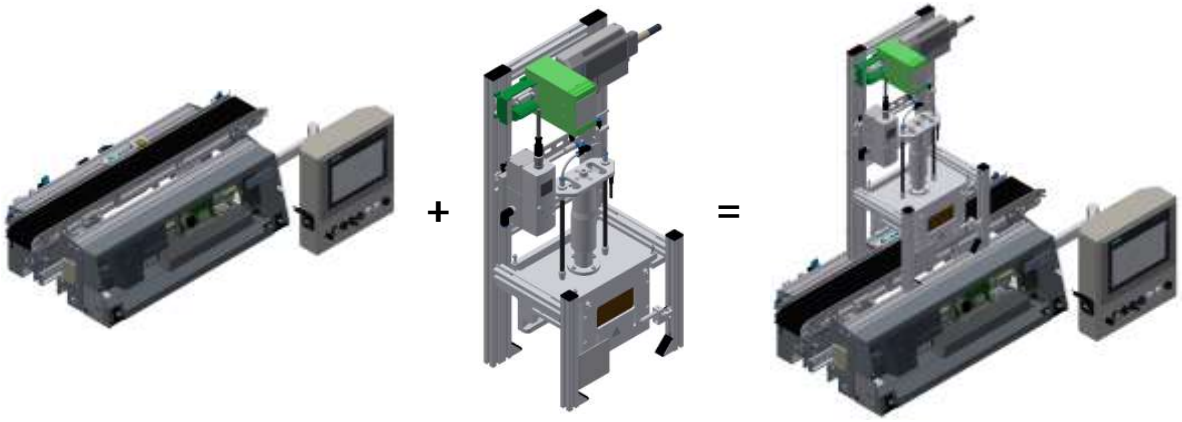
**NOTE**

- 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.

### 7.2 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**



basic module, e.g. CP Lab Conveyor

application module, e.g. muscle press

station muscle press

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

carrier

pallet

workpiece

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.

front cover

board

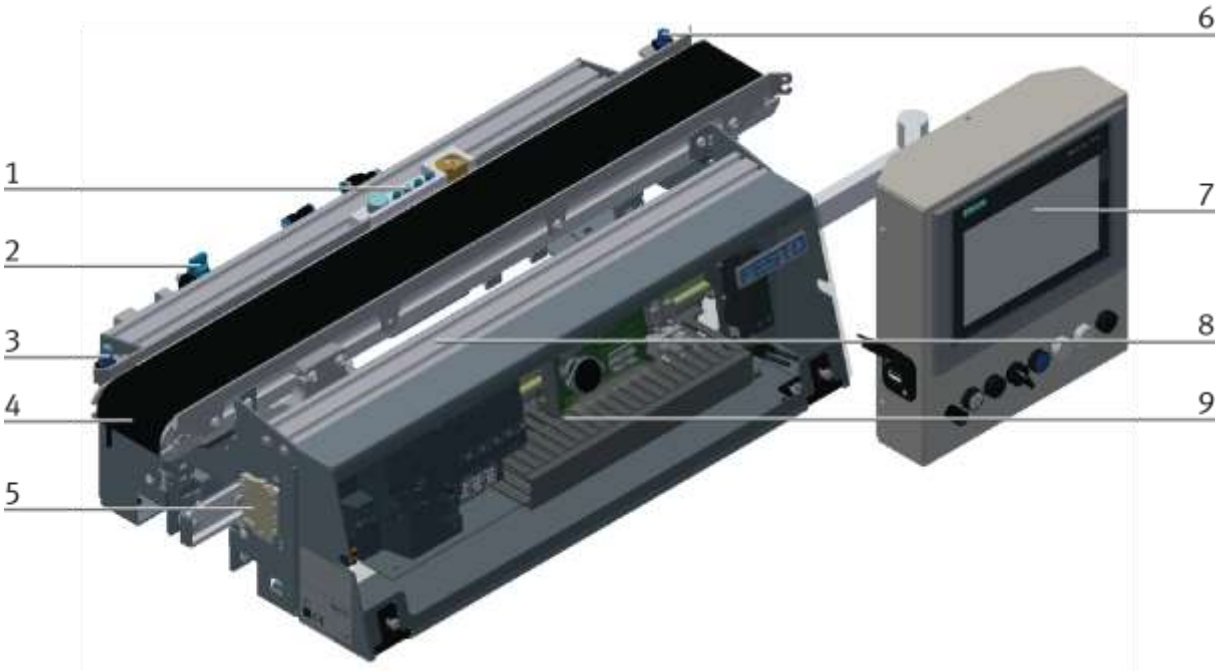
back cover

### 7.3 The CP Lab conveyor

The CP Lab conveyor consists of

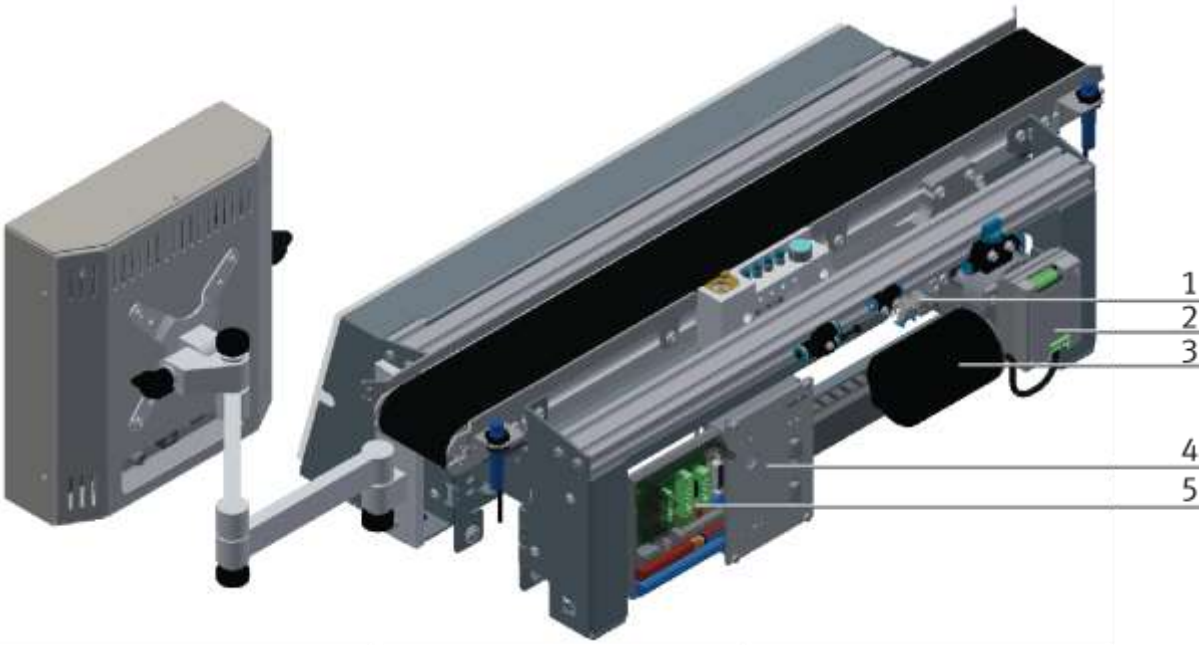
- a 80mm wide and 700mm long pallet transfer system
- a basic frame
- a control cabinet for controlling and further electrical components
- a control panel on a mike boom (option)
- On the basic frame, there are coupling sensors for an easy communication with other directly connected CP Lab conveyors.
- At the start and at the end of the CP Lab conveyor, there are capacitive sensors which recognize the pallet on the CP Lab conveyor.
- A stopper unit with different ways of identification which stops and identifies the pallet.
- A 24V geared motor which can be replaced by other motors (230 V / 400V). On the motor, there is an incremental encoder for detecting the rotational speed.

The CP Lab conveyor is designed for transporting pallets with workpieces to move back and forth or for transporting them to further CP Lab conveyors. Easy tasks can be realized here. It is also possible to extend the CP Lab conveyor with different applications. This way, the field of activity can be extended as desired.




Pallet transfer system front view / illustration similar

| Position | Description | Position | Description |
|---|---|---|---|
| 1 | Stopping unit for carrier | 6 | Capacitive sensor end of conveyor |
| 2 | On-off valve | 7 | Control panel / Touch panel (CP-L-HMI T7 / optional)<br>Partnumber 8091107 |
| 3 | Capacitive sensor start of conveyor | 8 | Basic frame |
| 4 | Conveyor | 9 | Control cabinet for electrical components and controlling |
| 5 | Coupling sensor previous station | | |




CP Lab conveyor rear view / illustration similar

| Position | Description | Position | Description |
|---|---|---|---|
| 1 | Valve stopper with manual override<br>574351 / VUVG-L10-M52-MT-M5-1P3 | 4 | IO-Link DA-Interface |
| 2 | 2-quadrant controller for motor | 5 | Circuit board backside XZ2 |
| 3 | alternatively 24 V motor / 230 V Motor / 400 V Motor | | |

### 7.4 Stopper unit

The stopper unit is located in the middle of the CP Lab conveyor. The carrier runs over the extended stopper unit. The screw (pos. 1 picture below) runs into the slot of the carrier. At the end of the slot the carrier is stopped.

With the help of the sensors at the stopper unit, the carrier can be identified. There are two ways for identifying:

- Variant 1
  It is identified by 4 inductive sensors; for this exercise, the carriers may be provided with grub screws at different positions.
- Variant 2
  The identity is read by the RFID sensor.

It is also possible to use the first of the inductive sensors for controlling; in this case the first grub screw is read and reports the position of the workpiece at the stopper.

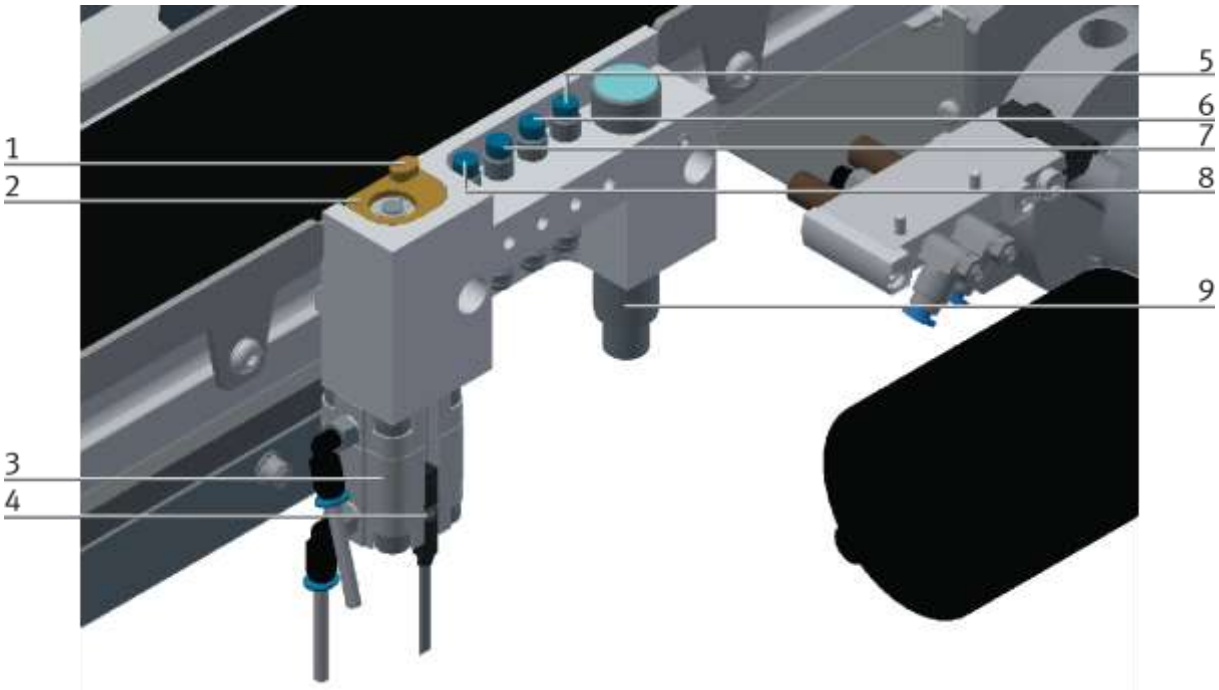
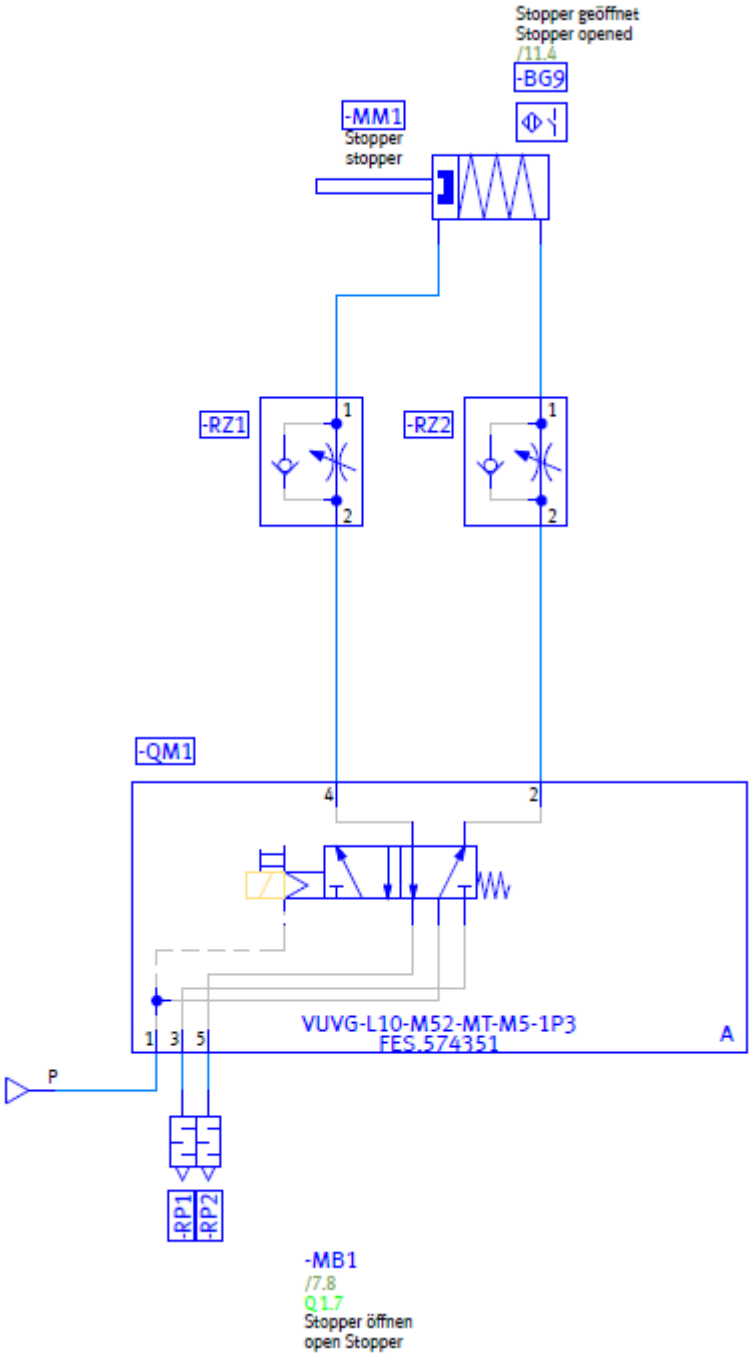



illustration similar

| Position | Description | Position | Description |
|---|---|---|---|
| 1 | Stopper and guide for carrier | 6 | Inductive sensor<br>150395 / SIEN-M8NB-PS-S-L |
| 2 | Sprung stopper ratchet | 7 | Inductive sensor<br>150395 / SIEN-M8NB-PS-S-L |
| 3 | Stopper<br>157211 / AEVUZ-16-5-P-A | 8 | Inductive sensor<br>150395 / SIEN-M8NB-PS-S-L |
| 4 | Sensor for stopper retracted<br>574334 / SMT-8M-A-PS-24V-E-0,3-M8D | 9 | RFID read-write head M18<br>Siemens 6GT2821-1AC32 |
| 5 | Inductive sensor<br>150395 / SIEN-M8NB-PS-S-L | | |

The CP Factory / Lab stop unit consists of

- 1 spring-return cylinder AEVUZ-16-5-P-A with 2 pneumatic connections
- 2 One-way flow control valves (exhaust air throttles)
- 1 monostable 5/2-way valve (VUVG-L10-M52-MT-M5-1P3)
- 1 brass element
- 1 spring



**Set up:**
In the internal thread of the cylinder piston rod, a hexagon socket screw with washer is introduced. The washer forms a positive fit with the brass element as long as the brass element is not pressed down by hand and the cylinder is in the home position. Between brass element and cylinder body a spring is inserted.
The cylinder is connected via two connections, each with a one way flow control valve. The one way flow control valves are connected to the monostable 5/2-way valve.
The use of the spring-return cylinder as a double-acting cylinder with a monostable 5/2-way valve is due to the following requirements for the stopper:

**Stopper requirements:**
- In the basic position the piston rod of the cylinder should extend.
- The speed for retracting and retracting the cylinder should be adjustable separately.
- Excessive noise during the extension and retraction movement of the cylinder should be avoided.
- In the event of compressed air or voltage drop, the cylinder must assume its basic position, ie extend.
- Compressed air and / or voltage must not lead to any hazard exposure.
- The extension of the cylinder must not exert excessive impact on an overlying carrier.
- The cylinder should be dimensioned as small as possible.

**Analysis of the movement profile:**
Situation:
In the depressurized state, the piston rod is in the upper end position due to the spring return, as it is a compact cylinder of the AEVUZ (pulling mode) series. Also, the brass element is in the upper end position, since due to the extended cylinder piston rod, the spring between brass element and cylinder body is relaxed.
Both the brass element, as well as the piston rod can be pressed down in the pressureless state. Brass element and piston rod then return to their normal position.

Compressed air connection / resistance:
As soon as the compressed air is switched on, the piston rod can no longer be pushed down by hand. However, the brass element already, since its position in the basic position of the cylinder depends only on the state of the spring between the brass element and the cylinder body.
The behavior with compressed air connection / resistance is comparable to the upward movement:

Upward movement:
The 5/2-way valve ventilates in the basic position, the lower chamber of the cylinder. The rising pressure in the lower chamber and the spring installed in the cylinder press the piston rod out of the cylinder housing until the upper end position is reached. In this case, the one way control valve -RZ2 allows the compressed air without throttling. The compressed air from the upper chamber escapes via the one way control valve -RZ1. This is therefore an exhaust air throttling. This allows the speed of the upward movement to be adjusted.
If no carrier is located above the stopper, the brass element also returns to its basic position. The upward movement of the piston rod relaxes the spring between the brass element and the cylindrical body during the movement. This also pushes the brass element upwards.

If a carrier is located above the stopper, the measuring element is pressed against the carrier by the force of the spring between the measuring element and the cylinder body. The spring force is low enough that the carrier is not pushed upwards and is strong enough for the measuring element to return to the basic position after the carrier has left the stopper.

Downward movement:
If the valve coil or manual control of the monostable 5/3-way valve is actuated, the valve changes to the working position. The lower chamber of the cylinder is vented through the throttle of the one way flow control valve -RZ2, while -RZ1 causes the compressed air to flow unimpeded into the upper chamber of the cylinder. This is therefore also an exhaust air throttling. Thus, the speed of the downward movement can be adjusted via -RZ2.
During the downward movement, the spring of the cylinder and the spring between the measuring element and the cylinder body are additionally pretensioned.

**Monostable 3/2-way valve with throttling and single-acting cylinder**
This variant can not be used since

- the speeds for the extension and retraction movement can not be set independently of each other
- due to the small size of the single-acting cylinder, a precise adjustment of the supply air throttle is made more difficult => noise
- In the case of small sizes of the single-acting cylinder with exhaust air throttling, no sufficiently large compressed air cushion can be built up in the chamber so that the mechanism of the exhaust air throttling has a positive effect

### 7.5 Drive vesions

Whether DC motor or servo motor - the conveyor belt can be combined with all motors in just a few steps. Professional couplings or toothed belt transmissions convey maximum industrial practice with optimum didactic modularity.

#### 7.5.1 Gear motor 24 V DC

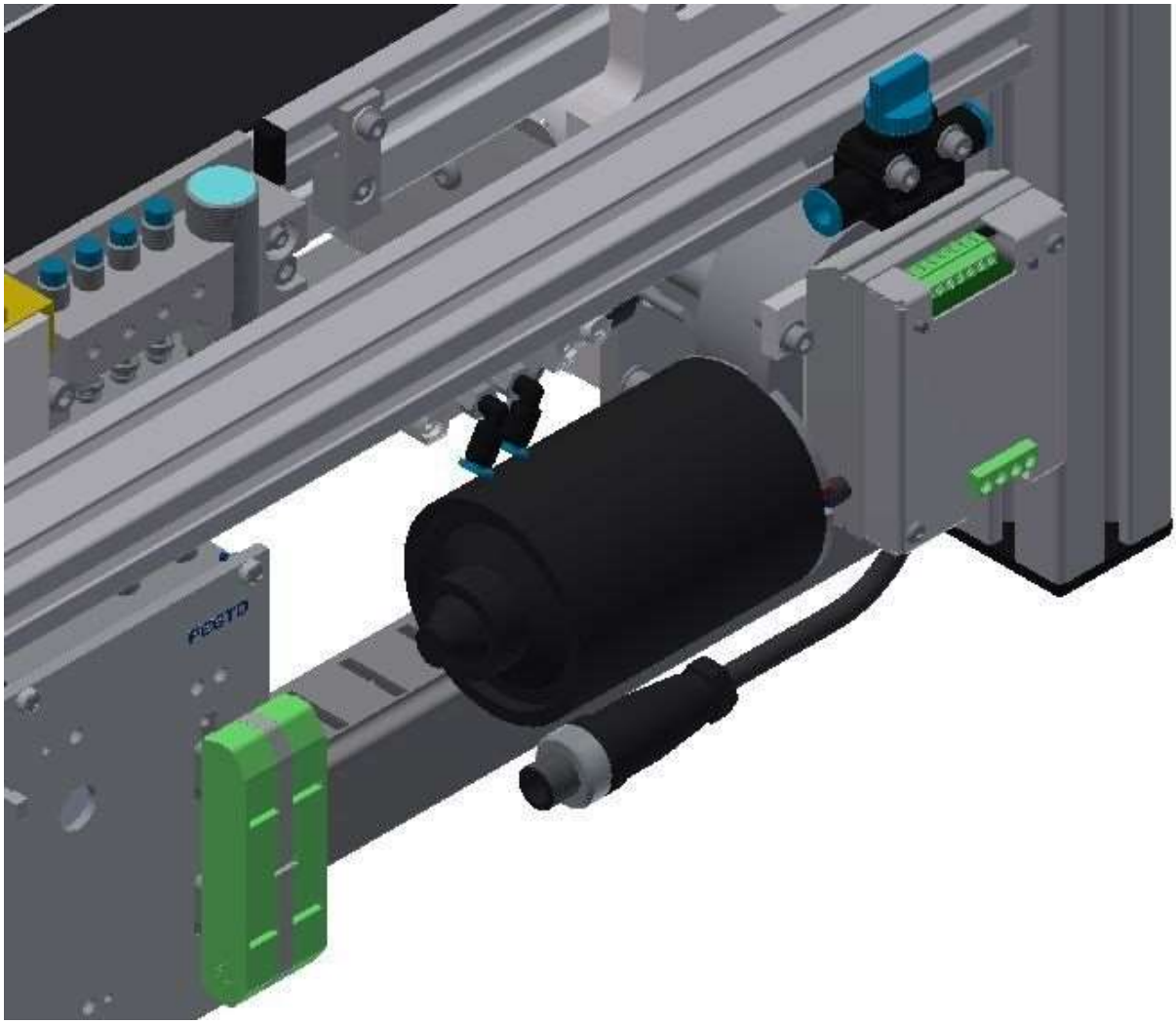



illustration similar

Valid for (see chapter type code)
CP-L-LINEAR-C11-M0-V2
CP-L-LINEAR-C13-M0-V2

### 7.5.2 Three-phase asynchronous motor with gearbox and self-ventilation 230 V AC

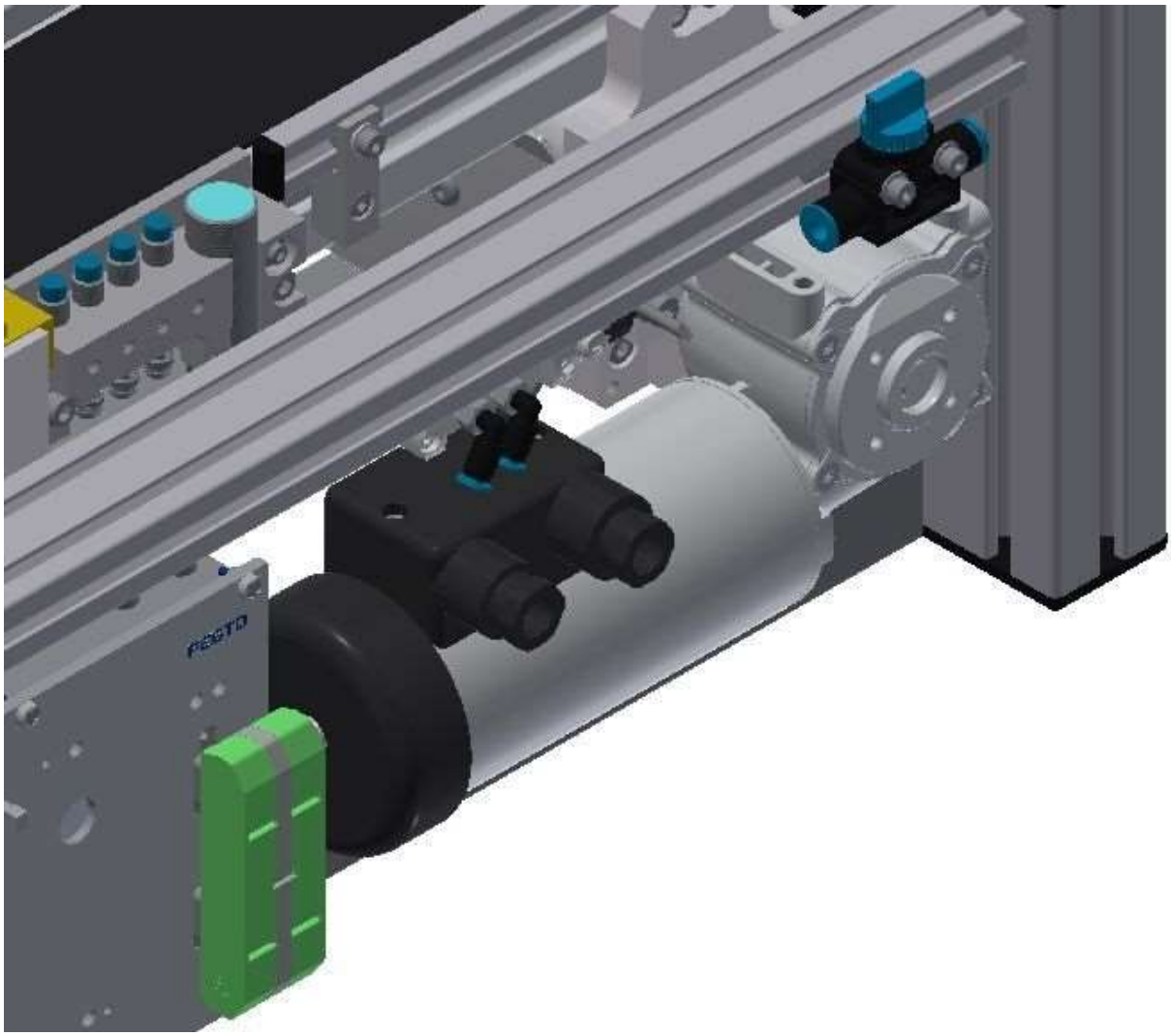



illustration similar

Valid for (see chapter type code)
CP-L-LINEAR-C11-M1-V2
CP-L-LINEAR-C13-M1-V2

### 7.5.3 Asynchronous motor with gearbox and self-ventilation 400 V AC

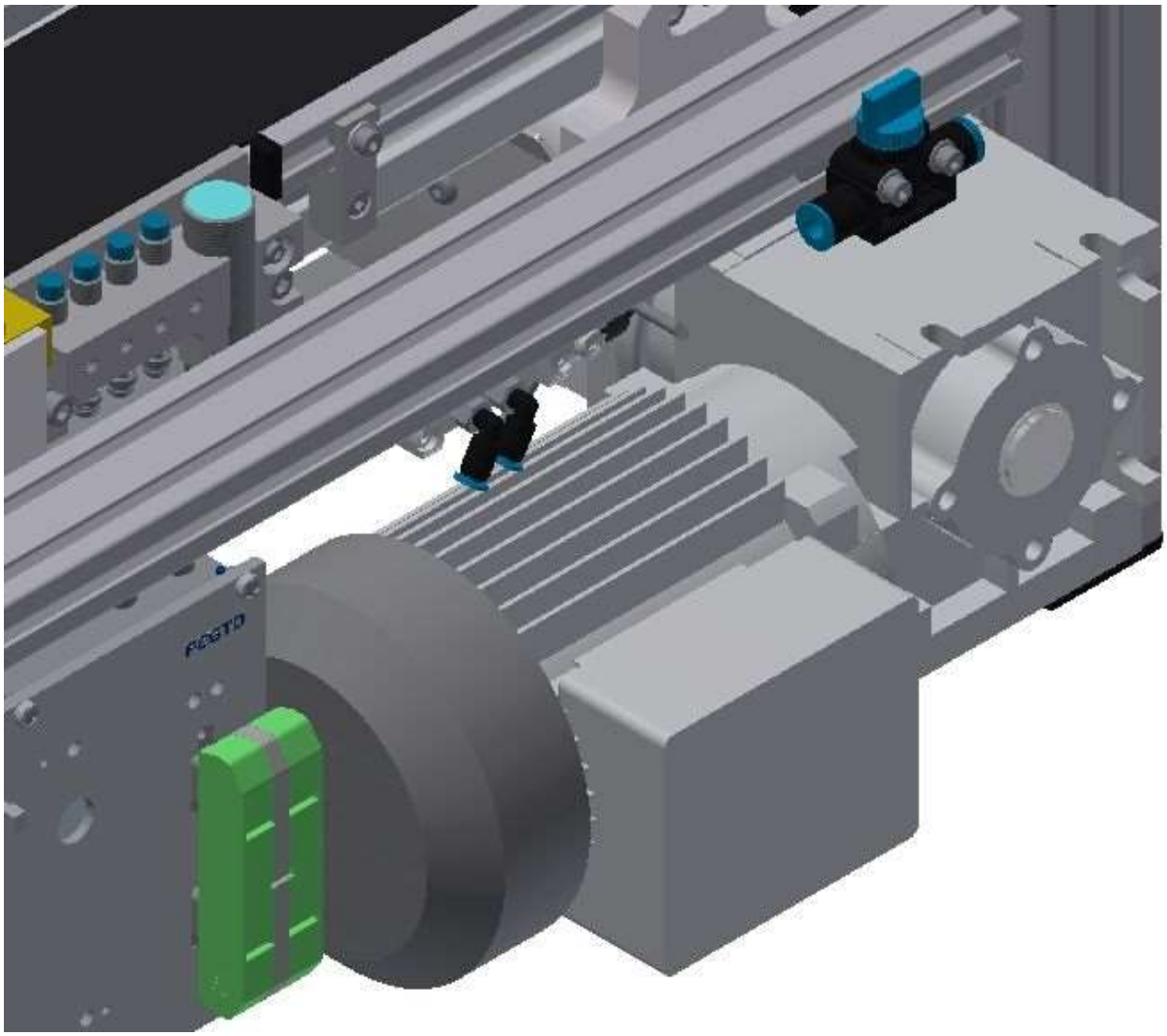



illustration similar

Valid for (see chapter type code)
CP-L-LINEAR-C11-M6-V2
CP-L-LINEAR-C13-M6-V2

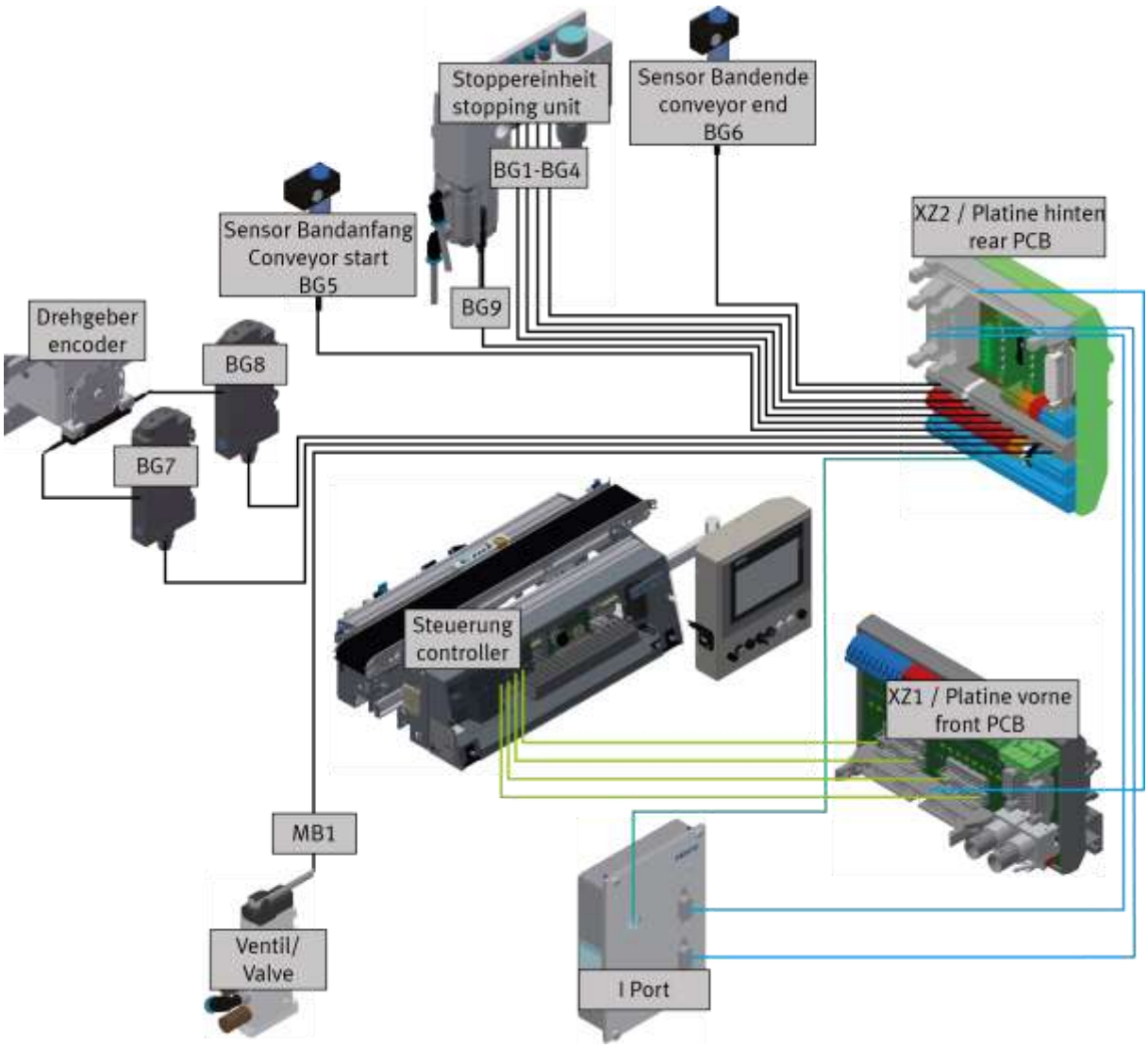
### 7.6 Signal generator

The drive unit is provided with an encoder with 8 cut-outs. The encoder is interrogated by 2 light barriers, which makes the evaluation of the rotational speed possible.
One turn is 94,2 mm


illustration similar

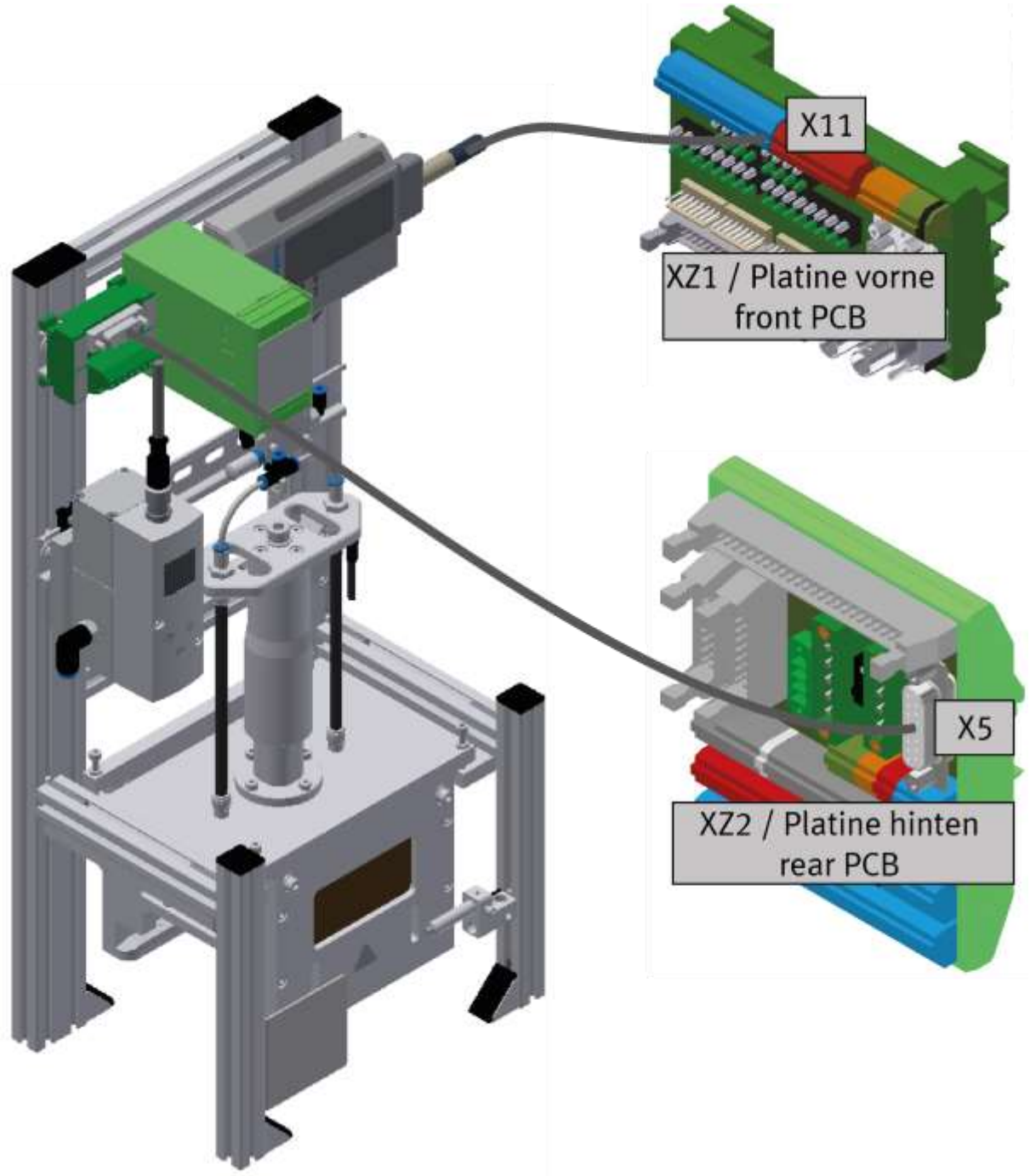
| Position | Description |
|---|---|
| 1 | Light barrier channel A (BG8) / signal or coupling sensor is selectable with switch on the circuit board (left turning signal, right coupling sensor) |
| 2 | Light barrier channel B (BG7) / signal or coupling sensor is selectable with switch on the circuit board (left turning signal, right coupling sensor) |

## 7.7 Electrical connections




Electrical connections / illustration similar

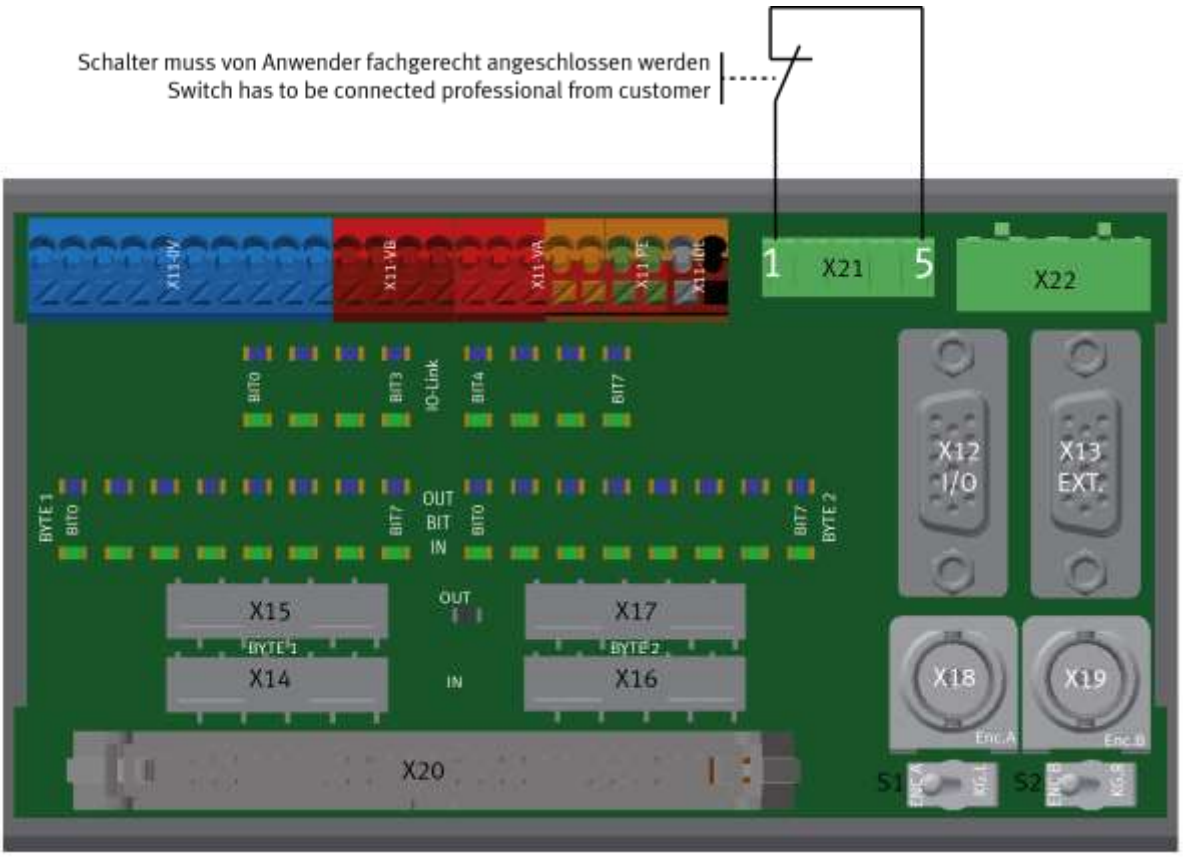
The shaft encoder has got 2 channels, channel A is connected with the output unit BG8, channel B is connected with the output unit BG7. The output units can be connected alternatively to the coupling sensors. (left turning signal, right coupling sensor)
The iPort is connected to the I/O link master of the ET200 SP.
Instead of the controller, it is possible to install a I/O Terminal.




Electirc connection application module / illustration similar

If an application module is connected to the CP Lab conveyor, the cable that is hardwired to X11 is plugged into the SYS-Link connector of the I / O terminal. If the application module has an analogue interface, the analogue terminal is plugged into the rear XZ2 board at interface X5.

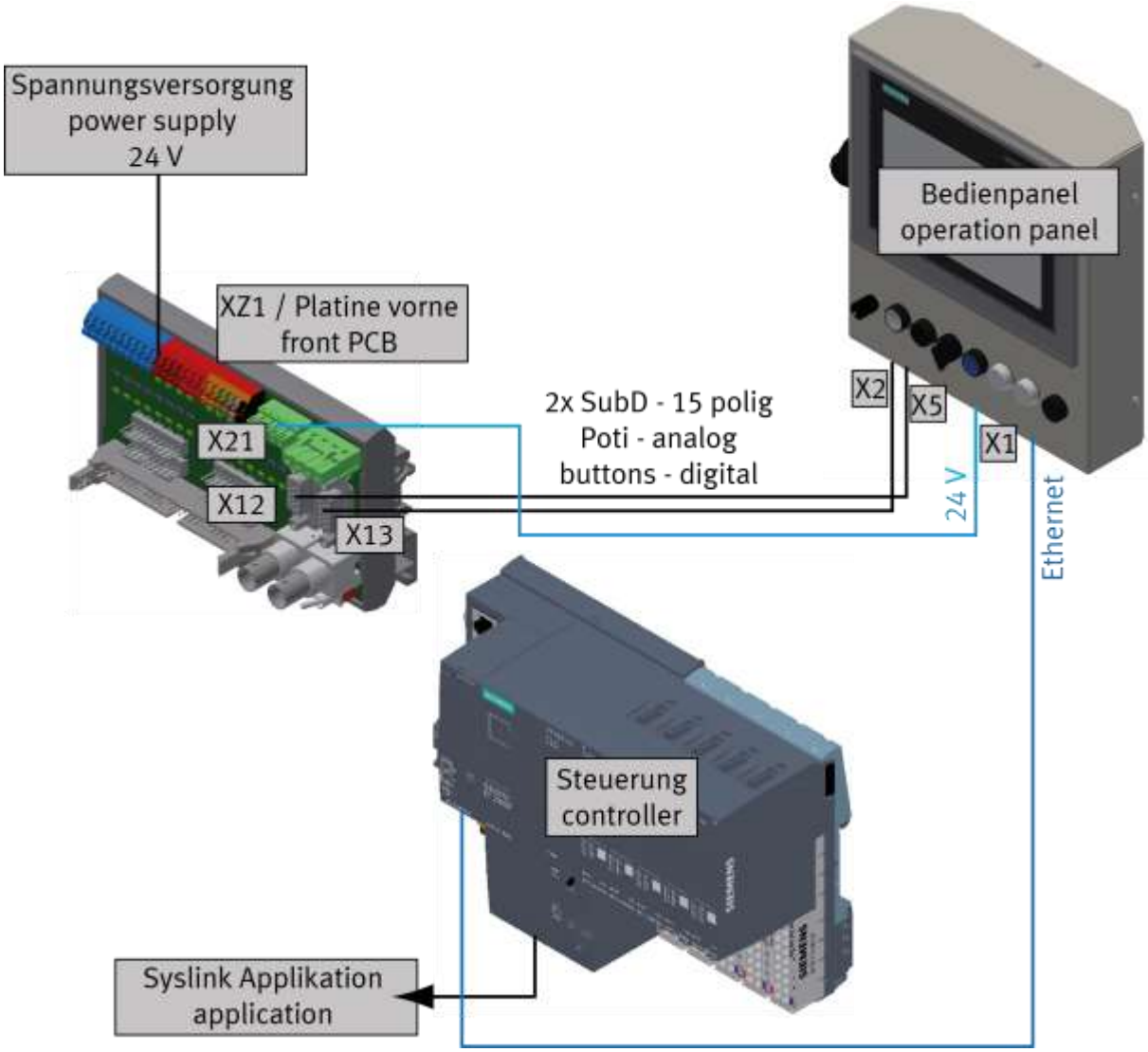
### 7.7.1 Connections without HMi




Further electrical connections / illustration similar

If there is no HMi Touchpanel, a switch has to be connected at the front PCB. Connect clamp 1 from X21 plug with clamp 5 from X21.

### 7.7.2 Connections with HMi (option)




Further electrical connections / illustration similar

The potentiometers of the control panel are connected to the 15 pole SubD plug on the control panel. There are also 4 I/O signals on this plug. The cable is connected to XZ1 /X12.
The external power supply is connected with lab cables at the XZ1.
With the SYSlink plug, applications are connected to the controller.

## 7.8 Activation motors

### 7.8.1 Motor version 24V

Valid for (see chapter type code)

CP-L-LINEAR-C11-M0-V2

CP-L-LINEAR-C13-M0-V2

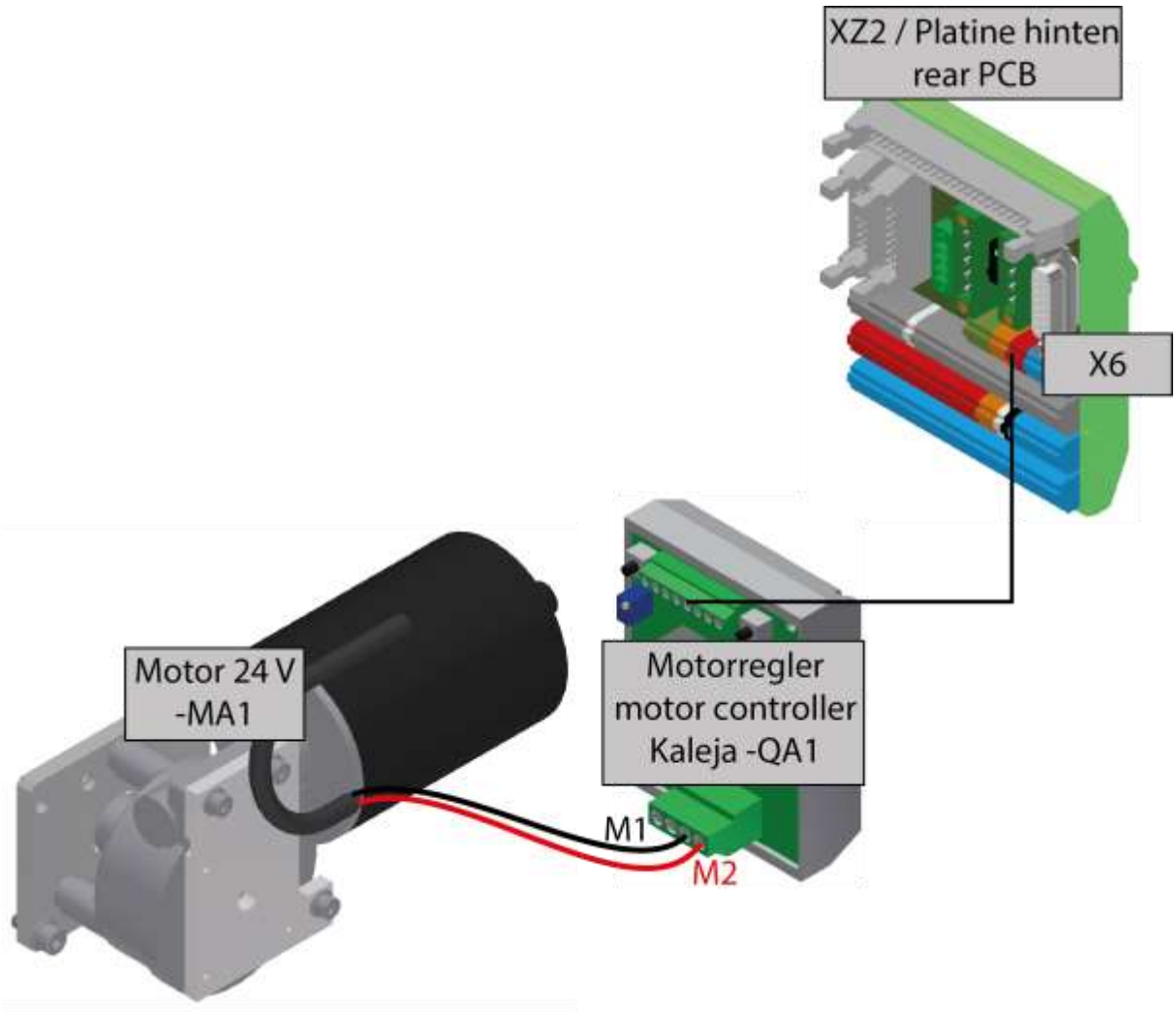



illustration similar

### 7.8.2 Motor version 230V

Valid for (see chapter type code)
CP-L-LINEAR-C11-M1-V2
CP-L-LINEAR-C13-M1-V2

Configured in triangle.

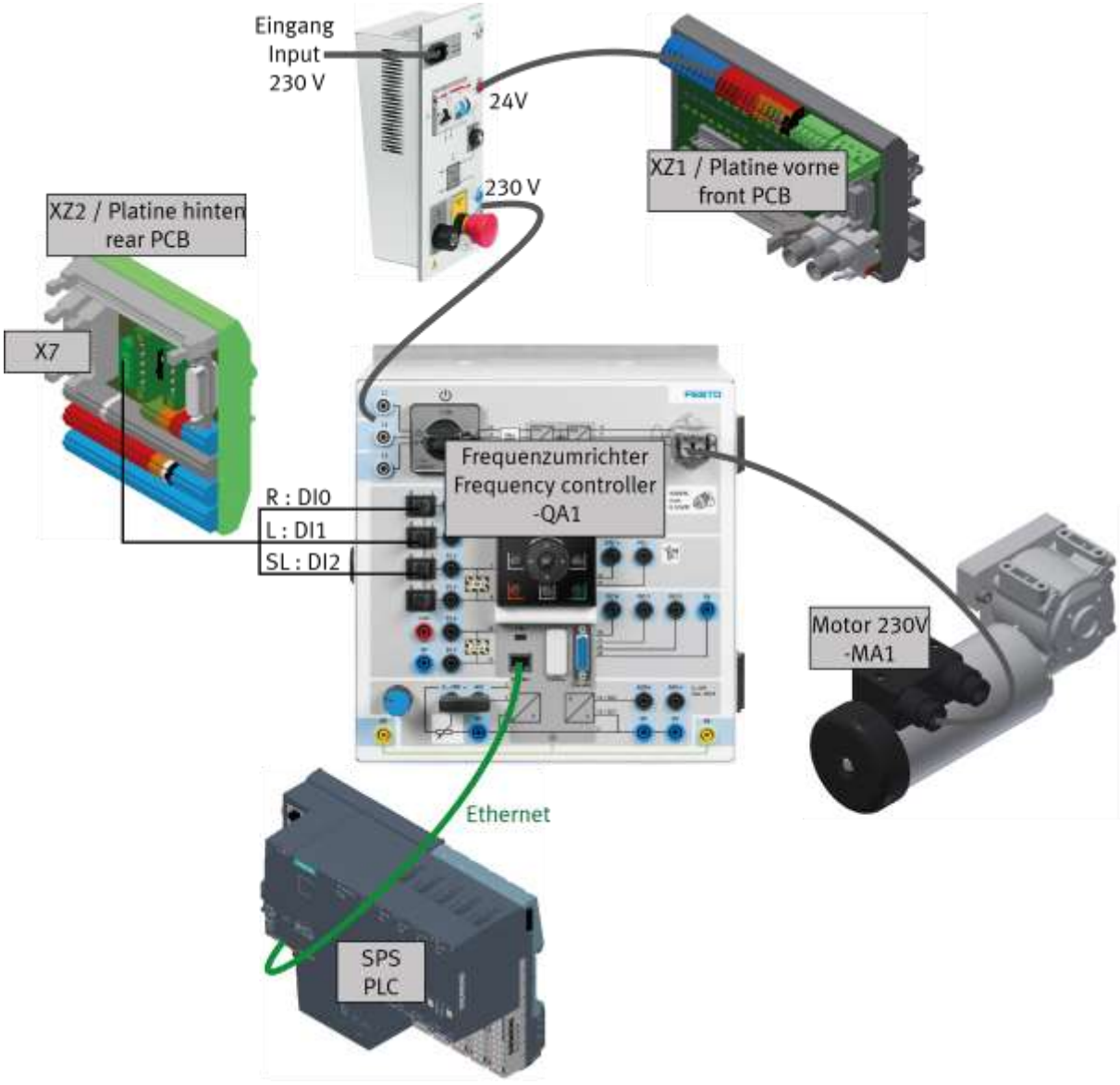
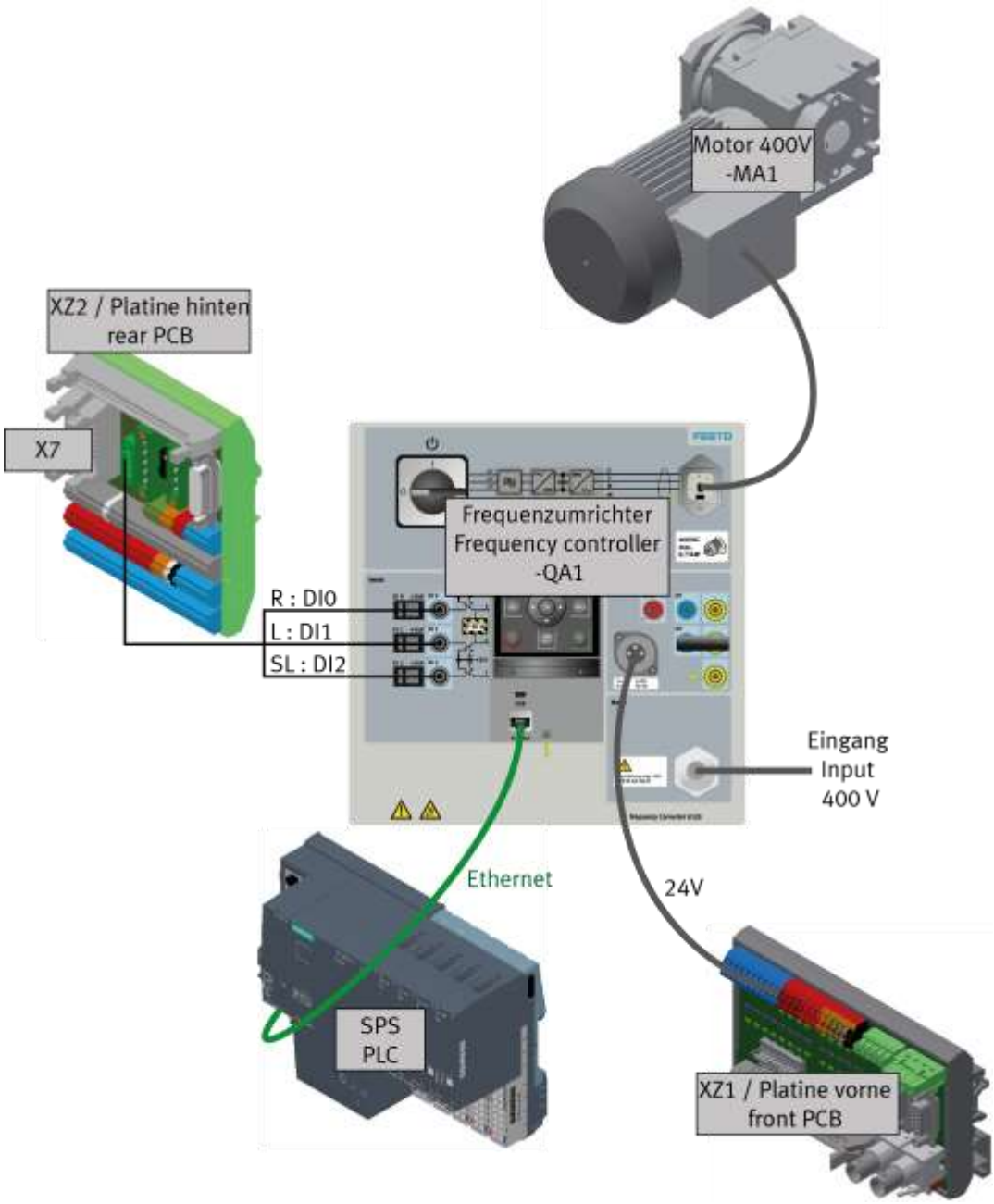



illustration similar

| Motor MA1 – Clamps | G120 CU240-2PN / QA1- Clamps |
|---|---|
| U1 | X1:1 |
| V1 | X1:2 |
| W1 | X1:3 |
| PE | X1:PE |

### 7.8.3 Motor version 400V

Valid for (see chapter type code)
CP-L-LINEAR-C11-M6-V2
CP-L-LINEAR-C13-M6-V2




| Motor MA1 – Clamps | G120 CU240-2PN / QA1- Clamps |
|---|---|
| U1 / W2 | X1:1 |
| V1 / U2 | X1:2 |
| W1 / V2 | X1:3 |
| PE / PE | X1:PE |

# 8 Commissioning

***NOTE***

– The following applies to the start-up as well as to the restart.

- The CP Lab conveyor is delivered pre-assembled.
- All attachment parts are individually packaged.
- All components, tubings and cablings have been clearly marked in order to guarantee a problem-free retrieving of all connections.

### 8.1 Visual Inspection

**⚠ WARNING**

- **Any damages must always be repaired instantly.**

Visual inspection has to be carried out prior to every commissioning!
Before you start the CP Lab conveyor, you must always inspect the following parts regarding visual damages and function:

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

### 8.2 Safety Regulations

**⚠ WARNING**

- **Any damages must always be repaired instantly.**

The CP Lab conveyor may only be operated on the following conditions:

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

### 8.3 Workplace

The commissioning of the CP Lab conveyor requires:

- a CP Lab conveyor
- a carrier with a pallet and a workpiece
- an on-site electrical connection in the room
- an on-site pneumatically connection in the room

## 8.4 Function extension by application modules

### 8.4.1 Assembly of an CP application module

| | NOTE |
|---|---|
| | 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. |

**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.

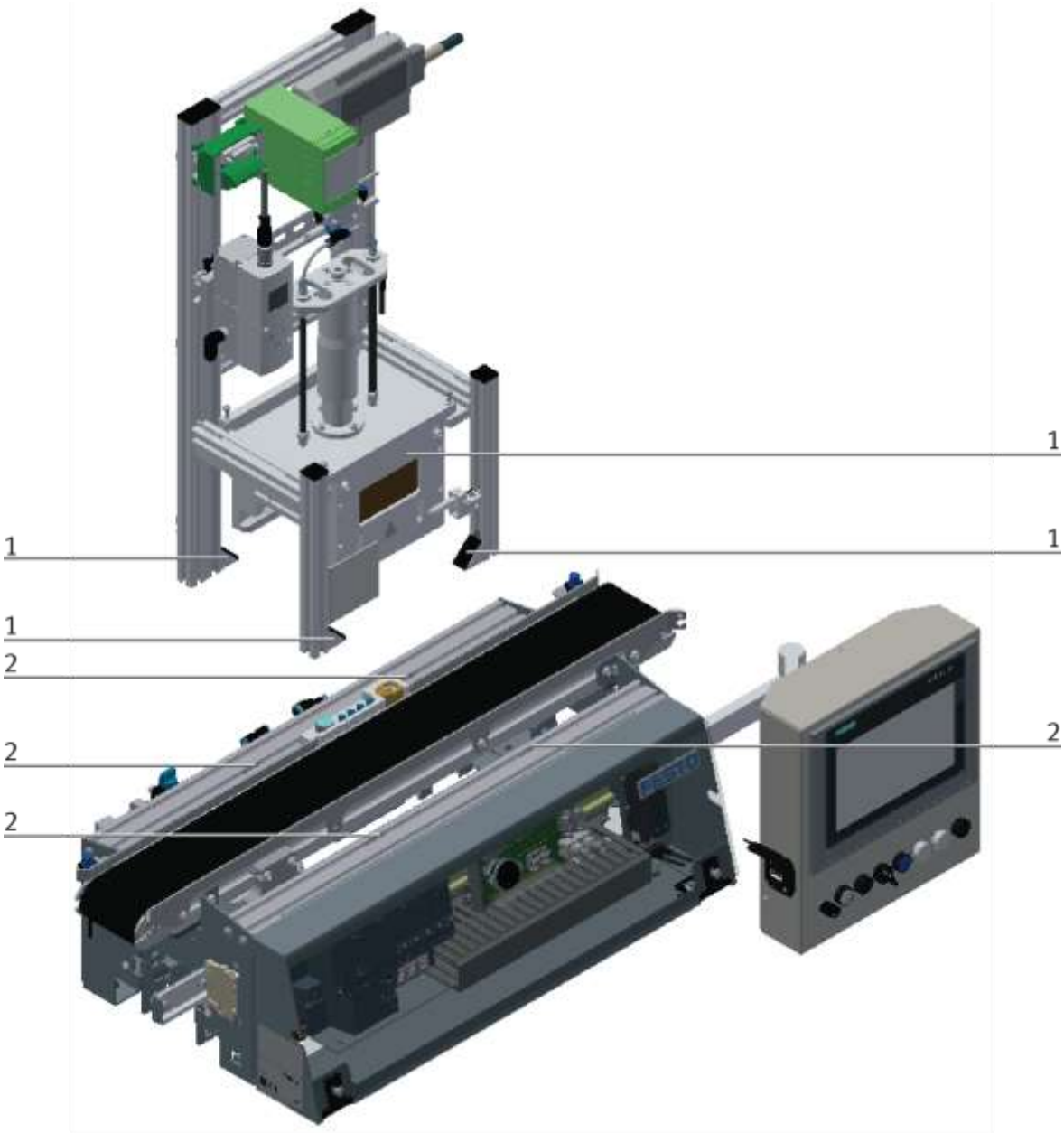

Positioning slot nuts / illustration similar

| 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***<br>Use Allen keys for lateral adjustment of the slot nuts. |

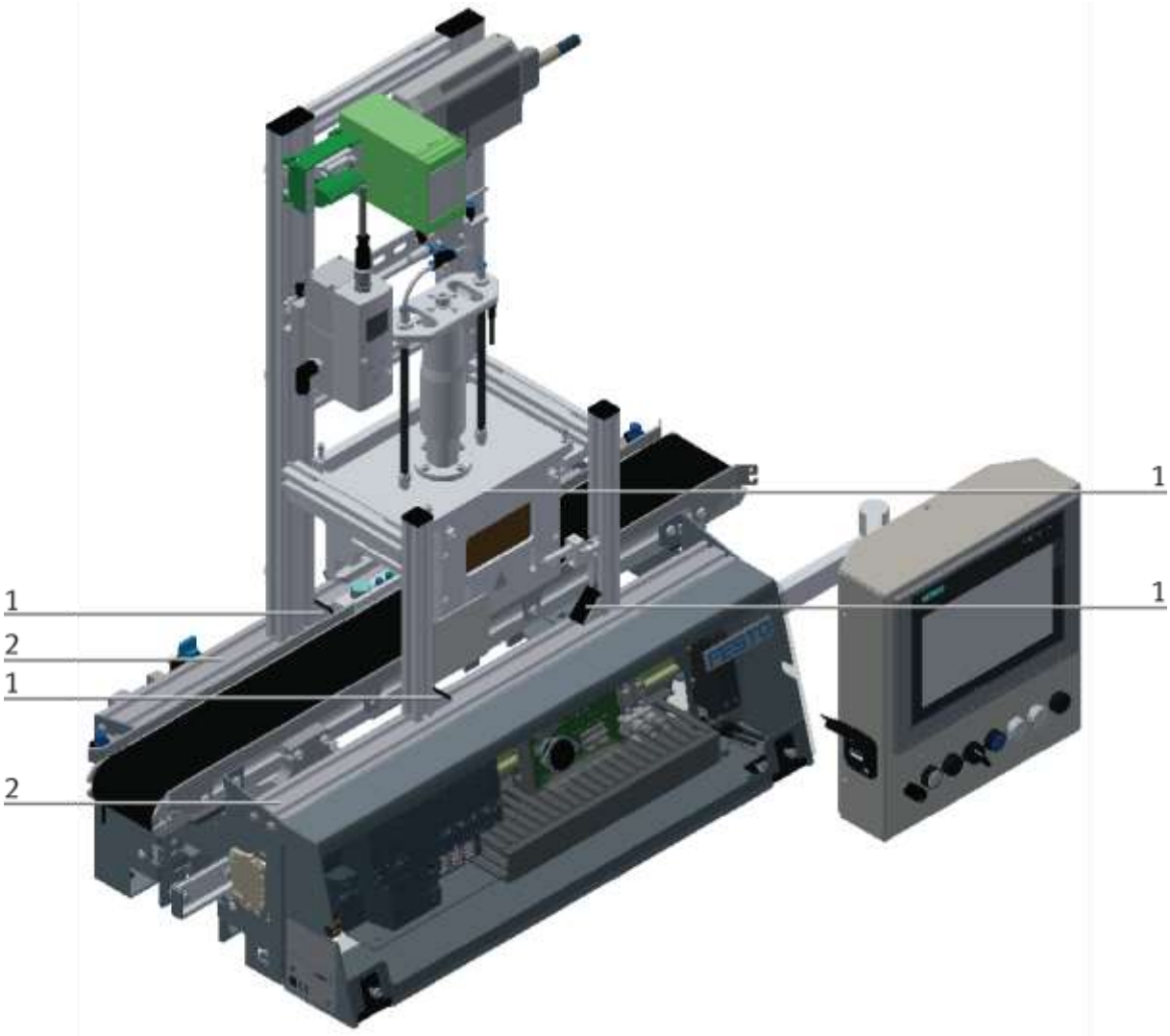



How to put on the CP application module / illustration similar

| 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

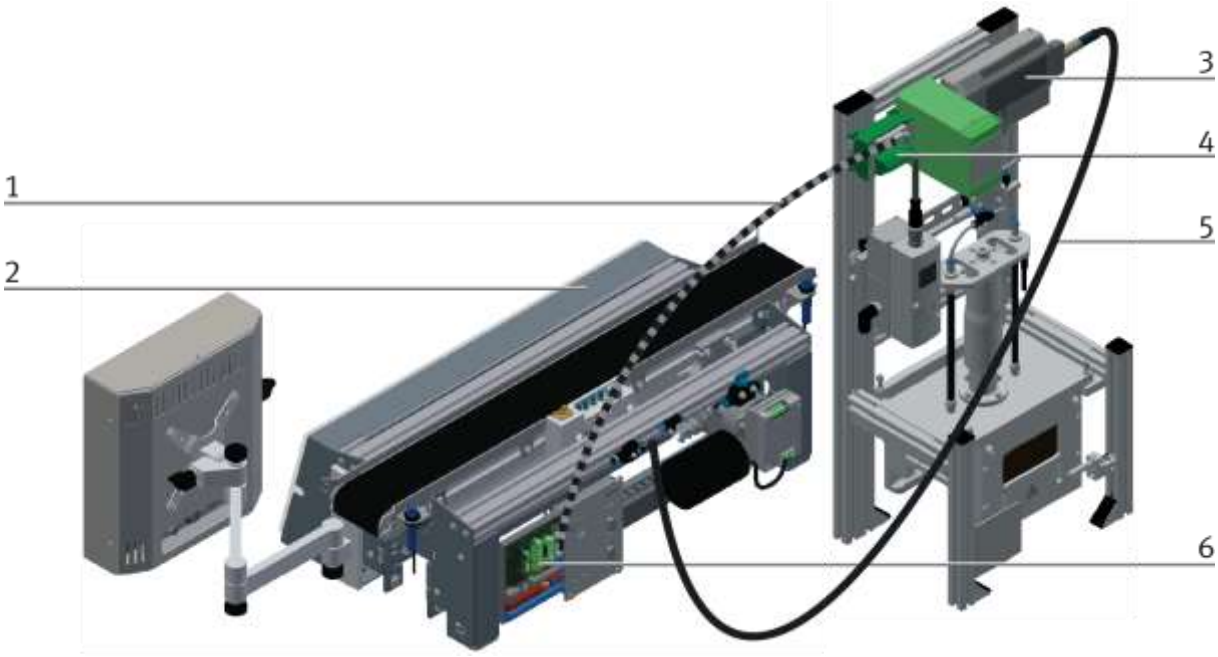
| Position | Description |
|---|---|
| 1 | CP application module: mounting bracket with cover |
| 2 | basic module CP Lab Conveyor: cross profile |

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

| | NOTE |
|---|---|
| | 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! |

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.



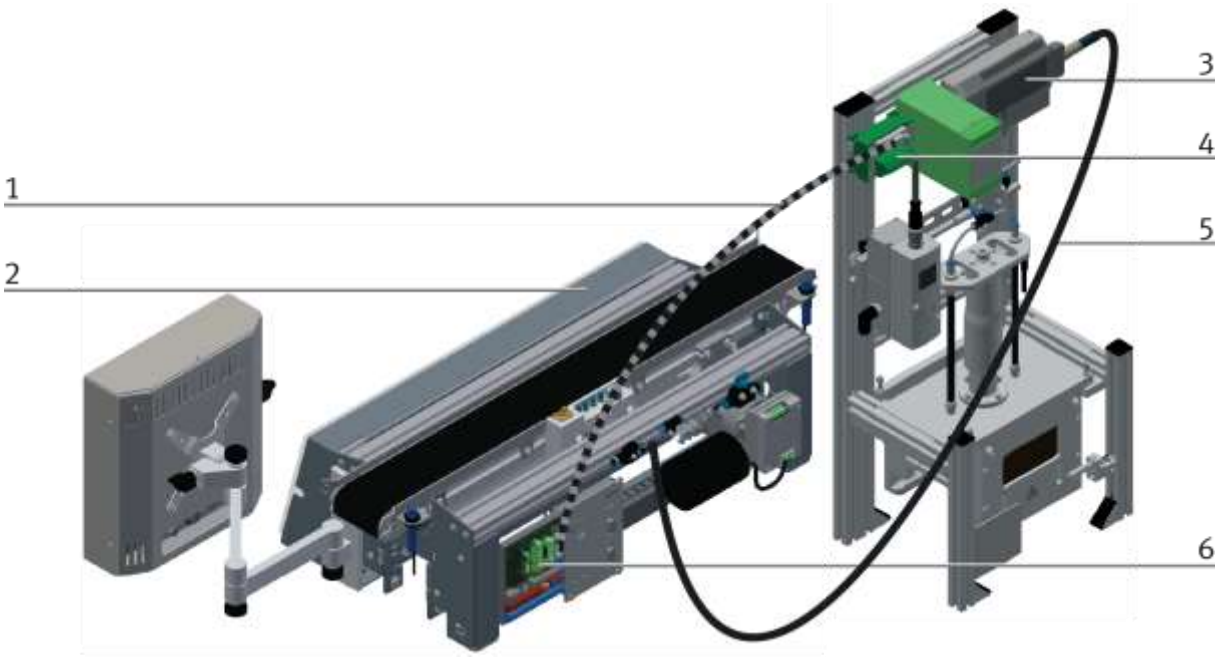

Electrical connections / illustration similar

| Position | Description |
|---|---|
| 1 | connecting cable with15-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.

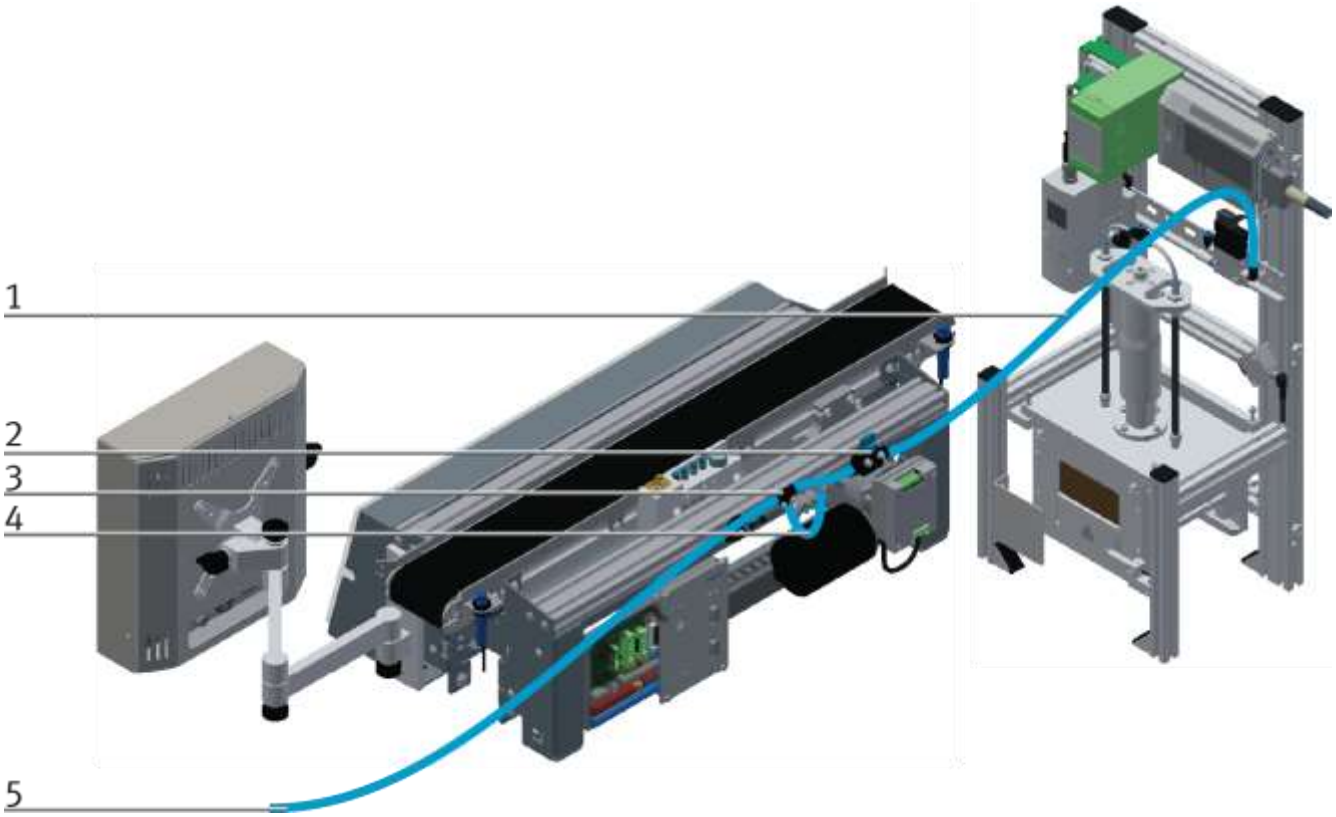



Electrical connections / illustration similar

| Position | Description |
|---|---|
| 1 | connecting cable with15-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) |

### 8.4.3 Pneumatic connection from application modules (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

### 8.5 Electrical Commissioning

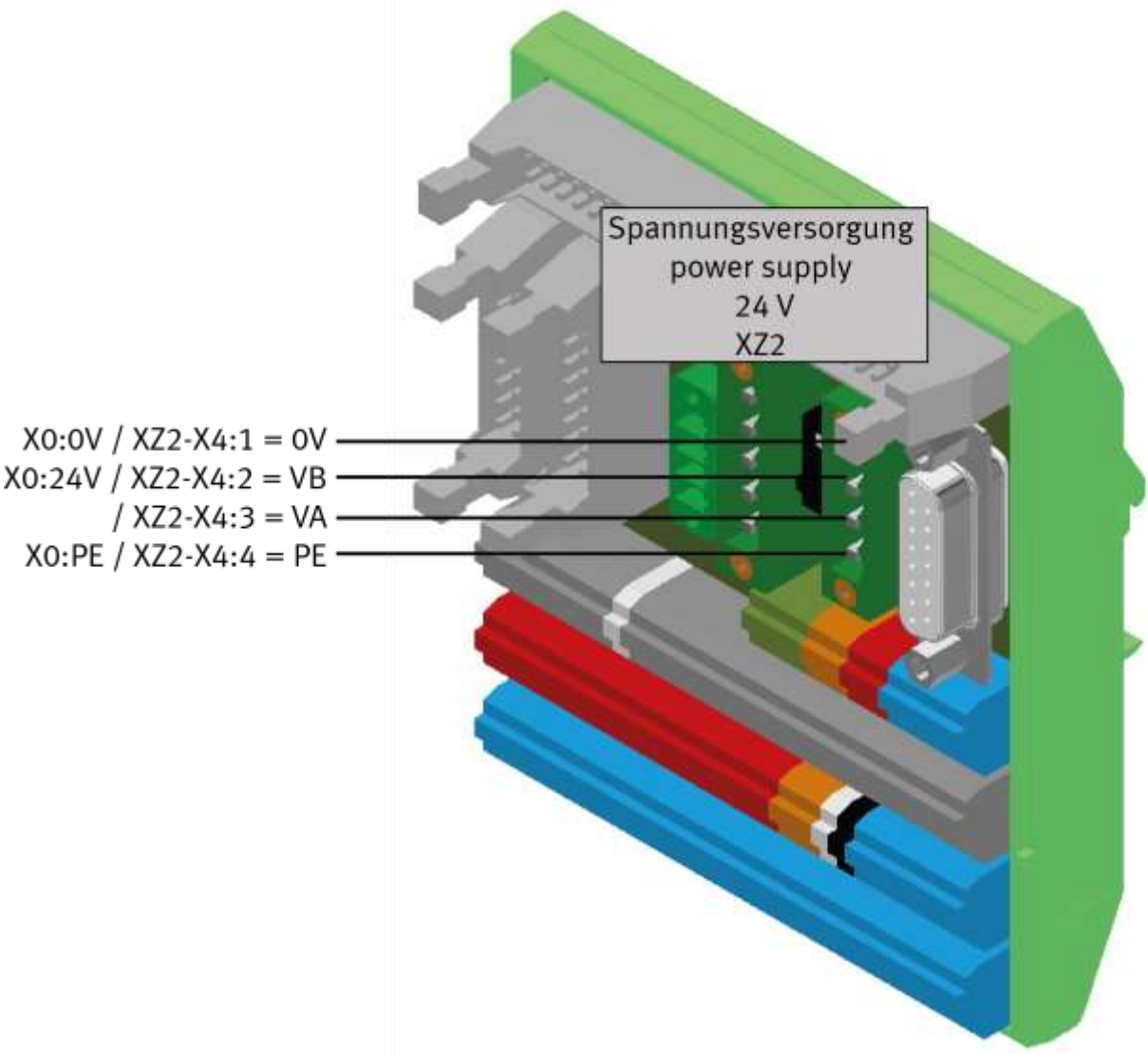
Now the CP Lab conveyor has to be supplied with electric power (24V). The external power supply has to be connected as follows:

0V to XZ2 clamp 1

24V to XZ2 clamp 2

PE to XZ2 clamp 4

The appliances are connected to the other corresponding clamps.




Wiring the CP Lab conveyor / illustration similar

### 8.5.1 Modus switch

Independent if the Festo Didactic IO-Link-DA-Interface is used as IO-Link-Device or an field bus node, the wiring of the I-Port-interface hast to be changed. This is done by the circuit board:
Switch position:
Lower position 1=CTEU: A field bus node can be set on the Festo Didactic IO-Link-DA-Interface.
Upper position 2= IO-Link: The Festo Didactic IO-Link-DA-Interface is used as an IO-Link-device.

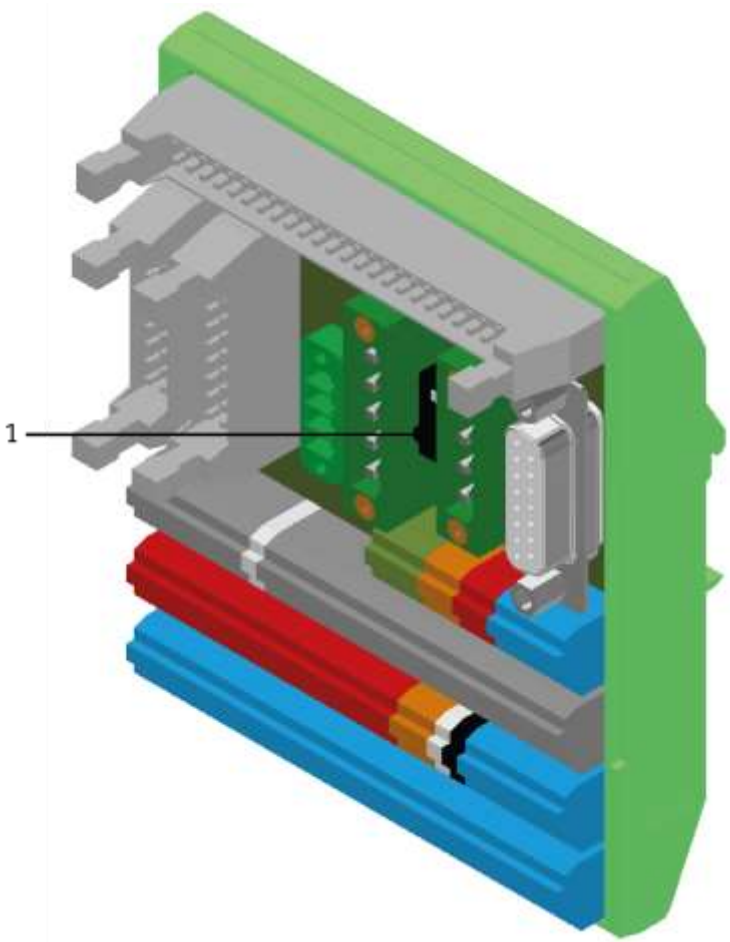



illustration similar

### 8.5.2 Off Button system

The touch panel (option) is provided with an OFF button actuator. With a 5 pole cable, the OFF button is connected to the power supply XZ1.

The voltage (24VDC) is supplied to the system with the clamp XZ1 from an external power supply unit. As a permanent positive (24VB), this voltage is then lead into the touch panel with the M12 cable. In the touch panel, the contact of the OFF button connects the switched positive (24VNA) with 24VB. That means, if you press the OFF button, the 24VNA will be separated from 24VB as well as all other objects at clamp XZ1 supplied by 24VNA.

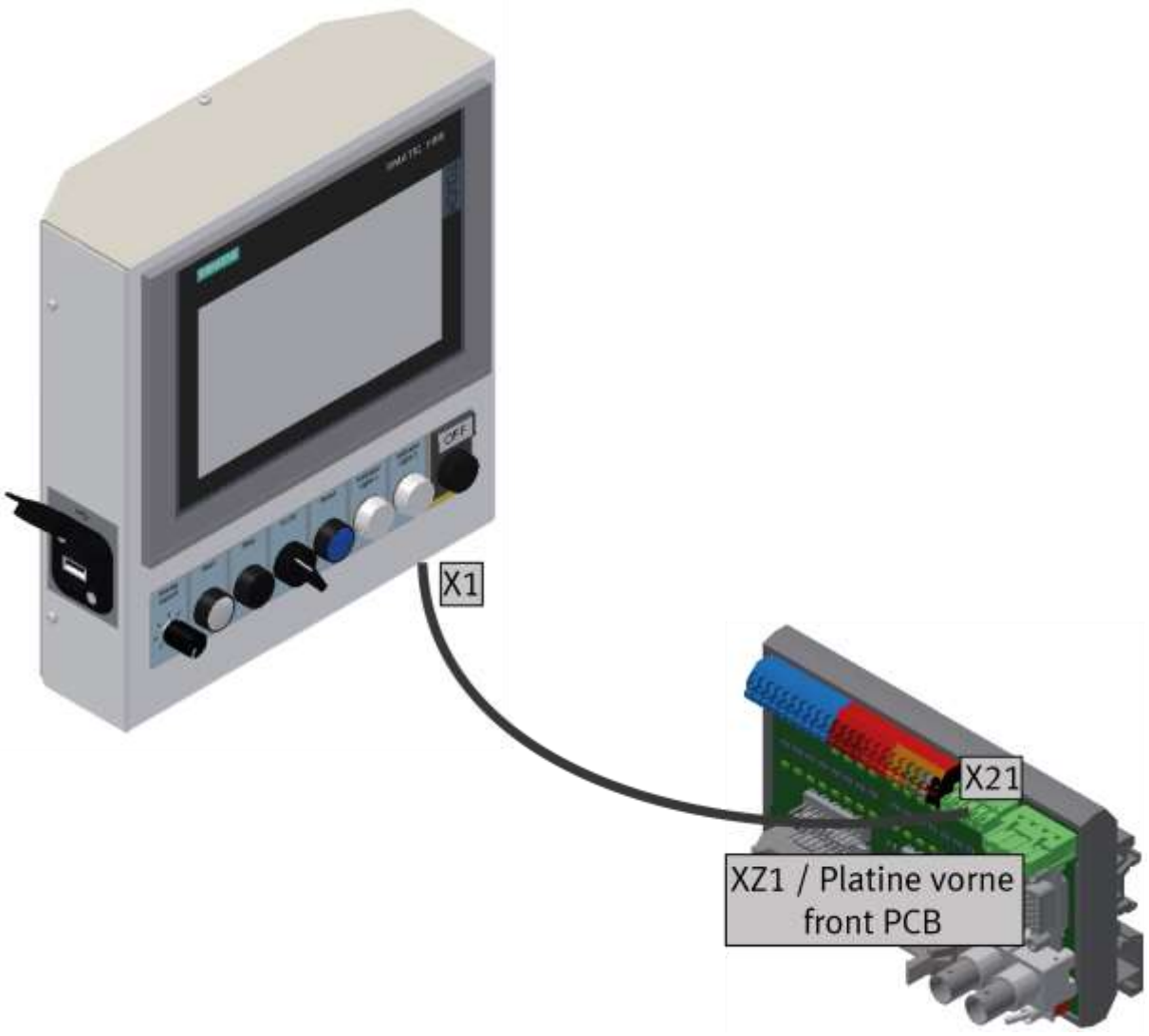



illustration similar

### 8.5.3 IN/Outputs

#### Description Interface Inputs

| Name | Clamp at ET200 SP | SysLink cable | SysLink plug |
|---|---|---|---|
| Application IN0 | KF2 / clamp: 1 (I0) | WG21 / GYPk | XG2: 1 |
| Application IN1 | KF2 / clamp: 2 (I1) | WG21 / RDBU | XG2: 2 |
| Application IN2 | KF2 / clamp: 3 (I2) | WG21 / WHGN | XG2: 3 |
| Application IN3 | KF2 / clamp: 4 (I3) | WG21 / BNGN | XG2: 4 |
| Application IN4 | KF2 / clamp: 5 (I4) | WG21 / WHYE | XG2: 5 |
| Application IN5 | KF2 / clamp: 6 (I5) | WG21 / YEBN | XG2: 6 |
| Application IN6 | KF2 / clamp: 7 (I6) | WG21 / WHGY | XG2: 7 |
| Application IN7 | KF2 / clamp: 8 (I7) | WG21 / GYBN | XG2: 8 |

#### Description Interface Outputs

| Name | Clamp at ET200 SP | SysLink cable | SysLink plug |
|---|---|---|---|
| Application OUT0 | KF4 / clamp: 1 (O0) | WG21 / WH | XG4: 1 |
| Application OUT1 | KF4 / clamp: 2 (01) | WG21 / BN | XG4: 2 |
| Application OUT2 | KF4 / clamp: 3 (02) | WG21 / GN | XG4: 3 |
| Application OUT3 | KF4 / clamp: 4 (03) | WG21 / YE | XG4: 4 |
| Application OUT4 | KF4 / clamp: 5 (04) | WG21 / GY | XG4: 5 |
| Application OUT5 | KF4 / clamp: 6 (05) | WG21 / PK | XG4: 6 |
| Application OUT6 | KF4 / clamp: 7 (06) | WG21 / BU | XG4: 7 |
| Application OUT7 | KF4 / clamp: 8 (07) | WG21 / RD | XG4: 8 |

#### Description Interface Voltage

| Name | SysLink cable | SysLink plug |
|---|---|---|
| 24VB | WG21 / WHPK | XZ1/X11: VB |
| 0VB | WG21 / WHBU | XZ1/X11: 0 XZ1/X11: 0V |
| 24VA | WG21 / BK | XZ1/X11: VA |
| 0VA | WG21 / PKBN | XZ1/X11: 0V |
| 0VA | WG21 / PUR | XZ1/X11: 0V |

## I/O module

I/O module XD1 / illustration similar

| XZ1 out | XD1 in | XD1 out | To application |
|---|---|---|---|
| X11 - VB | XG1: 24VB | XJ1:22 | APP_24VB |
| X11: 0V | XG1: 0VB | XJ1:23 | APP_24VB |
| X11: VA | XG1: 24VA | XJ1:10 | APP_24VB |
| X11: 0V | XG1: 0VA | XJ1:11+12 | APP_24VB |
| X14:1 | XG1:1 / I0 | XJ1:13 | APP_DI0 |
| X14:2 | XG1:2 / I1 | XJ1:14 | APP_DI1 |
| X14:3 | XG1:3 / I2 | XJ1:15 | APP_DI2 |
| X14:4 | XG1:4 / I3 | XJ1:16 | APP_DI3 |
| X14:5 | XG1:5 / I4 | XJ1:17 | APP_DI4 |
| X14:6 | XG1:6 / I5 | XJ1:18 | APP_DI5 |
| X14:7 | XG1:7 / I6 | XJ1:19 | APP_DI6 |
| X14:8 | XG1:8 / I7 | XJ1:20 | APP_DI7 |
| X15:1 | XG1:9 / O0 | XJ1:1 | APP_DO0 |
| X15:2 | XG1:10 / O1 | XJ1:2 | APP_DO1 |
| X15:3 | XG1:11 / O2 | XJ1:3 | APP_DO2 |
| X15:4 | XG1:12 / O3 | XJ1:4 | APP_DO3 |
| X15:5 | XG1:13 / O4 | XJ1:5 | APP_DO4 |
| X15:6 | XG1:14 / O5 | XJ1:6 | APP_DO5 |
| X15:7 | XG1:15 / O6 | XJ1:7 | APP_DO6 |
| X15:8 | XG1:16 / O7 | XJ1:8 | APP_DO7 |

## 8.6 Commissioning

**WARNING**

- **Danger of being pulled in at the conveyors**
  - When the automatic mode starts, the belts of the conveyor belts start to move, creating a risk of being pulled in.
  - When starting, do not stand directly at the ends of the belt or hold on to them, keep enough distance.
  - Failure to heed the information given can lead to injuries.

For the CP Lab conveyor, an initial start-up has been made ex works.
Please follow the following instructions in order to be able to work with CP Lab conveyor as well as with a possibly present application:

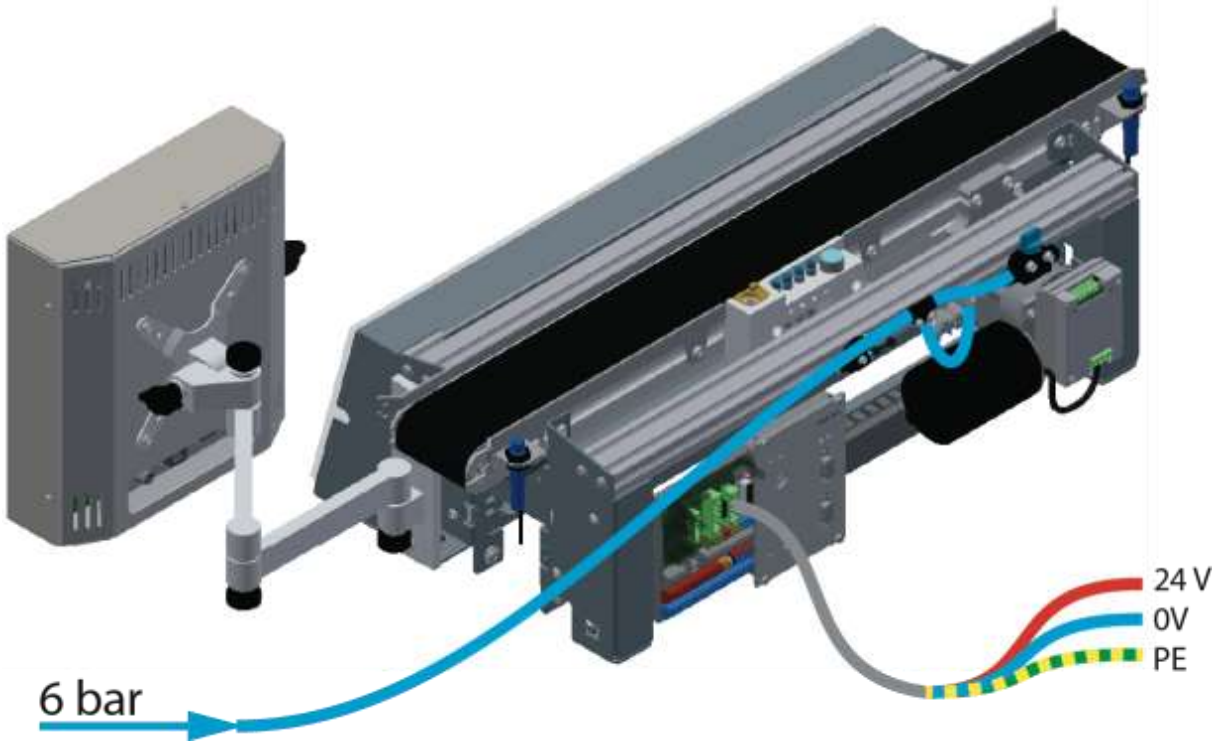



illustration similar

1. CP-L-CONV with 24 V DC motor: Connect the power supply 230 V AC for the power supply unit and connect the 24 V supply cable of the module.
   CP-L-CONV with 230 V AC motor and G120 Edutrainer: Connect the the supply unit Edutrainer with 230 V. Connect the 24 V supply calbe of the module and connect the the supply cable of the G120.
   CP-L-CONV with 400 V AC motor and G120 Edutrainer: Connect the the supply unit Edutrainer with 400 V. Connect the 24 V supply calbe of the module and connect the the supply cable of the G120.

2. The power supply is correctly connected to the CP Lab conveyor, but not yet switched on yet.
3. The CP Lab conveyor is supplied with approx. 6 bar compressed air. When commissioning for the first time, make sure to increase the pressure slowly. This prevents unpredictable events.
4. All EMERGENCY STOP signaling devices (pushbutton, door contact, light barriers, etc.) are not actuated or activated and unlocked.
5. Check any installed application for visual damage and repair if necessary
6. Remove workpieces
7. For CP-L-CONV with 24 V DC motor: Switch on the power supply to the power supply unit.
   For CP-L-CONV with 230 V AC motor and G120 Edutrainer: Switch on the Edutrainer and G120 supply unit.
   For CP-L-CONV with 400 V AC motor and G120 Edutrainer: Switch on the Edutrainer and G120 supply unit.
8. The HMI (touch panel) is started and starts up
9. Illuminated button Q1 on the control panel flashes
10. Press illuminated button Q1
11. Q1 illuminated pushbutton lights up.
12. Acknowledge the error message on the HMI
13. On the HMI, select the straightening mode and press the straightening button
14. Select Automatic on the HMI and press the Automatic button

# 9 Operation

The operation is explained with the help of an example. There might be deviations with other applications.

## 9.1 Starting the station

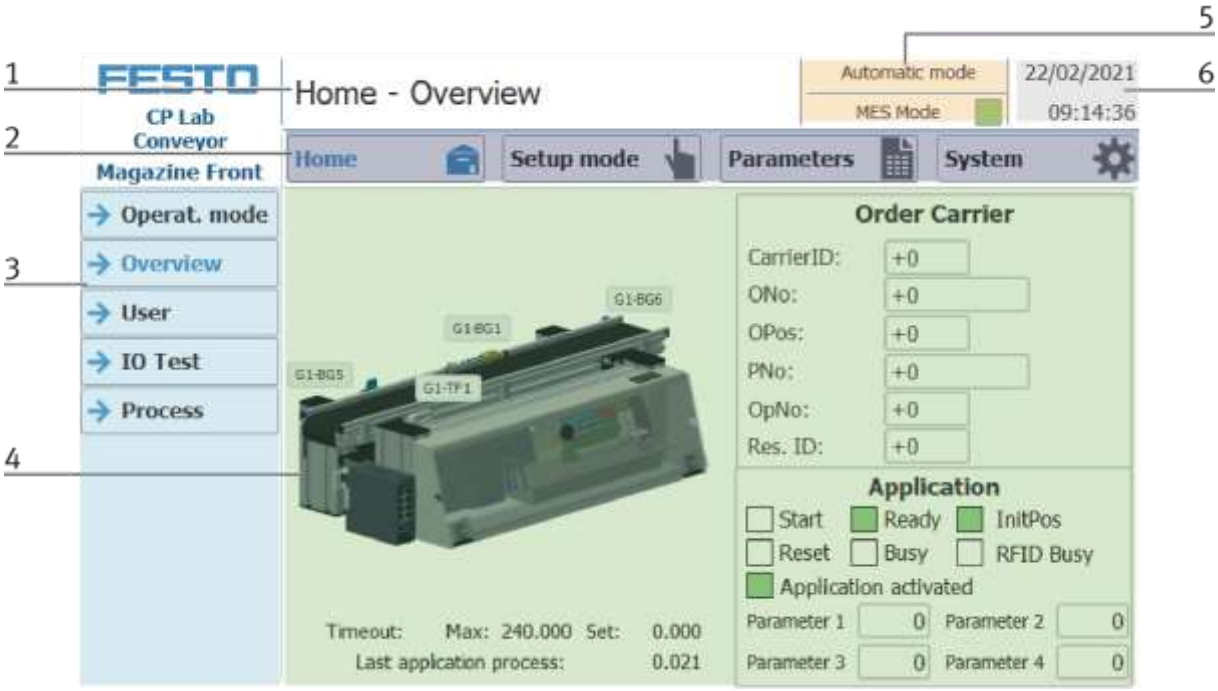
An initial commissioning has already been carried out ex works for the station.

Follow these steps to work with the station and the applications:

1. Establish mains supply 230 V AC.
2. The system is supplied with approx. 6 bar compressed air. When commissioning for the first time, make sure to increase the pressure slowly. (Prevents unpredictable events).
3. Now you can work with the system.

### 9.2 Menu architecture from operation panel

This description serves as an example; it is made with a base module and an application module magazine. Some of the functions are not available if there is no or other application module mounted.




| Position | Description |
|---|---|
| 1 | Description of menu (main or submenu) OR in case of an active Error or an error message, this field is also for announcement |
| 2 | Main menu (always shown the same)<br>Home:<br>Here the module can be controlled, the mode (default / MES) can be selected, the automatic or the set-up mode can also be operated.<br>Setup:<br>Here, the application can be operated manually in setup mode<br>Parameter:<br>The parameters of the application are set here, a simulation can be started, the transitions can be defined, or the tape can be set<br>System:<br>Here the system parameters such as language, time, etc. are set |
| 3 | Submenu<br>Changing content, depending on the main menu |
| 4 | Changing content, depending on the main or submenu |
| 5 | Announcement of operation mode or mode (MES or default) |
| 6 | Announcement of actual date and time |

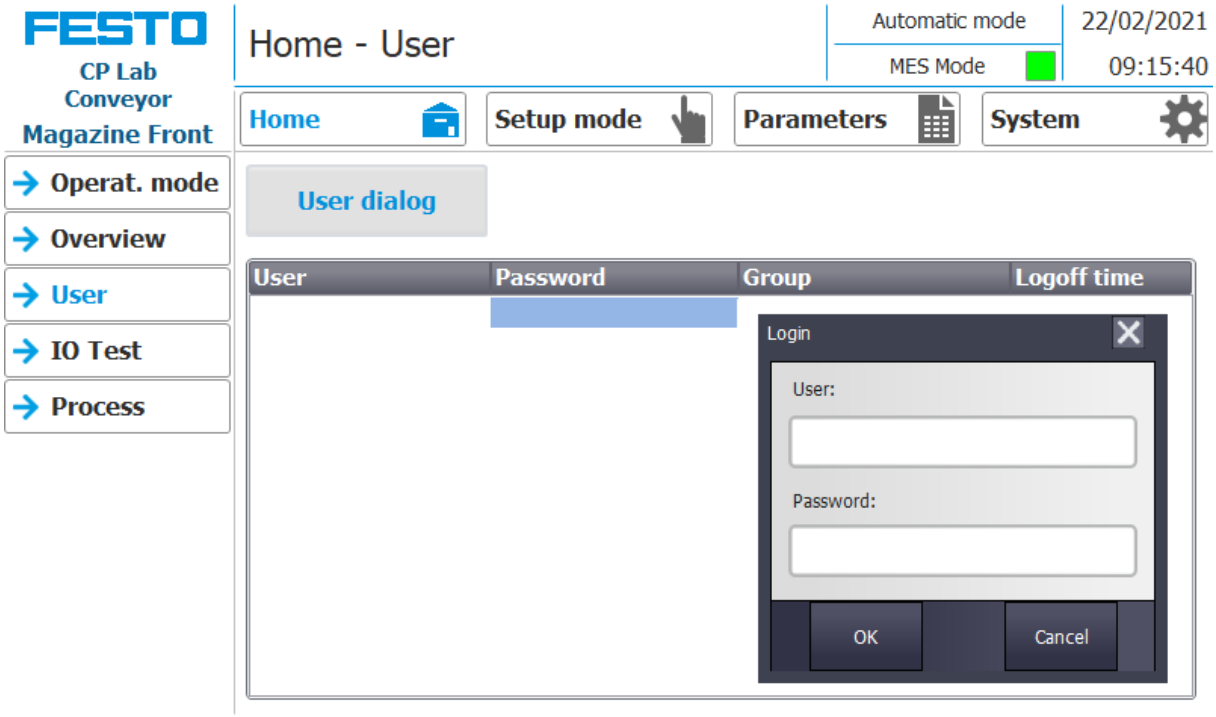
**Log in as an administrator**

There are 2 functions in the operation of the HMI that are only available when the operator logs on to the HMI. These functions are the I/O test in the setup mode and the user area.

If one of the functions has been logged in, the other function is also available without the user having to log in again.

The process is explained using the user function as an example.


1. The following window opens with a click on the User dialog button.

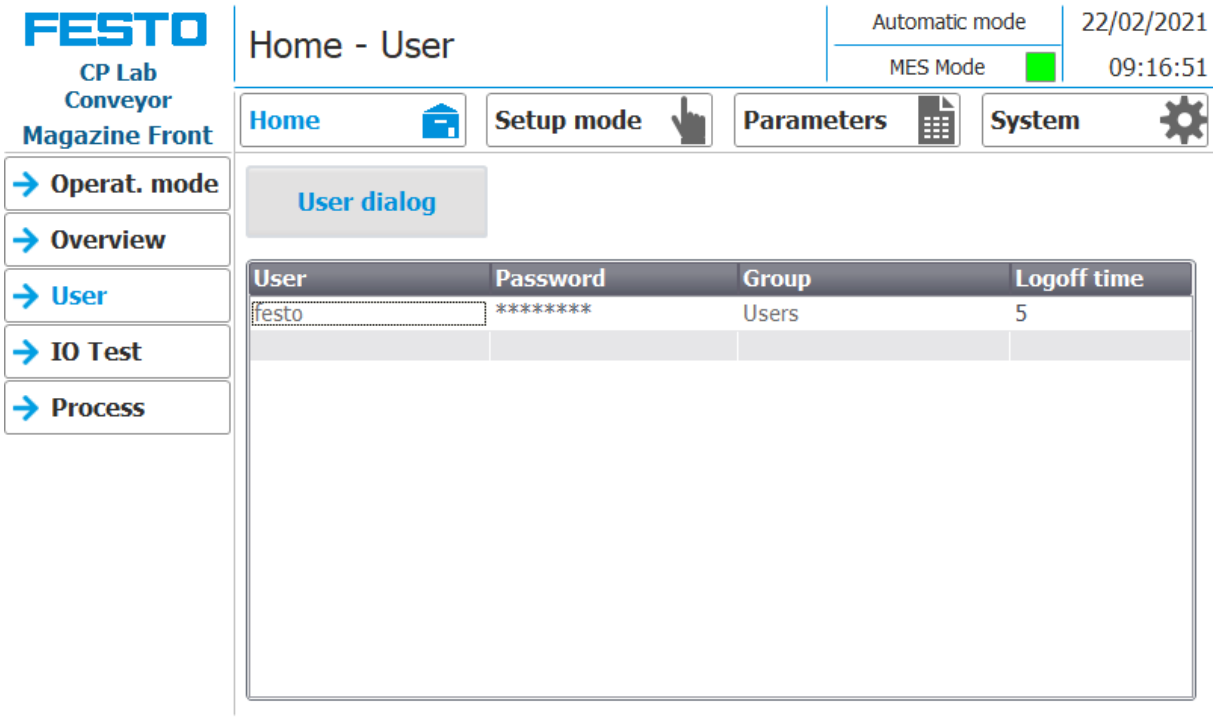



2. If you click in the User and / or Password fields, the input window opens and the user data can be entered.


3. Here the user data can be entered with the return key the entry is confirmed.

User: festo

Password: festo




4. The user is now logged in as "Administrator" and the functions User and I / O test are available.

### 9.3 Operation modes

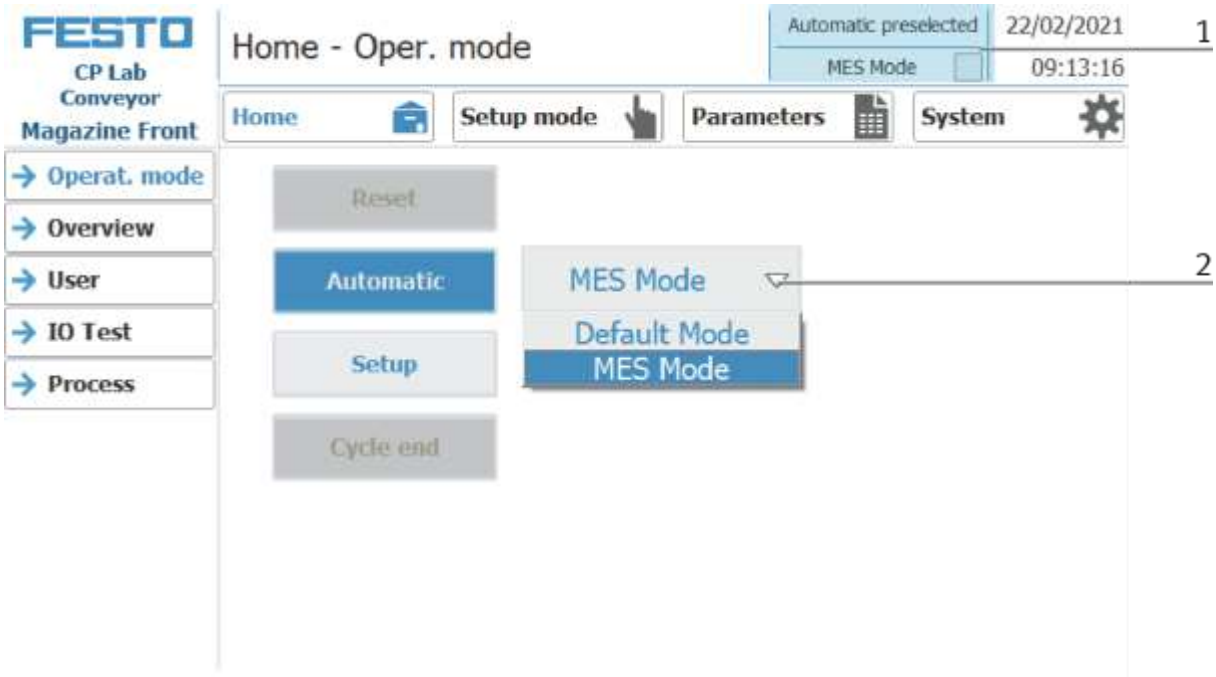
The following operation modes are available

- Reset
  The station is moved to its home position
- Setup
  The station runs in set-up mode, actuators can be controlled and monitored
- Automatic
  The station runs in automatic mode, all processes run automatically, no actuators can be controlled.
  There are two modes in the automatic mode: the default mode and the MES mode.

#### 9.3.1 Mode

The mode can be set between MES and default, there are two ways to set it.

1. Clicking on the blue marked area opens a pop-up window in which the operating mode can be selected. Other functions are also integrated in the pop-up.
2. The mode can also be set on the Home / Operating mode page.




Possibilities of mode

- MES mode
  In the MES mode, all processes are centrally started, executed and monitored by the MES software. All stations must be set to MES mode and automatic start.
- Default Mode
  The automatic sequence is not centrally controlled in the default mode, all information from the transition tables (see chapter "Schematic process flow") is read and processed separately at each station.

### Display MES Mode

Various states are displayed in the Home operating mode on the Overview page.


| Position | Description |
|---|---|
| 1 | Change to sub menu Overview |
| 2 | Display of various information about the station |
| 3 | Display operation state MES is active |
| 4 | Display of the order data of the current carrier |
| 5 | Display of various functions (marked green if active) and its parameters |

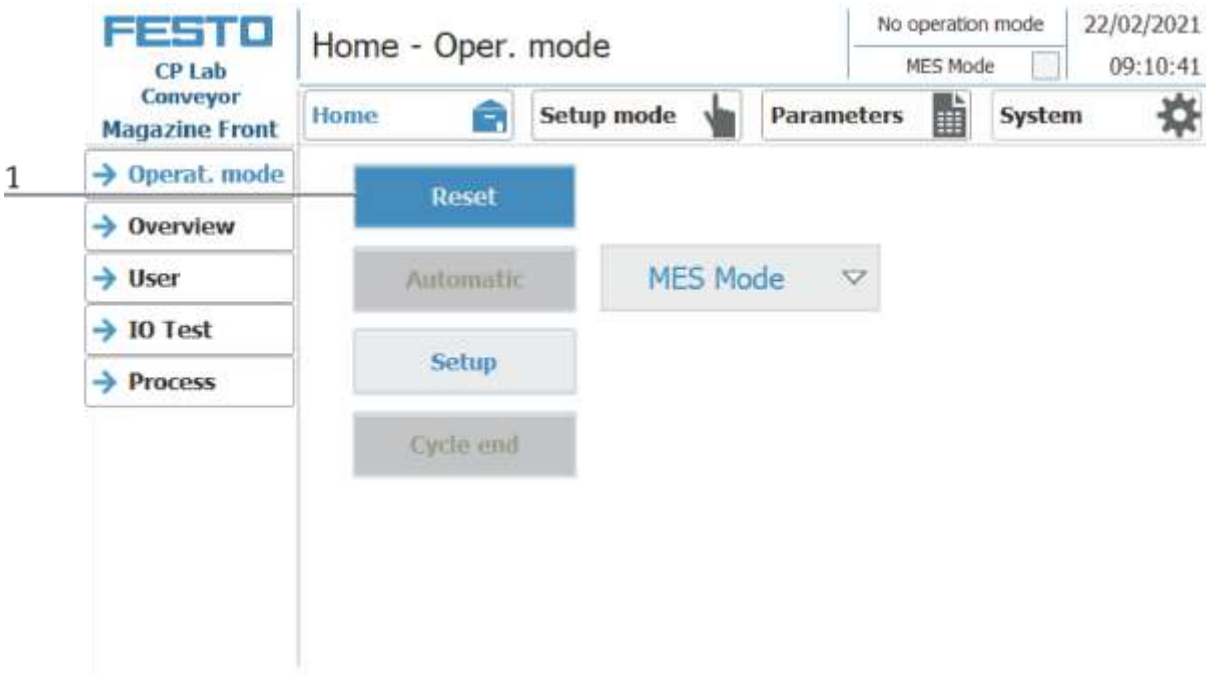
### Display Default mode

Various states are displayed in the Home operating mode on the Overview page.


| Position | Description |
|---|---|
| 1 | Change to sub menu Overview |
| 2 | Display of various information about the station |
| 3 | Display default mode is active |
| 4 | Display of Order carrier (RFID statecode) |
| 5 | Display of various functions (marked green if active) and its parameters |

### 9.3.2 Operation mode Reset

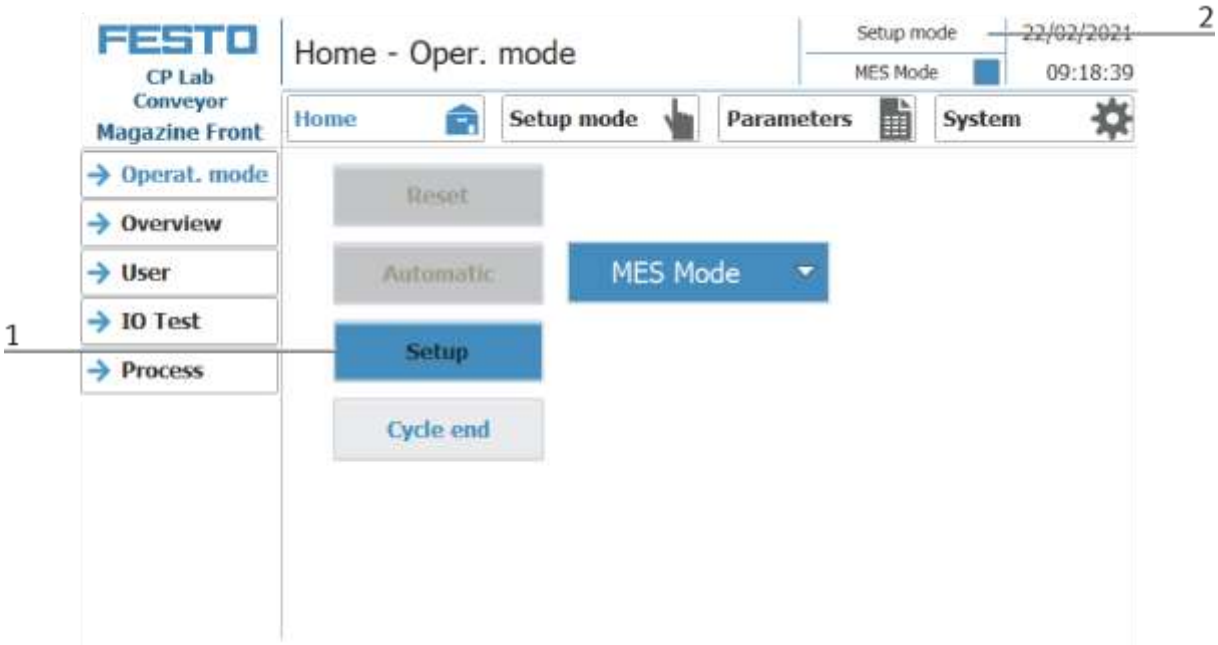
In the operation mode Reset, the station is moved to its home position.




1. After switching on the station, the Reset button flashes, press this to move the station into its home position.
2. The operating mode Reset is displayed here during the process.

### 9.3.3 Operation mode Setup

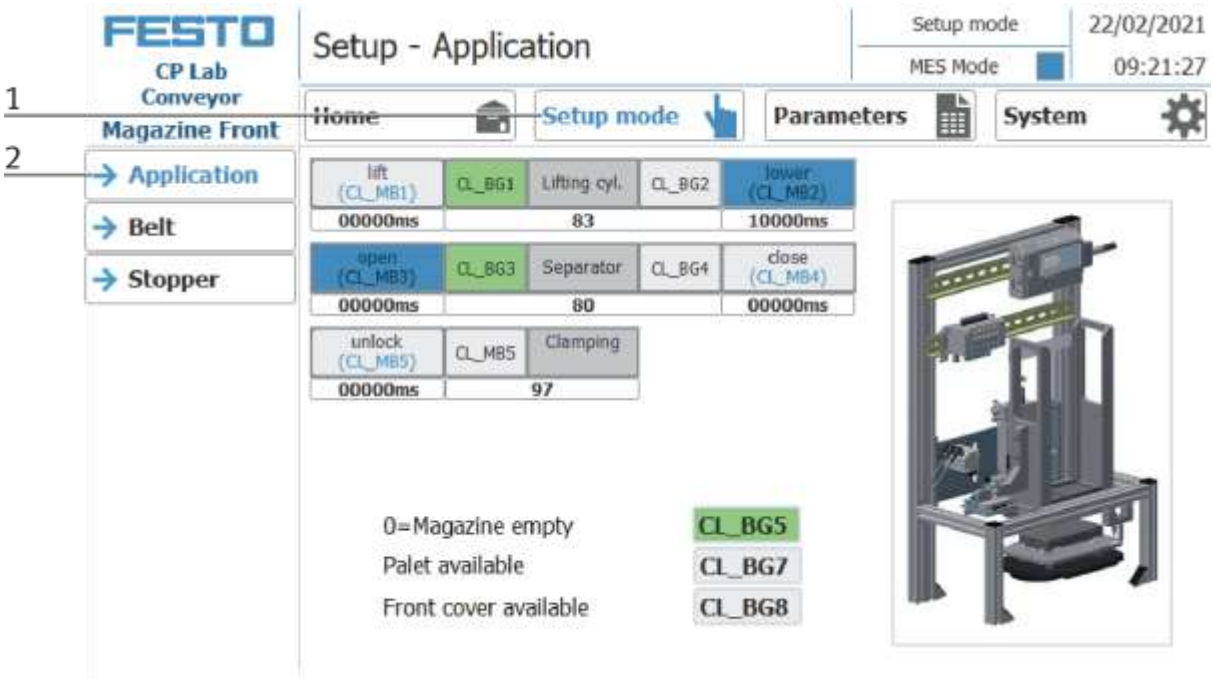
In operation mode Setup, all sensors can be displayed and actuators can be controlled from the HMI. This is used for troubleshooting or during commissioning.

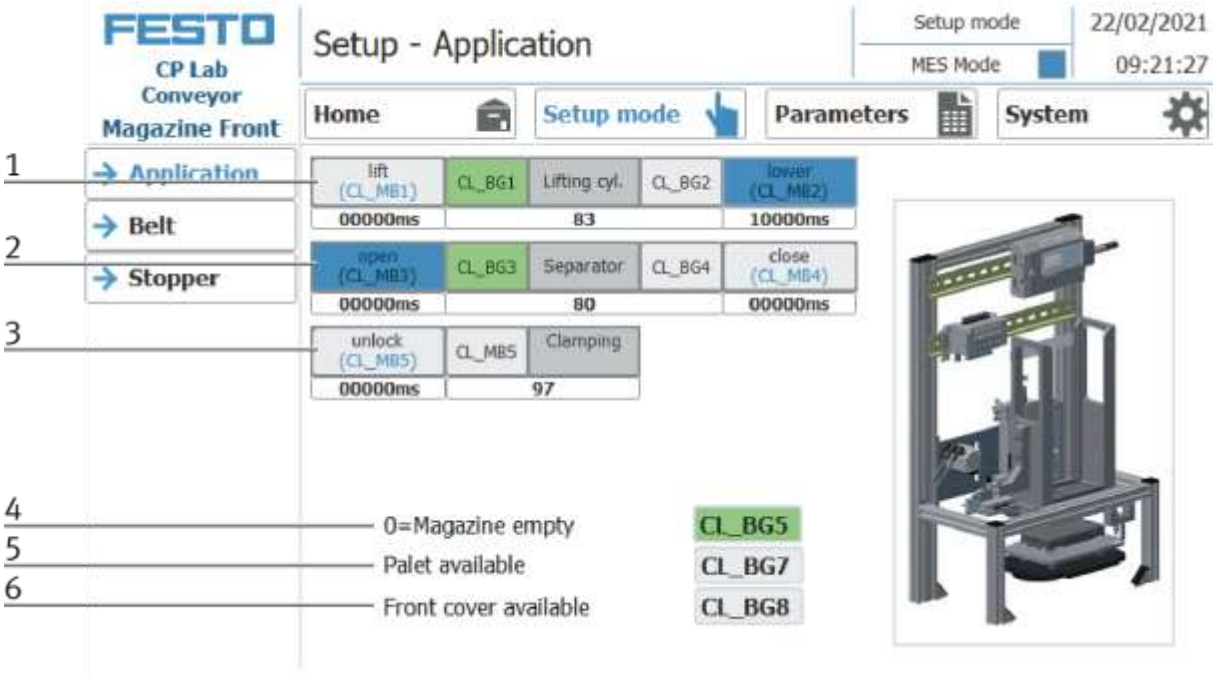



1. Automatic mode is not active and the Setup button is not greyed out - press the Setup button to activate the Setup mode.
2. The current operation mode is displayed here

**Set up application**

1. Click the Setup mode button
2. Select application - the currently installed application is always displayed here. In the example, this would be the application module magazine. The content of this page changes depending on the installed application module. The description of the functions is described in the operating instructions for the application modules. Here the magazine is used as an example.



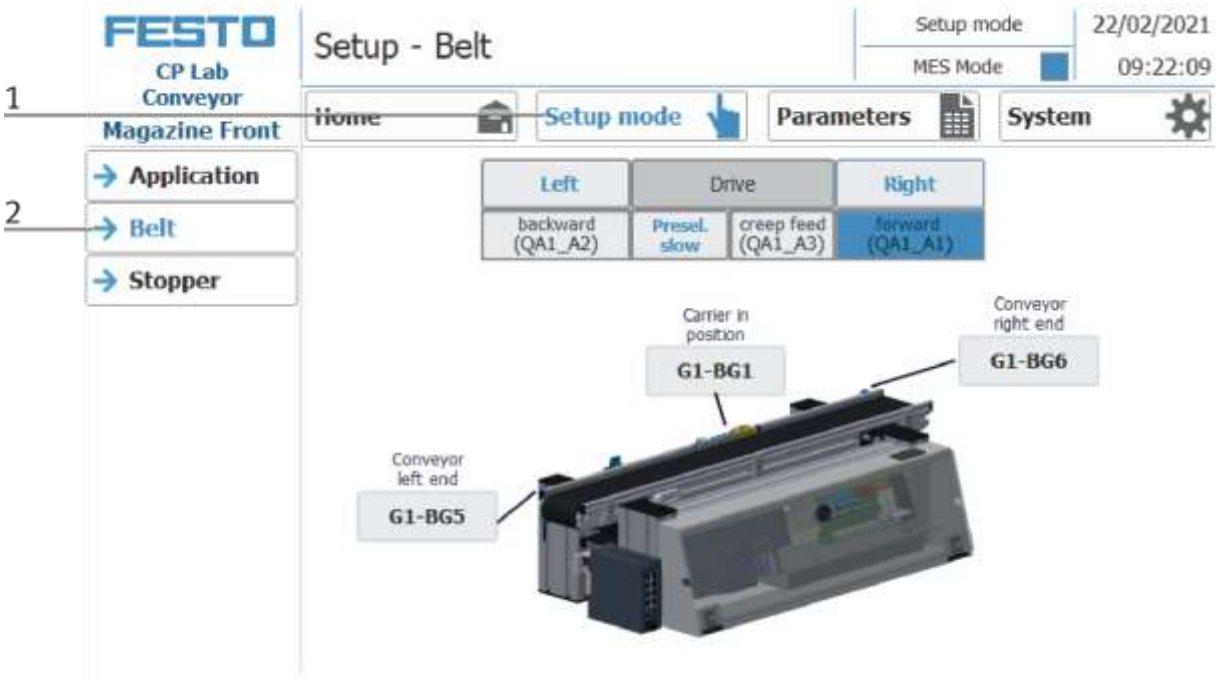


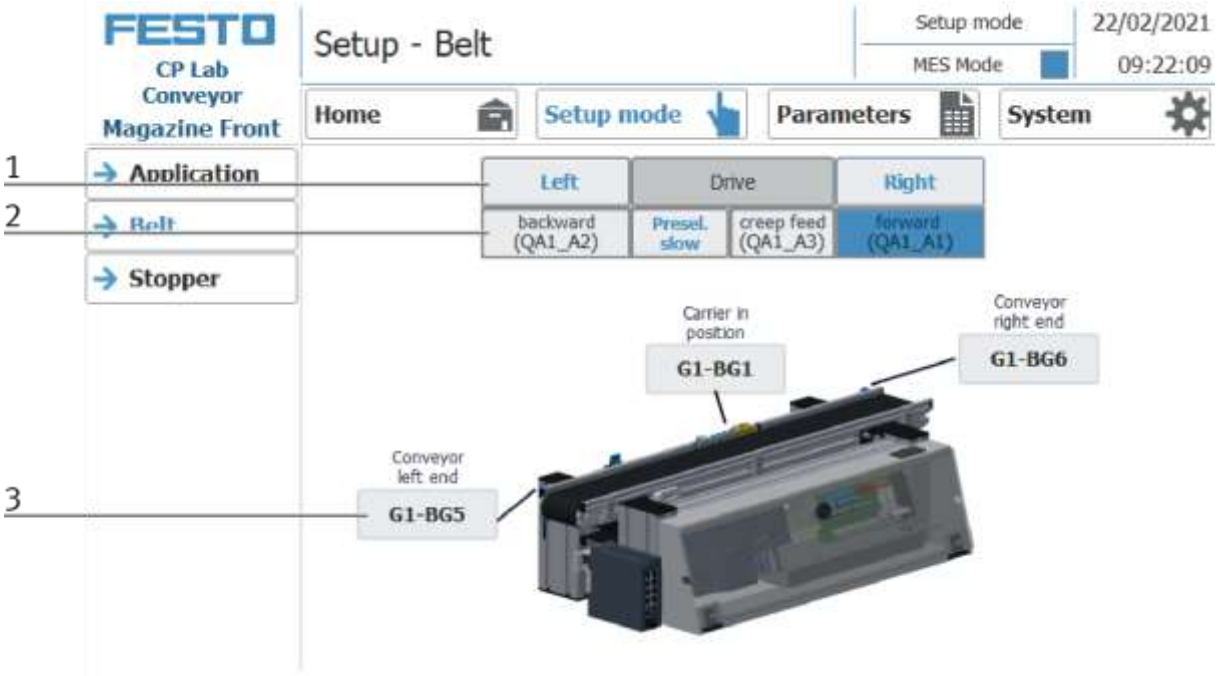

The functions can be activated in the Setup menu under Application by clicking the buttons.

| Position | Description |
|---|---|
| 1 | Move lifting cylinder (Z-axis)<br>Lift: Move the Z axis up (actuator CL_MB1 is activated, lights up blue when active)<br>CL_BG1: Sensor CL_BG1 Indicator (lights up green when Z axis is up)<br>Lifting cyl: Z axis display<br>CL_BG2: Sensor CL_BG2 indicator (lights up green when Z axis is down)<br>lower: Move the Z axis down (actuator CL_MB2 is activated, lights up blue when active) |
| 2 | Separator<br>open: open the separator (actuator CL_MB3 is activated, lights up blue when active)<br>CL_BG3: Sensor CL_BG3 Indicator (lights up green when separator is opened)<br>Separate: Display separator<br>CL_BG4: Sensor CL_BG4 Indicator (lights up green when separator is closed)<br>Close: close separator (actuator CL_MB4 is activated, lights up blue when active) |
| 3 | Release the clamp<br>Unlock: Unlocking the clamp (actuator CL_MB5 is activated, lights up blue when active)<br>CL_MB5: Indicator (lights up green when clamp is declamped)<br>Clamp: Display Clamp |
| 4 | 0 = Magazine empty: Sensor CL_BG5 Display (lights up green when the magazine is empty) |
| 5 | Palette / front cover available: Sensor CL_BG7 Indicator (lights up green when a pallet with front cover is installed) |
| 6 | Front / back cover available: Sensor CL_BG8 Indicator (lights up green when front / back cover is present) |

**Setup Belt**

1. Click the Setup mode button
2. Select belt - the functions of the conveyor belt are displayed and / or controlled here.

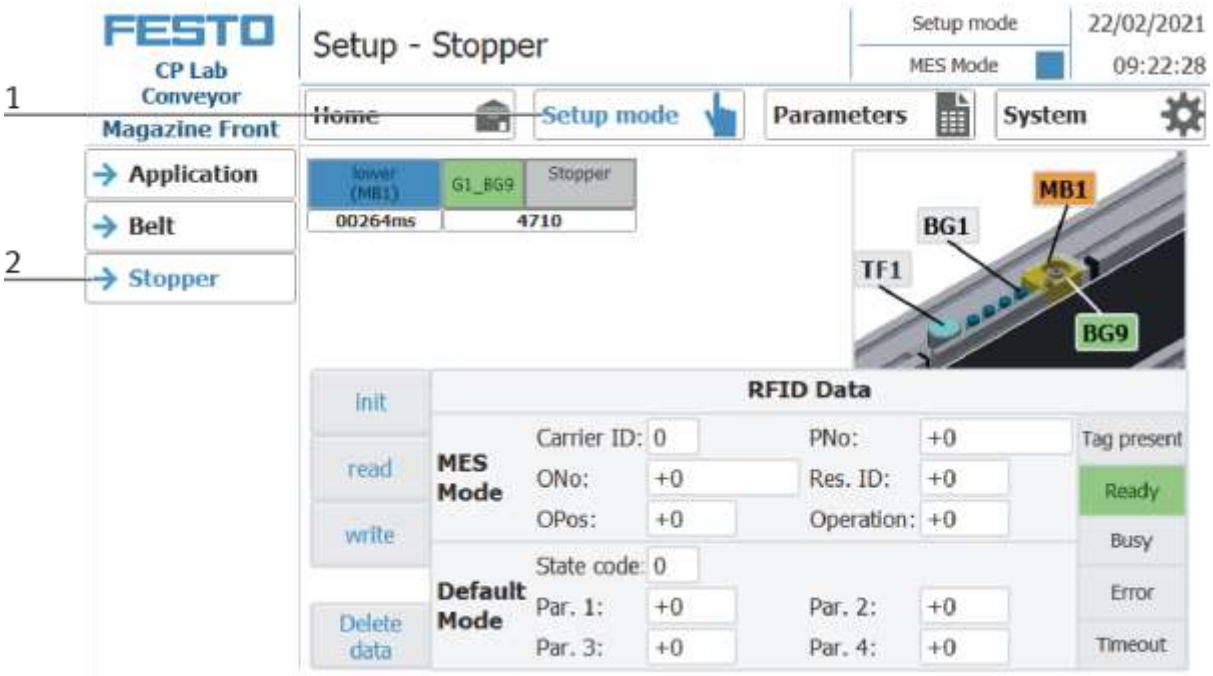


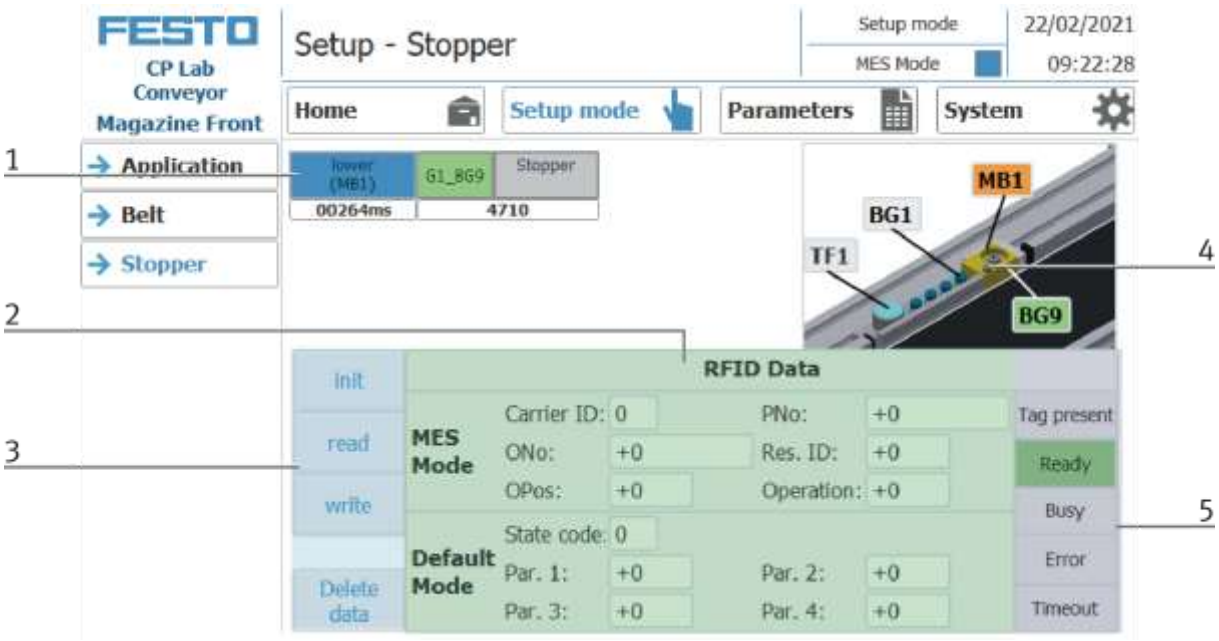



| Position number | description |
|---|---|
| 1 | Run the conveyor left / right<br>Left: conveyor moves counter clockwise to the left<br>Drive: Display conveyor belt<br>Right: conveyor moves clockwise to the right |
| 2 | Backward: Move the conveyor to the left (actuator QA1_A2 is activated, lights up blue when active)<br>Preselection slow: Slowly set the conveyor speed<br>Creep feed: Move the conveyor slowly (actuator QA1_A3 is activated, lights up blue when active)<br>Forward: Move the conveyor to the right (actuator QA1_A1 is activated, lights up blue when active) |
| 3 | Sensor G1-BG5 indicator conveyor left end (lights up green when active)<br>Sensor G1-BG1 indicator conveyor carrier in position (lights up green when active)<br>Sensor G1-BG6 indicator conveyor right end (lights up green when active) |

**Setup Stopper**

1. Click the Setup mode button
2. Select stopper - the functions of the stopper position are displayed and / or controlled here.

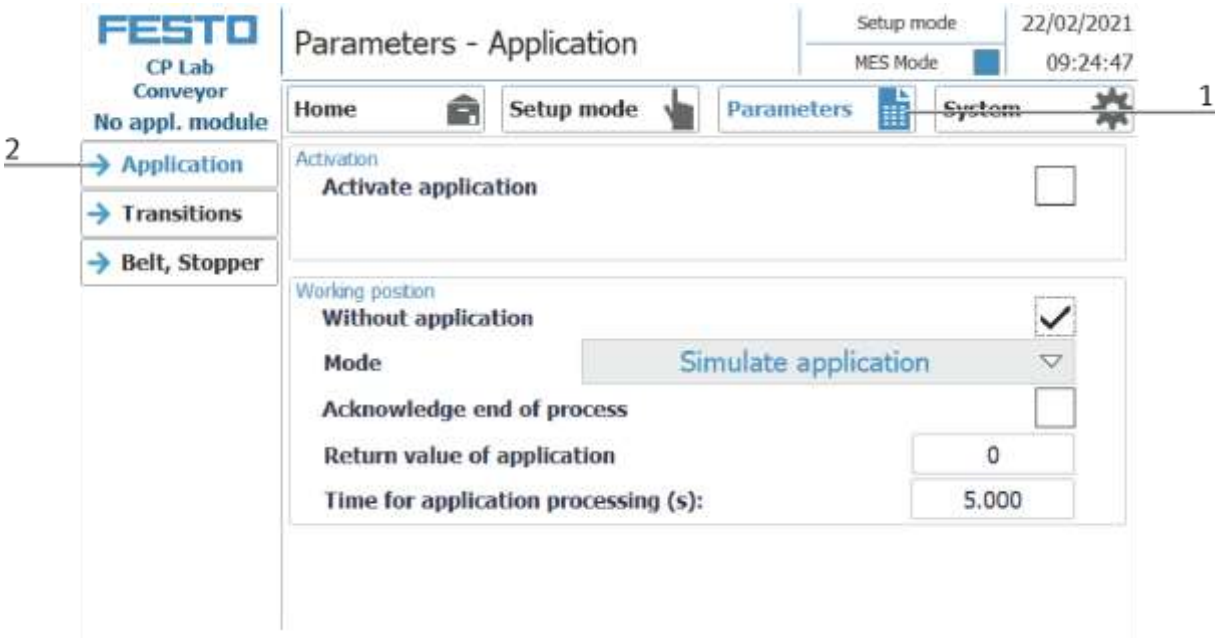


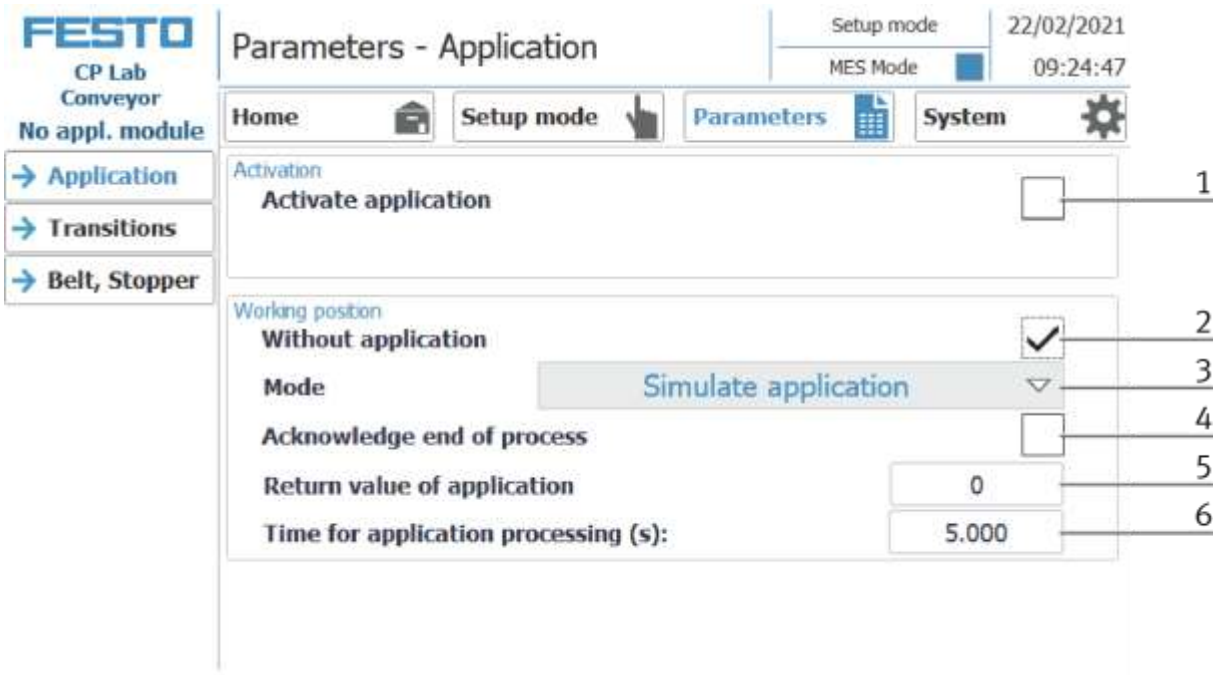



| Position number | description |
|---|---|
| 1 | Move down the stopper<br>Lower: Move stopper down (actuator MB1 is activated, lights up blue when active)<br>G1_BG9: Sensor G1_BG9 Stopper lowered (lit green when active)<br>Stopper: Indicator stopper |
| 2 | RFID area<br>MES Mode: Displays the job data<br>Default Mode: Displays the RFID status |
| 3 | Write and read RFID area<br>Initialize: Set RFID data to zero<br>read: Read RFID data<br>write: Write current data on RFID<br>Delete data: all data in the input mask are deleted - not directly on the RFID (for easier entry) |
| 4 | Range Display of the active sensors (lit green when active) and actuators (lit orange when active) at the stopper |
| 5 | Display of RFID reading status |

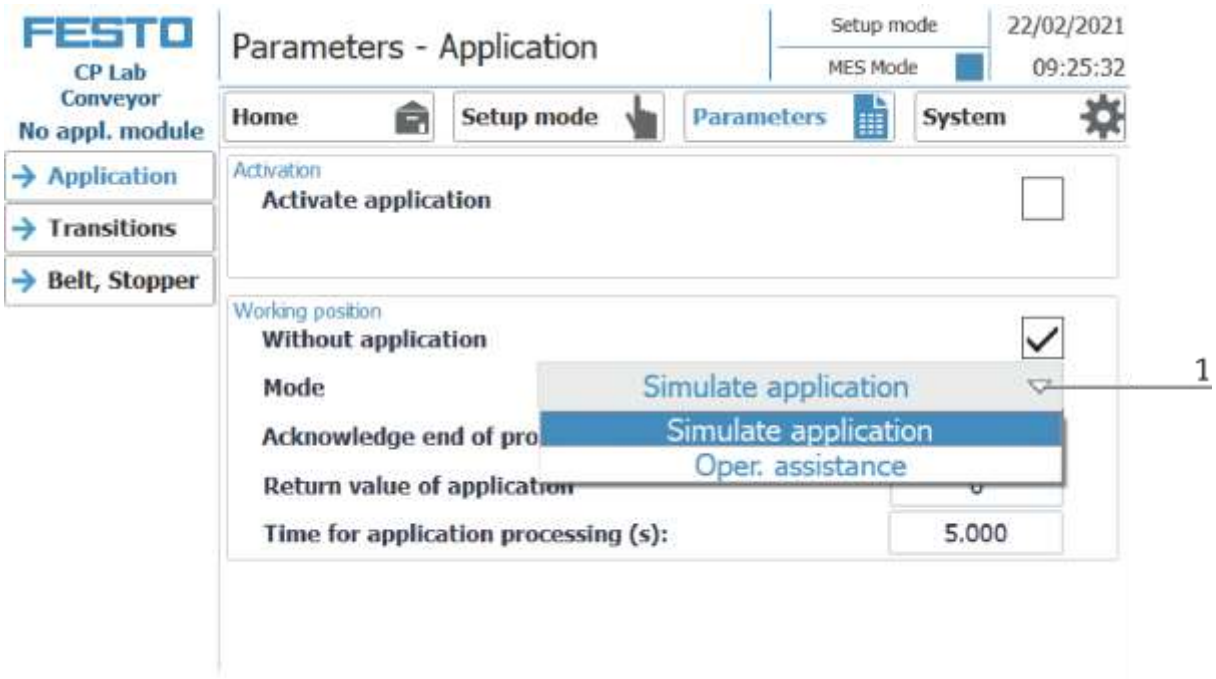
**Set up application parameters**

1. Click on the Parameter button
2. Select application - the parameters of the application can now be set up here.





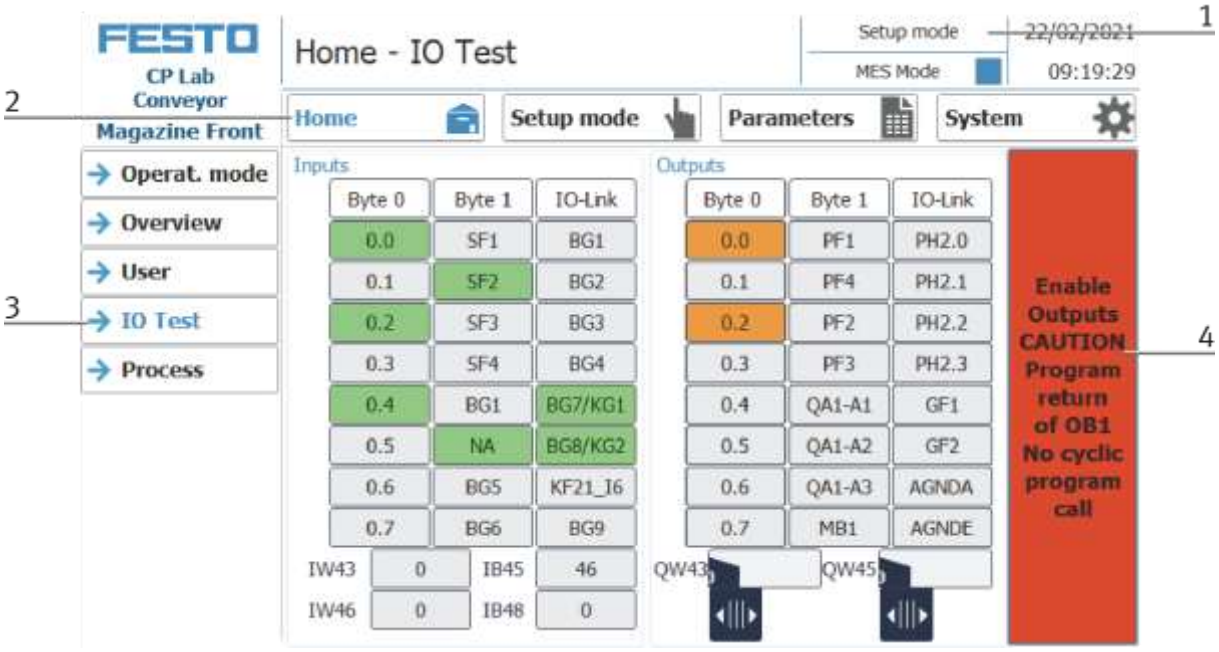

| Position number | description |
|---|---|
| 1 | Here the application module can be activated (tick set). If no application module is activated, the carrier is stopped at the stopper and released again without processing. |
| 2 | Here you can specify whether the station should be operated without an application module. If a check is placed here, the application module is not used. In this case there are two options, operator guidance or a simulation of the application.<br>This function is helpful if the application module is not available, but the function is to be integrated into a process. See chapter operator assistance and process simulation on a free AP |
| 3 | Here it can be determined in simulation mode whether a operator assistance or the application module should be simulated. See chapter operator assistance and simulate application on free AP |
| 4 | If the processing end is to be confirmed, a check mark must be set here. The process is only continued if this has been confirmed at the HMI, otherwise the process is automatically continued after the end of processing. |
| 5 | The desired return value can be entered here |
| 6 | Here you can enter the time required for the simulation. |



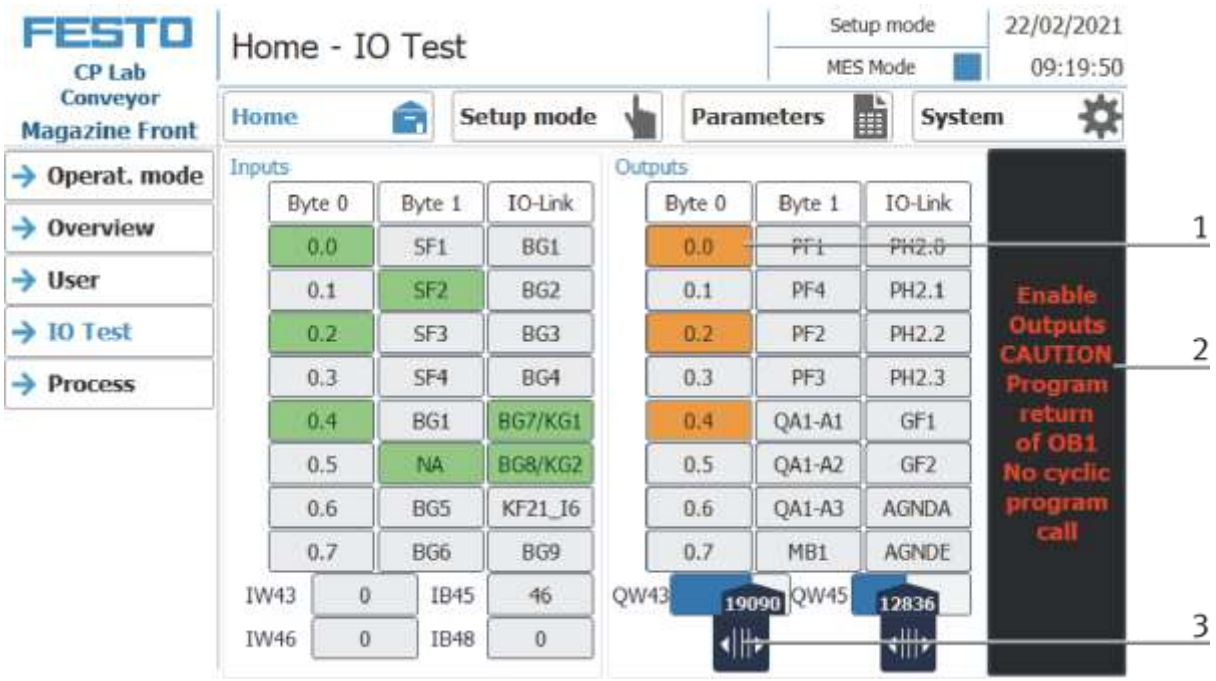

1. Choice between
   Simulate application - no application is activated, an automatic process is simulated. The processing time for the simulation can be specified in this window.

   and worker guidance. (See chapter worker guidance)

## I/O Test

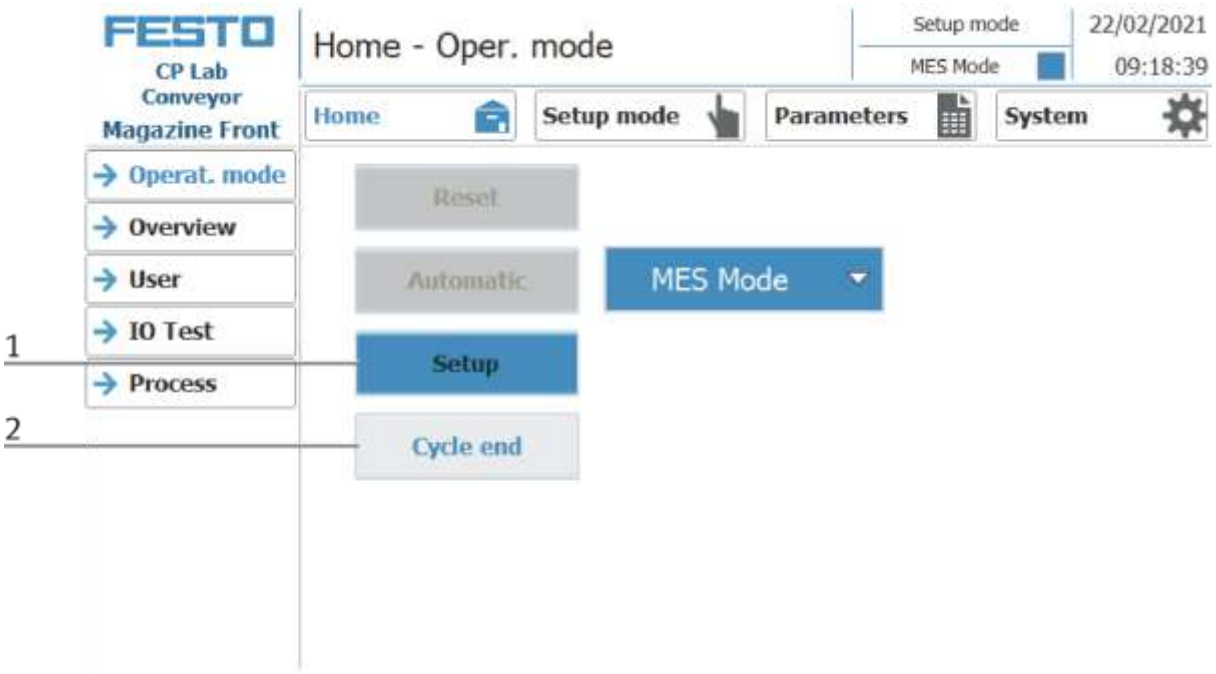



| Position number | Description |
|---|---|
| 1 | Setup mode must be active |
| 2 | Choose Home |
| 3 | Choose I/O Test |
| 4 | By clicking in this area, the outputs are enabled and can be activated.<br>A login as "Administrator" is required. |




| Position number | Description |
|---|---|
| 1 | By clicking in a field, this digital output is activated (orange if active) |
| 2 | By clicking again in this field, the outputs are blocked again |
| 4 | These controllers can be used to set values for the analog outputs (blue when active, the value is displayed above the controller. |

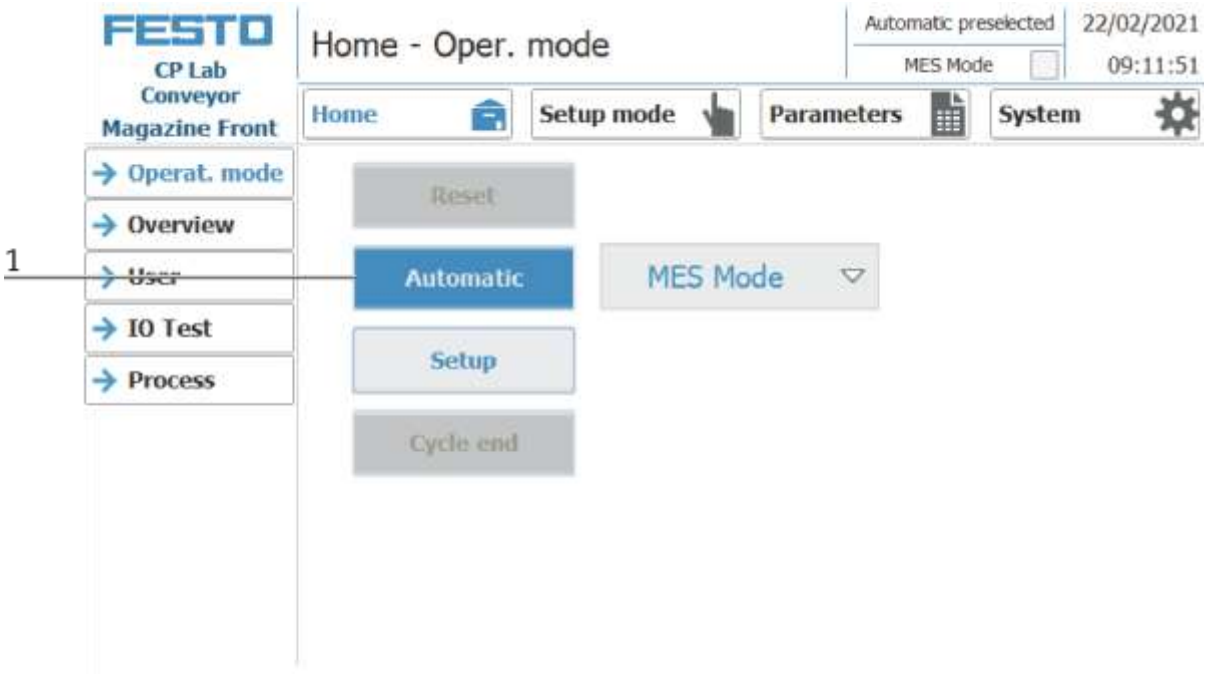
**Exit operation mode setup**




1. Setup mode is active, button lights up blue
2. Press the cycle end button to end the operation mode setup.

### 9.3.4 Operation mode automatic

In automatic mode, the chosen automatic processes can be processed at the station. Depending on the selection of the mode, the processes are controlled via the transition tables (default) or via MES.

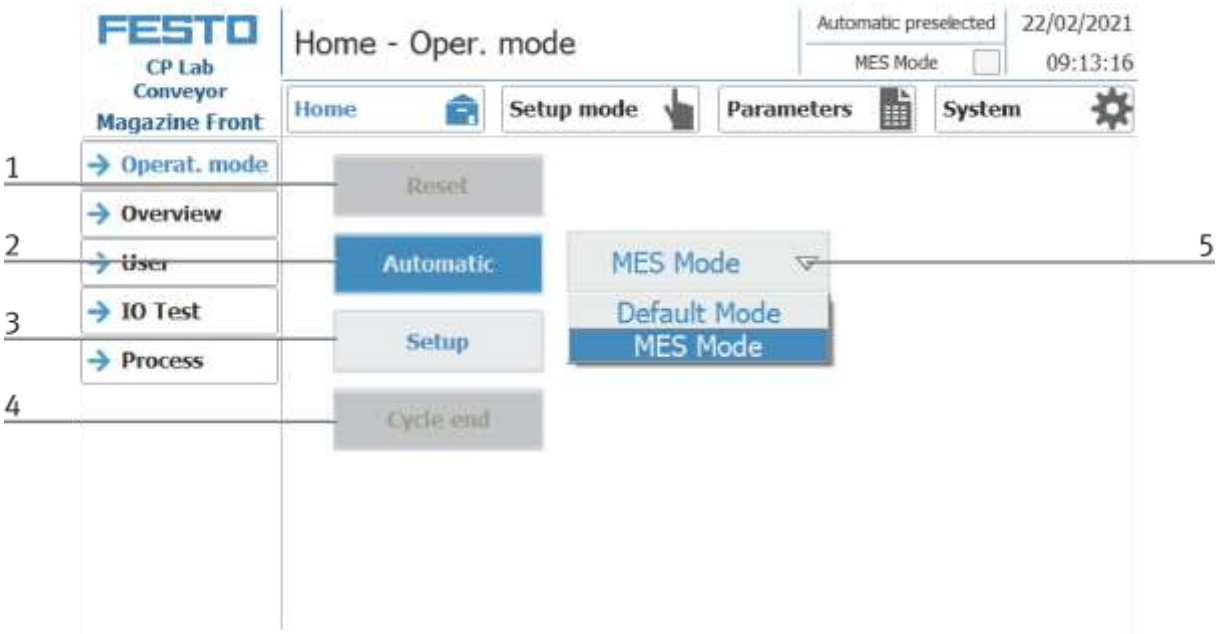



1. Automatic button flashing blue – Press Button to activate operation mode automatic


2. Operation mode automatic is active, button lights up blue
3. Announcement of active operation mode automatic

### 9.3.5 Main menu - Home

**Sub menu operation mode**



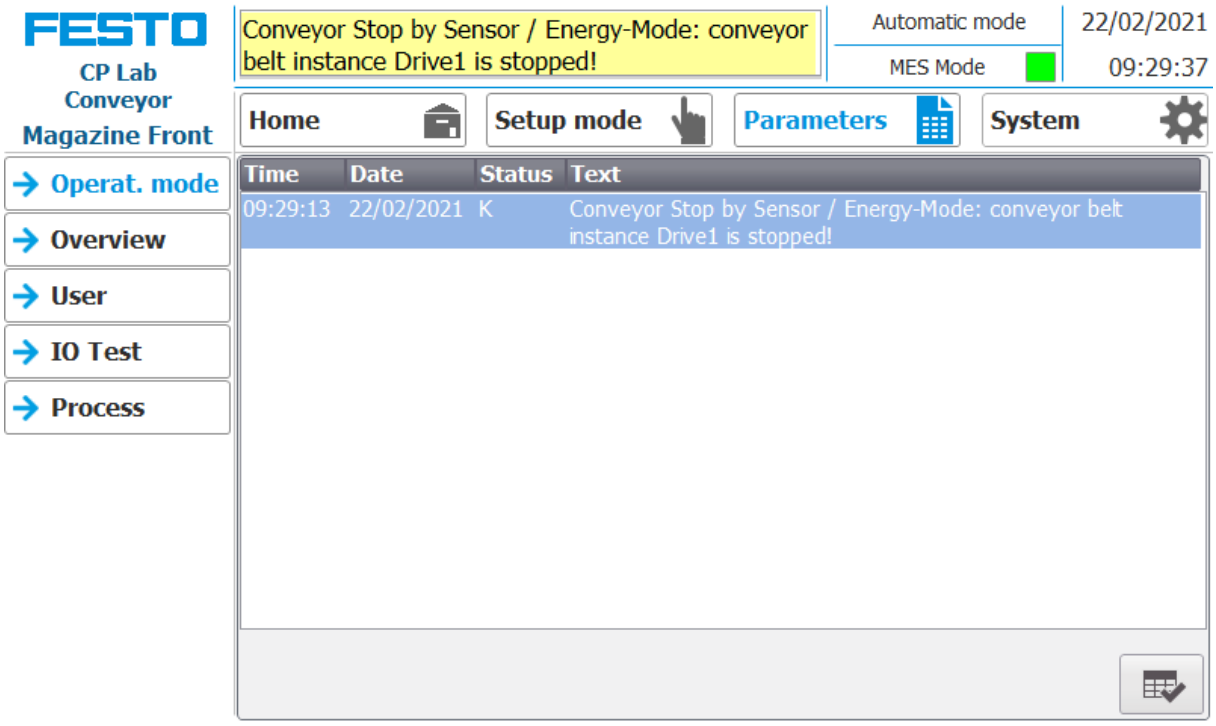

In the operation mode Home, the operating mode and the mode (MES or default) can be selected and started.

| Position | Description |
|---|---|
| 1 | Reset button: Start reset sequence |
| 2 | Automatic button: the automatic sequence in dependent from the mode (Default/MES) is started here |
| 3 | Setup button: Here the application module can be controlled manually and sensors can be displayed. Suitable for commissioning an application module or for troubleshooting.<br>There is no difference in mode - setup mode is independent of default or MES mode. |
| 4 | Cycle end button: The currently active operating mode is stopped here. |
| 5 | Selection of the mode:<br>Default - automatic sequence is processed with the stored transitions<br>MES - automatic process is completely controlled by MES software |

**Submenu overview**

Various states are displayed in the operation mode home on the Overview page.
(changing content depending on the selected operating mode)

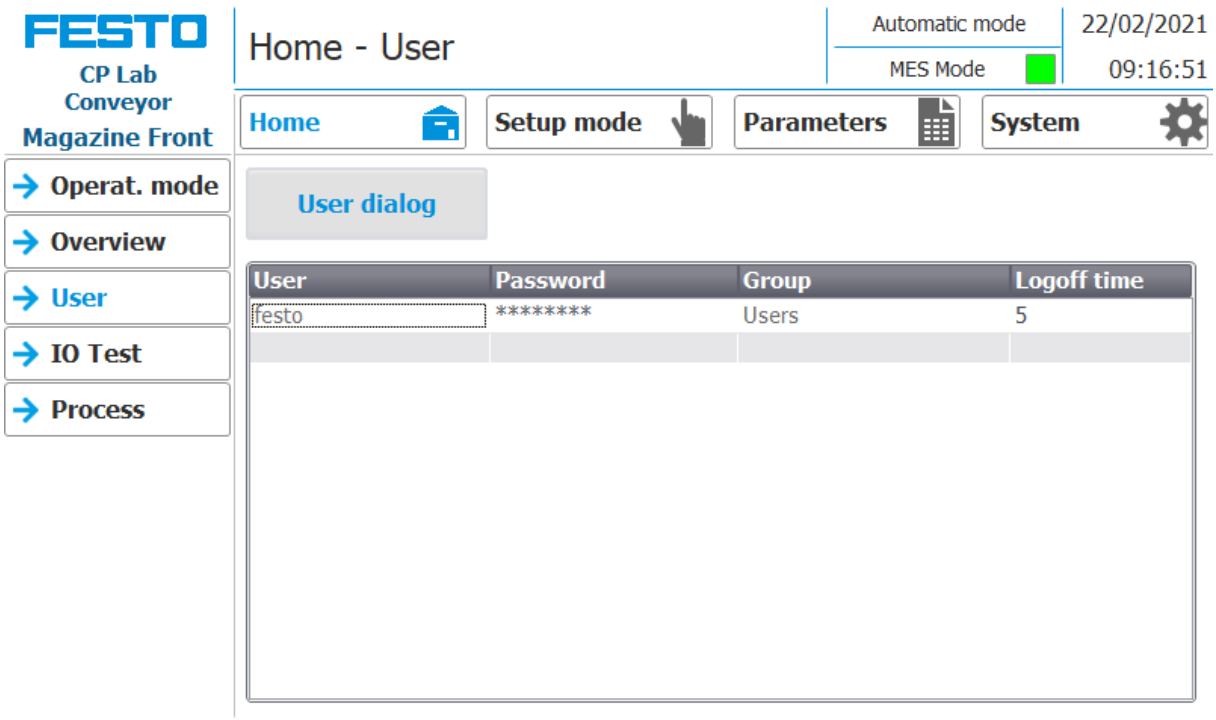

| Position | Description |
|---|---|
| 1 | Display of various information about the station |
| 2 | Display of the order data of the current carrier |
| 3 | Display of various functions (marked green if active) and its parameters |




Error messages are also displayed in the overview window.

**Sub menu user**

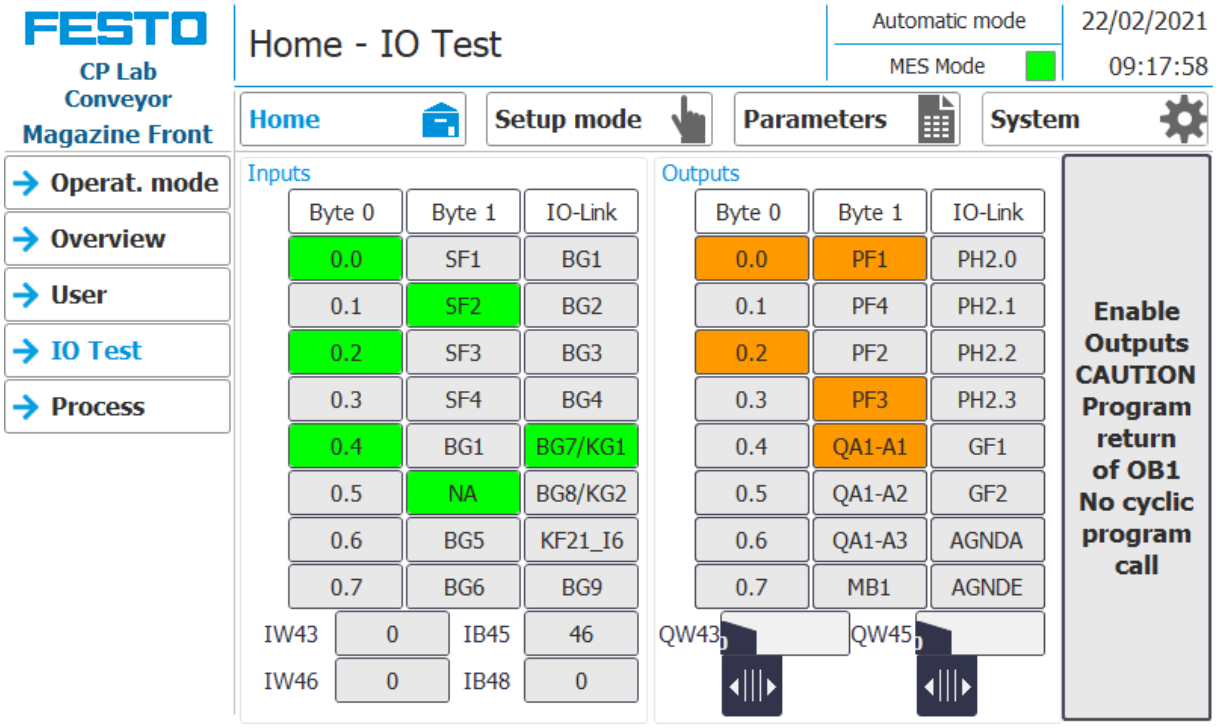
Different users can be created here. The function is independent of the selected mode (MES - or default)




Display / editing of all users, a login as "Administrator" is required.

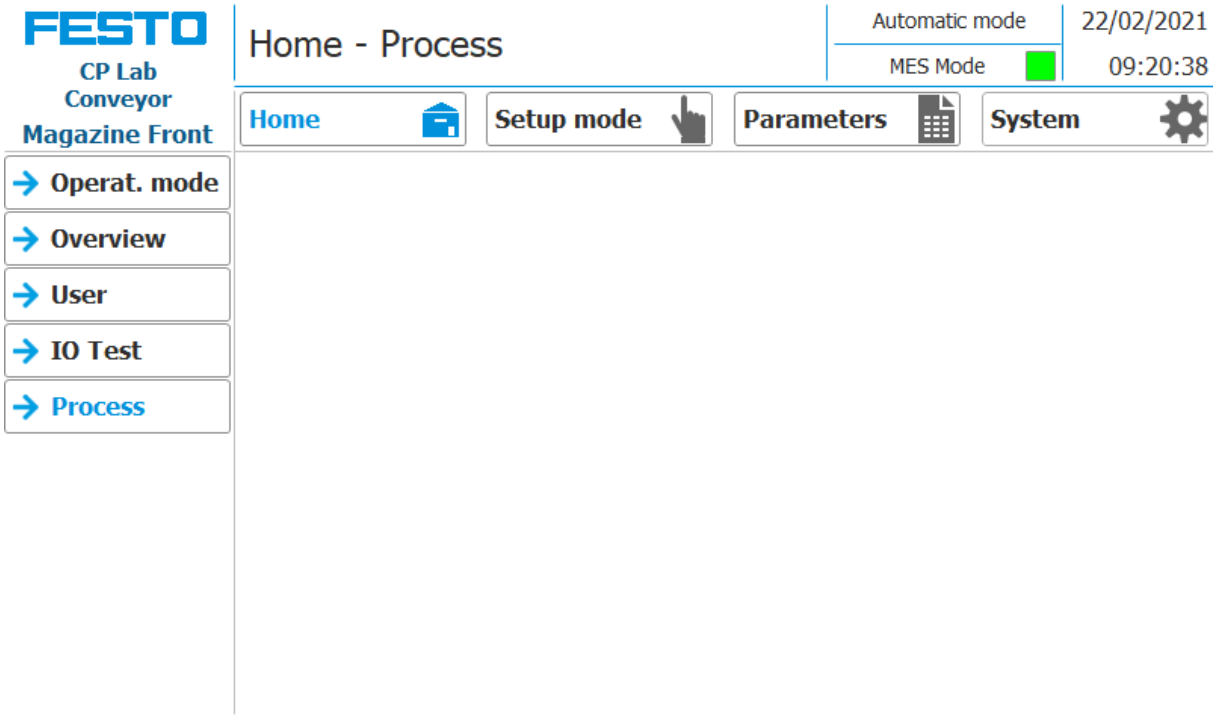
**Sub menu I/O Test**

The inputs / outputs are displayed here. The outputs can also be activated in setup mode.




**Sub menu process**

Here the process from the application module (if available) is announced.



### 9.3.6 Main menu - Setup

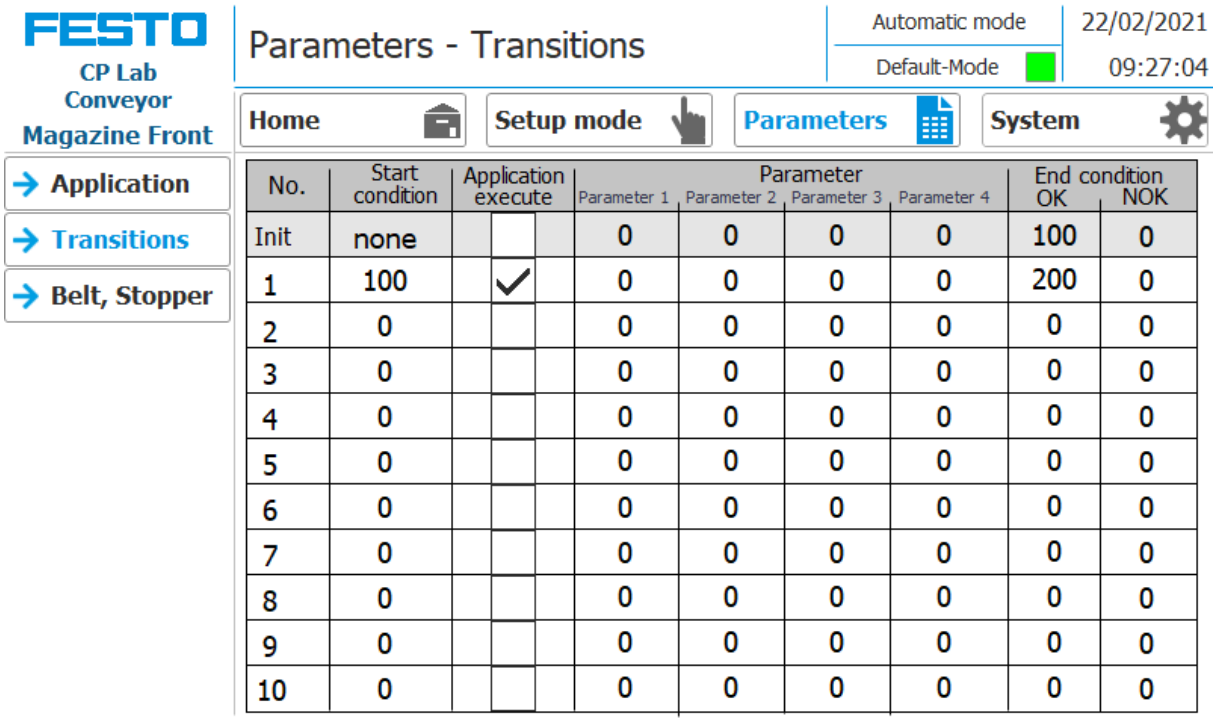
See chapter operation mode setup.

### 9.3.7 Main menu – Parameter

**Submenu application**

See chapter operation mode setup.

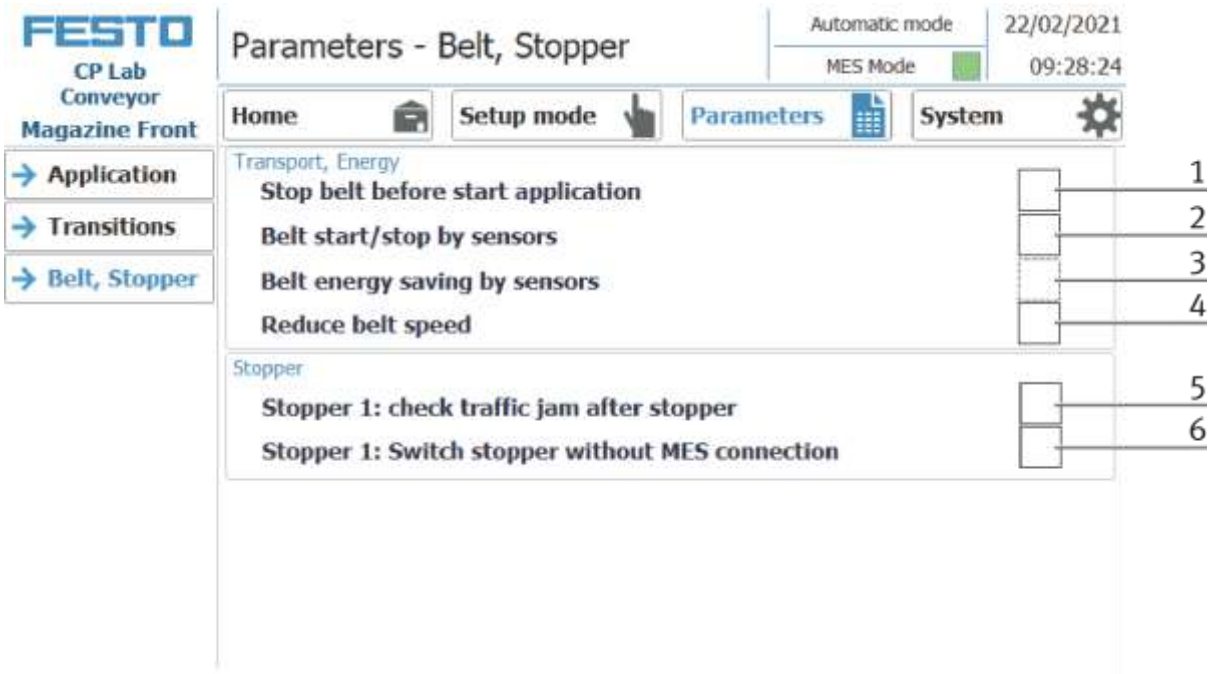
**Sub menu transitions**



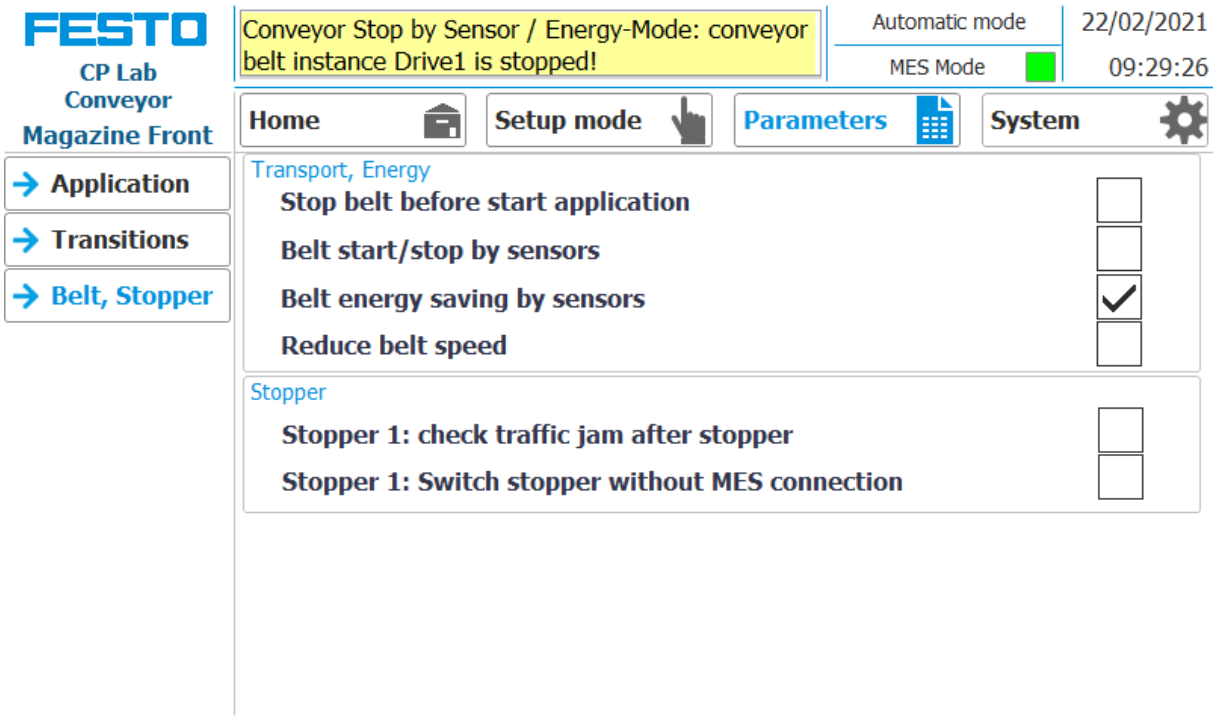

| No. | Start condition | Application execute | Parameter 1 | Parameter 2 | Parameter 3 | Parameter 4 | End condition OK | End condition NOK |
|---|---|---|---|---|---|---|---|---|
| Init | none | | 0 | 0 | 0 | 0 | 100 | 0 |
| 1 | 100 | ✓ | 0 | 0 | 0 | 0 | 200 | 0 |
| 2 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |

If the sub menu transitions is selected, the transitions of the installed application module are displayed. The transitions of all other application modules can be found in the associated manuals for the application modules.

### Sub menu belt, stopper



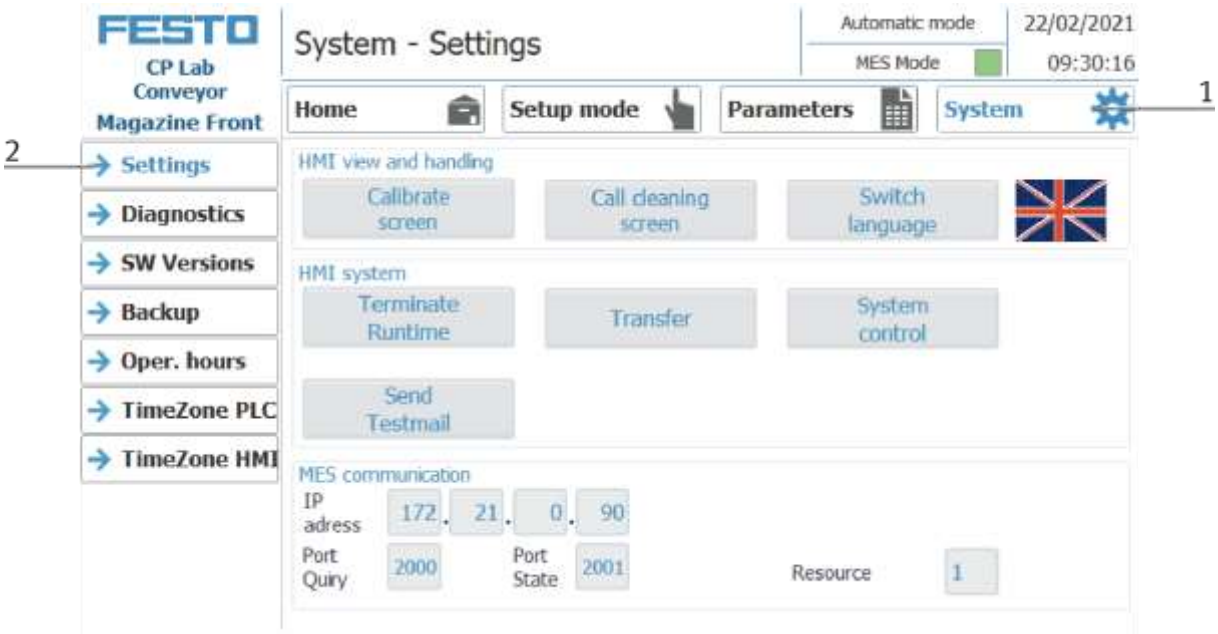

| Position number | description |
|---|---|
| 1 | Stop belt before start application: the belt is stopped before the application begins to start |
| 2 | Belt Start / Stop by sensors: Hook set when the belt should be switched automatically with the sensors. Switch on when Sensor at belt beginning signals a carrier, switch off when the sensor at the end of the belt signals the carrier passing by |
| 3 | Belt energy saving mode with sensors:<br>If no workpiece is detected on the belt via the sensors, the belt is switched off |
| 4 | Reduce belt speed:<br>Here the belt speed is reduced to save energy |
| 5 | Stopper: Check the jam at the belt outlet:<br>The carrier is only released from the stopper if the belt is not occupied at the belt outlet. |
| 6 | Stopper 1: Switch stopper without MES connection<br>Function active<br>MES in – workpiece carriers run through / MES out - workpiece carriers run through constantly<br>Function not active<br>MES in - workpiece carriers run continuously / MES out - workpiece carriers stop |



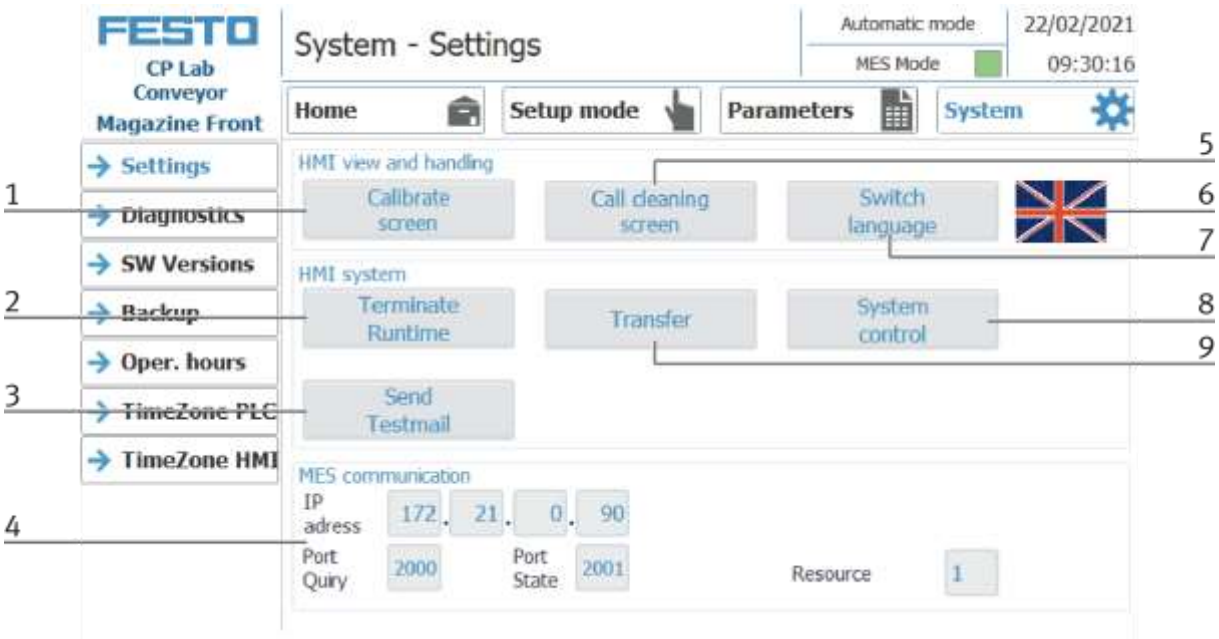

If the belt energy saving by sensors function is activated and the belts stop when there are no workpiece carriers on the belt, this is displayed in the upper message window.

### 9.3.8 Main menu – System

**Sub menu - Settings**



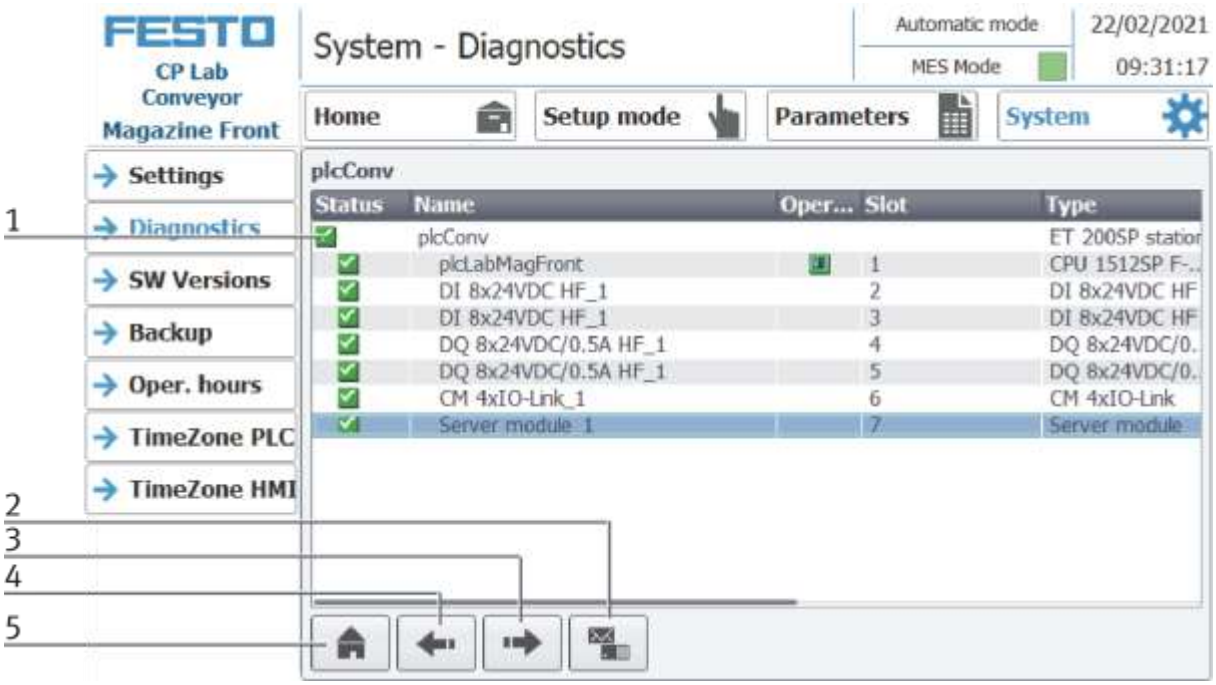

1. To get to the system settings, the System button must be selected
2. Click on Settings




The system can be set in this operating mode.

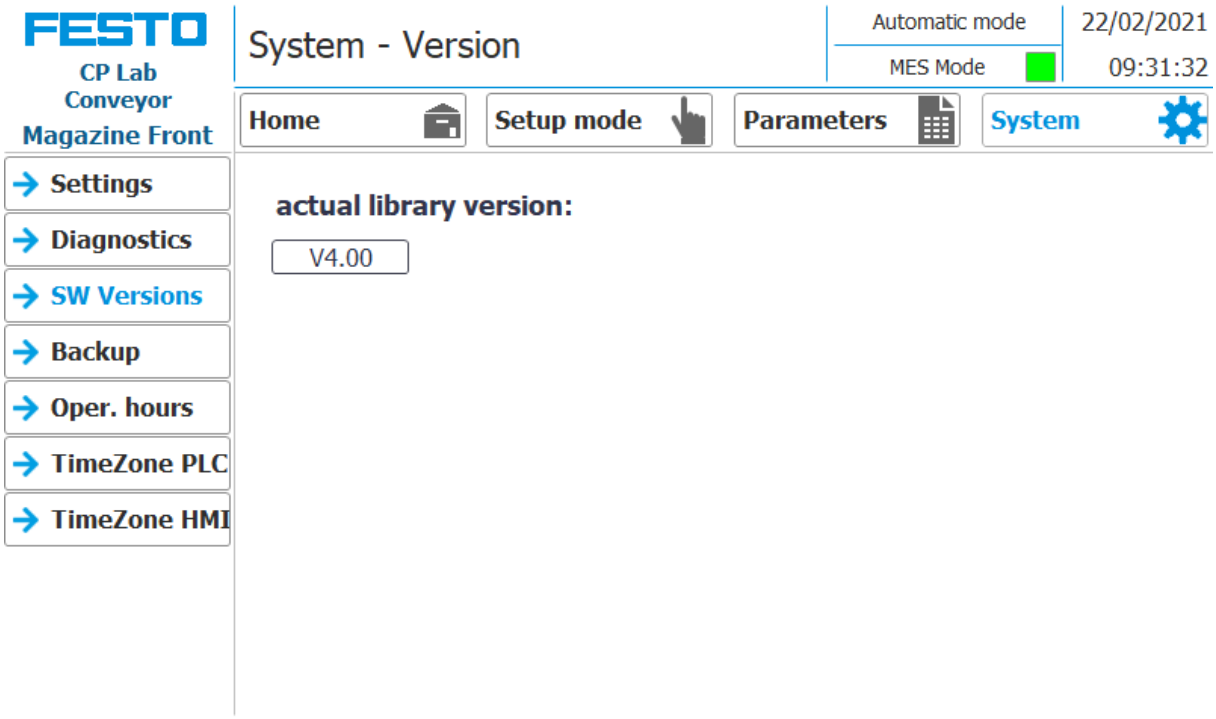
| Position number | Description |
|---|---|
| 1 | Button Calibrate Screen - If buttons react inaccurately, calibration of the touch screen can be restored |
| 2 | Button Terminate Runtime: The runtime is terminated and returned to Windows. |
| 3 | Button send test mail – send test mail to eMailserver (all error messages are sent from the hmi to a eMailserver on the MES4 PC – this function is to test if the configuration is ok.) |
| 4 | Display of the MES IP address additionally the IP of the MES can be set here. (Password protected) User: festo, PW: festo)<br>Input fields for your own resource number, query port and status port of the MES connection |
| 5 | Button call cleaning screen - the screen can be cleaned here. The touch function is interrupted and unintentional operation is excluded |
| 6 | Flag displays only current language. By clicking on button next to the flag language can be switched |
| 7 | Button switch language: here the language can be changed |
| 8 | Button system control: Windows system control is opened |
| 9 | Button Transfer: Runtime is closed and the transfer mode of the HMI is called |

### Sub menu diagnostics



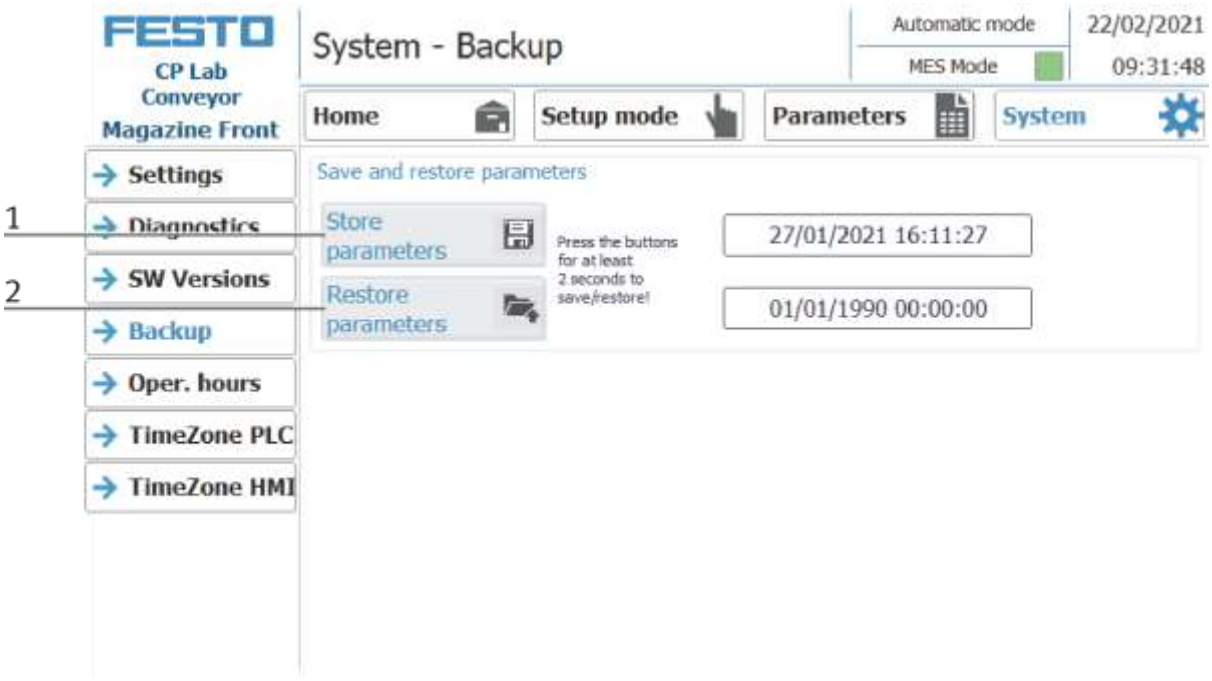

| Position number | Description |
|---|---|
| 1 | Announcement overview plant |
| 2 | Send diagnostic message via mail |
| 3 | Next diagnostic message |
| 4 | Previous diagnostic message |
| 5 | Home Button |

**Sub menu software versions**



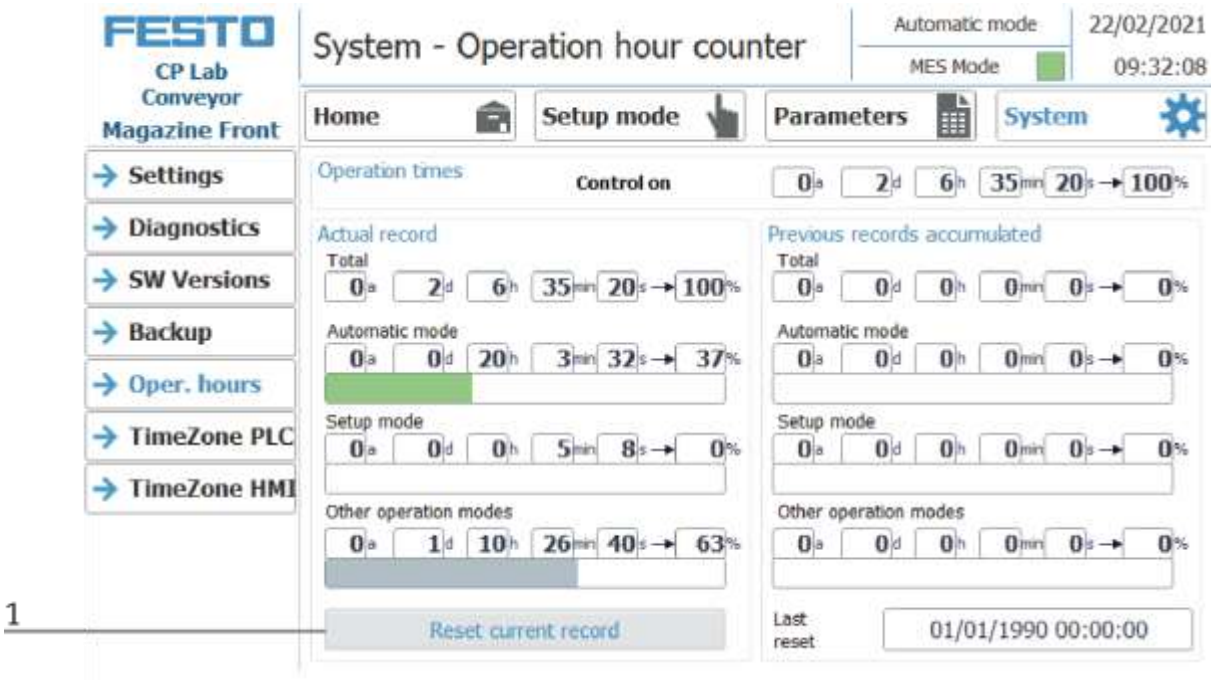

Display of the current library version.

### Sub menu Backup




| Position number | Descripition |
|---|---|
| 1 | Save parameters button: all parameters are saved, for this it is necessary to press the button for at least 2 seconds.<br>The display shows the date of the last storage. |
| 2 | Restore parameters button: all parameters are loaded, for this it is necessary to press the button for at least 2 seconds<br>The display shows the date on which the parameters were last loaded. |

**Submenu pperating hours counter**



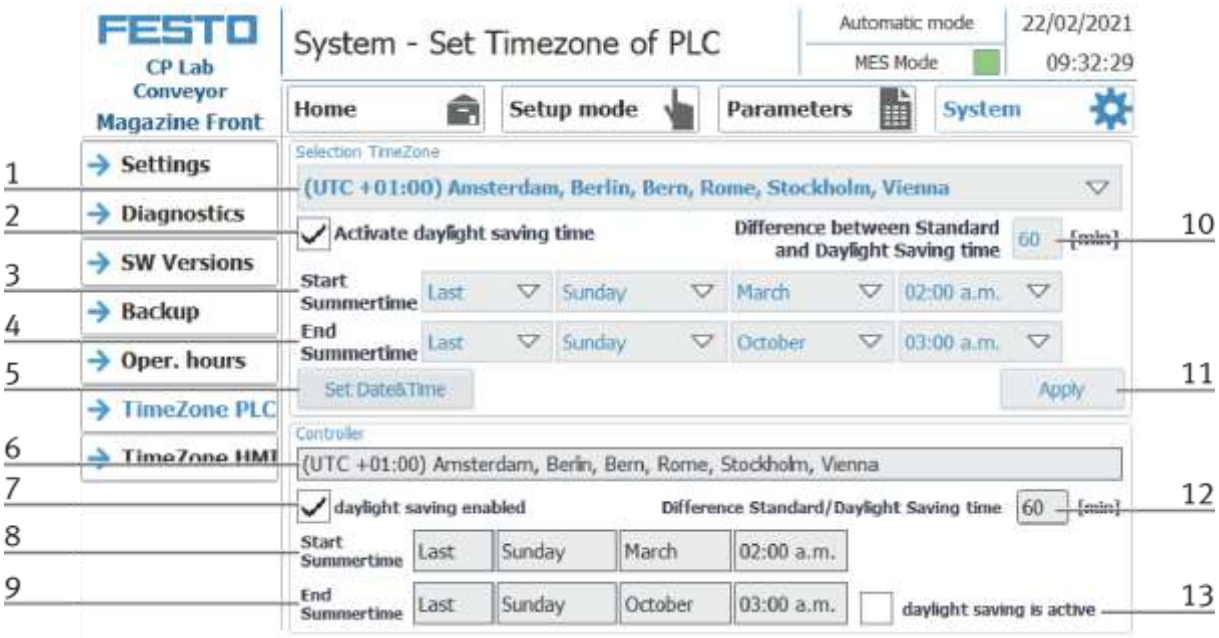

Display of the operating times with allocation to the respective operating mode.

In the "Operation times" area, the time since the control was switched on is counted.
In the "Actual record" area, the time until the next time the "Reset current record" button is pressed is counted. The times are divided into the categories “Total”, “Automatic mode”, Setup mode and “Other operating modes”. The times are counted under the heading “Other operating modes” while the station is in the operating mode “Automatic preselection”, “Setup” and “No operating mode”. The value in the "Total" line represents the total of the operating times differentiated according to the operating mode. The percentage refers to the proportion of the operating mode in the total time.

With the button (1) "Reset current record", the current recording is set to 0 and the operating times contained therein are added to the "Previous recordings accumulated" area. The current recording can thus be used, for example, for daily recordings.

All counter values are saved in a retentive data block. These are lost when the controller is booted. If they are to be retained, the values must be saved beforehand.

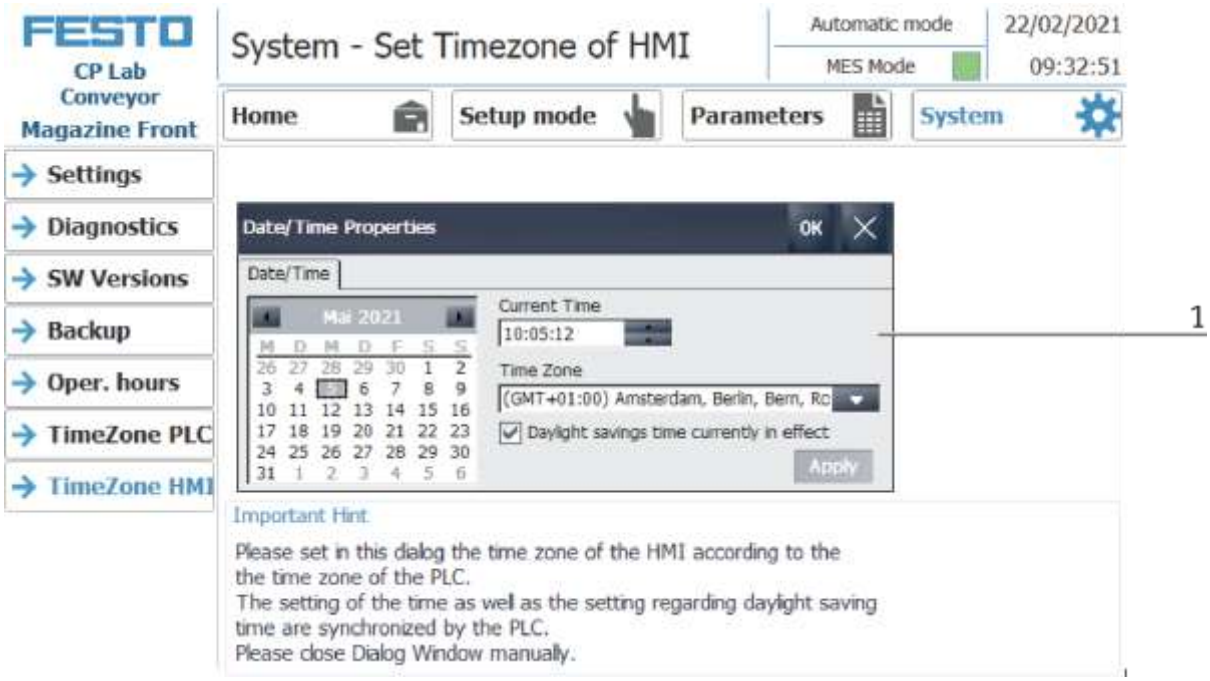
**Time zone submenu in the PLC**




The time and time zone of the PLC can be set in this menu. The default settings of the PLC are overwritten when you click the "Apply" button.

| Position number | Description |
|---|---|
| 1 | Select TimeZone |
| 2 | Checkmark set - the daylight saving time changeover is automatically changed at the times "Beginning of daylight saving time" and "End of daylight saving time"<br>Checkmark not set - there is no daylight saving time changeover |
| 3 | Setting the start of daylight saving time |
| 4 | Setting the end of summer time |
| 5 | Set time & date: When this button is pressed, a pop-up window opens for setting the time of the PLC |
| 6 | Display of the current time zone of the controller<br>*(Only valid if the time zone of the PLC has been set once using the "Apply" button)* |
| 7 | Display of whether daylight saving time changeover is active in the PLC.<br>*(Only valid if the time zone of the PLC has been set once using the "Apply" button)* |
| 8 | Display of the current start of daylight saving time in the control<br>*(Only valid if the time zone of the PLC has been set once using the "Apply" button)* |
| 9 | Display of the current end of daylight saving time in the control<br>*(Only valid if the time zone of the PLC has been set once using the "Apply" button)* |
| 10 | Enter the time difference between summer and winter time in minutes. |
| 11 | Accept the selected settings for the time zone and time change by pressing the button. |
| 12 | Display of the time difference between summer and winter time in minutes.<br>*(Only valid if the time zone of the PLC has been set once using the "Apply" button)* |
| 13 | Display of whether daylight saving time is currently active.<br>*(Only valid if the time zone of the PLC has been set once using the "Apply" button)* |

**Time zone submenu in the HMI**




The time and time zone of the HMI can be set in this menu. The default settings of the HMI are overwritten. It is important to set the time zone in the HMI the same as it is set in the PLC, otherwise certain functions will get a different time stamp. (e.g. sending emails)

| Position number | Descriptioin |
|---|---|
| 1 | System pop-up window of the HMI for selecting the time zone. The selected time zone in the Time Zone drop-down field is transferred to the HMI by pressing the "Apply" button.<br>Before exiting the menu item, close the system pop-up window by pressing the X at the top right. |

### 9.4 Switching on the station


Illustration similar

1. The station is supplied with voltage.
2. The station is supplied with 6 bar air pressure.
3. All EMERGENCY STOP signal transmitters (pushbuttons, door contacts, light barriers, etc.) are not actuated and unlocked.
4. Turn on the main switch – power supply unit.
5. Press the RESET button, the RESET button lights up blue, the HMI starts and starts up.
6. Wait till HMI is ready

### 9.4.1 Start automatic

The emergency stop is released in the same way at all other stations of the CP Factory system.

**WARNING**

- **Danger of being pulled in at the conveyors**
  - When the automatic mode starts, the belts of the conveyor belts start to move, creating a risk of being pulled in.
  - When starting, do not stand directly at the ends of the belt or hold on to them, keep enough distance.
  - Failure to heed the information given can lead to injuries.

For the CP Lab conveyor, an initial start-up has been made ex works.
Please follow the following instructions in order to be able to work with CP Lab conveyor as well as with a possibly present application:

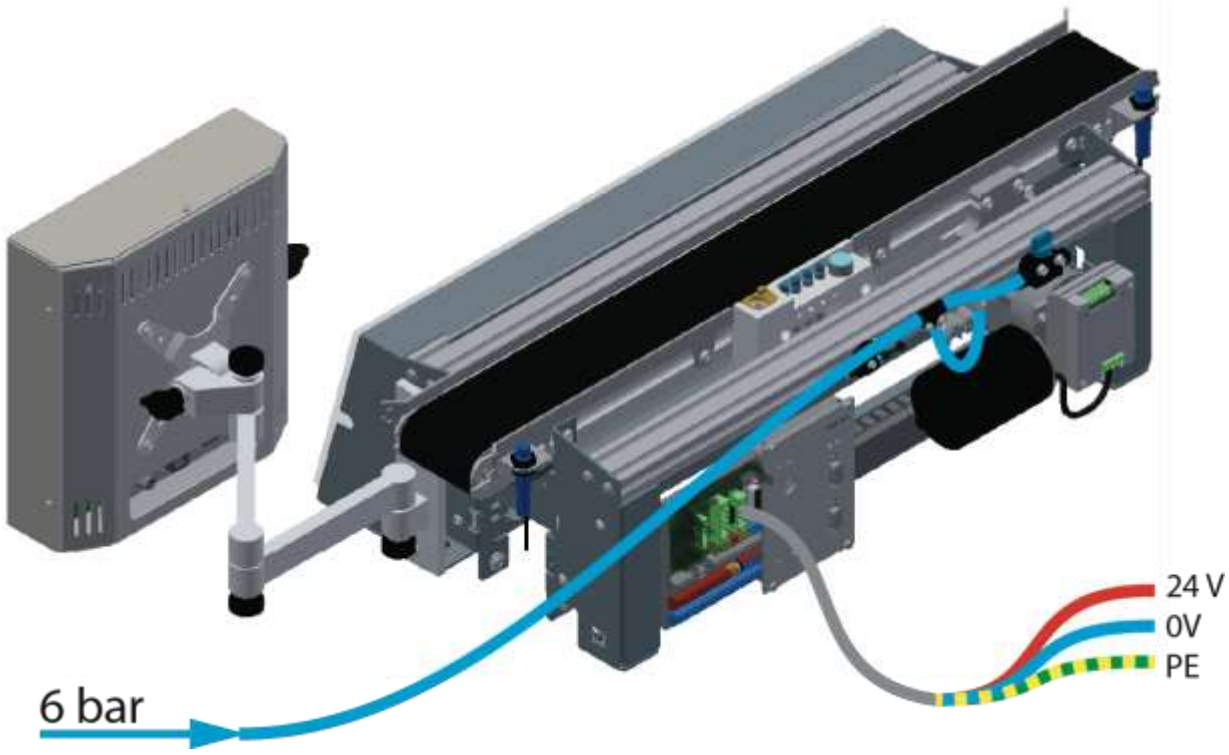
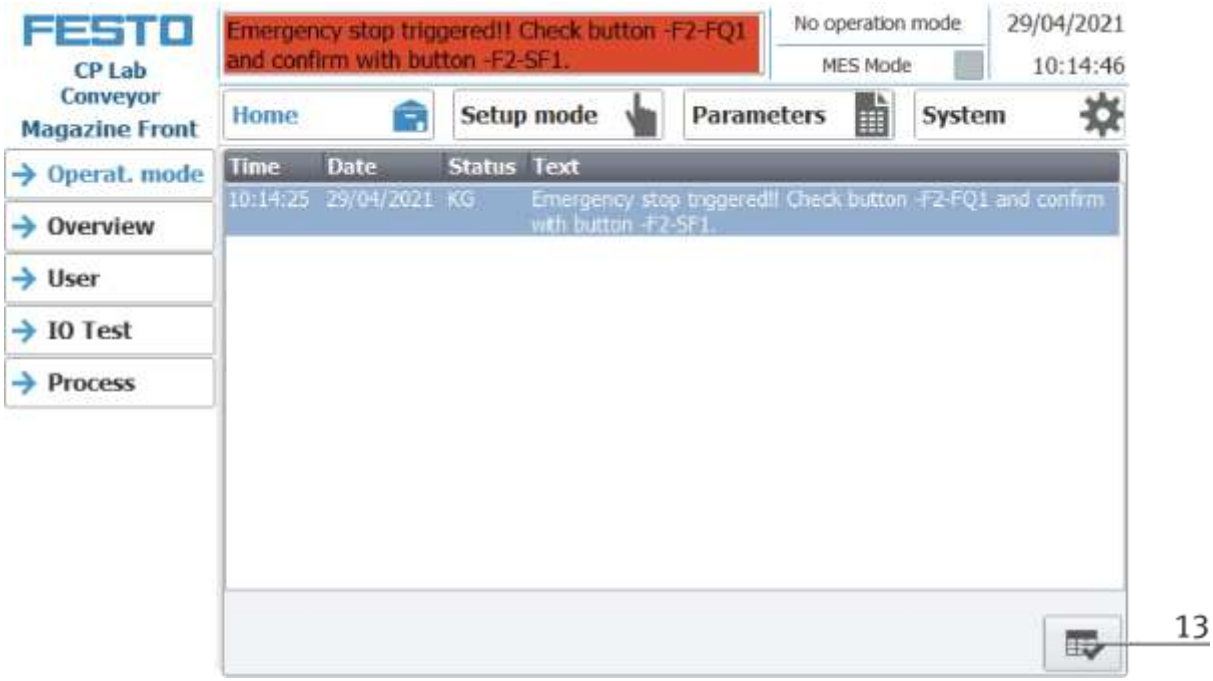



Illustration similar

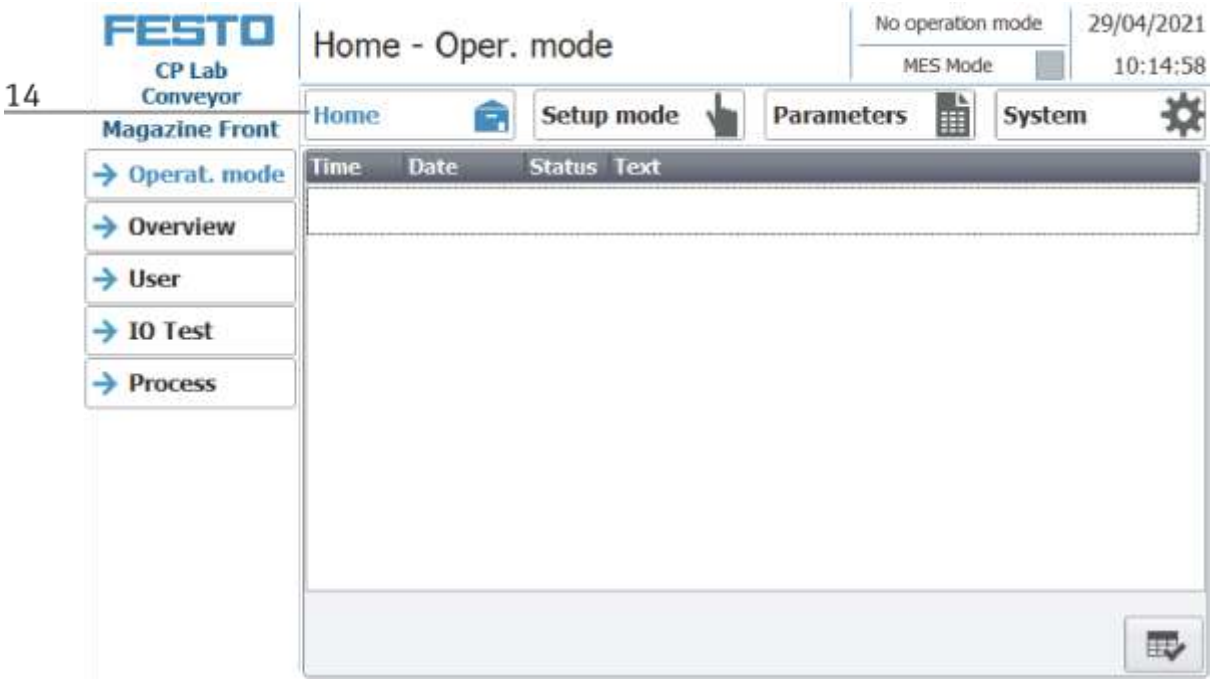
1. CP-L-CONV with 24 V DC motor: Connect the power supply 230 V AC for the power supply unit and connect the 24 V supply cable of the module.
   CP-L-CONV with 230 V AC motor and G120 Edutrainer: Connect the the supply unit Edutrainer with 230 V. Connect the 24 V supply calbe of the module and connect the the supply cable of the G120.
   CP-L-CONV with 400 V AC motor and G120 Edutrainer: Connect the the supply unit Edutrainer with 400 V. Connect the 24 V supply calbe of the module and connect the the supply cable of the G120.

2. The power supply is correctly connected to the CP Lab conveyor, but not yet switched on yet.
3. The CP Lab conveyor is supplied with approx. 6 bar compressed air. When commissioning for the first time, make sure to increase the pressure slowly. This prevents unpredictable events.
4. All EMERGENCY STOP signaling devices (pushbutton, door contact, light barriers, etc.) are not actuated or activated and unlocked.
5. Check any installed application for visual damage and repair if necessary
6. Remove workpieces
7. For CP-L-CONV with 24 V DC motor: Switch on the power supply to the power supply unit.
   For CP-L-CONV with 230 V AC motor and G120 Edutrainer: Switch on the Edutrainer and G120 supply unit.
   For CP-L-CONV with 400 V AC motor and G120 Edutrainer: Switch on the Edutrainer and G120 supply unit.
8. The HMI (touch panel) is started and starts up
9. Illuminated button Q1 on the control panel flashes
10. Press illuminated button Q1
11. Q1 illuminated pushbutton lights up.
12. Acknowledge errors on the HMI by clicking on the error message.

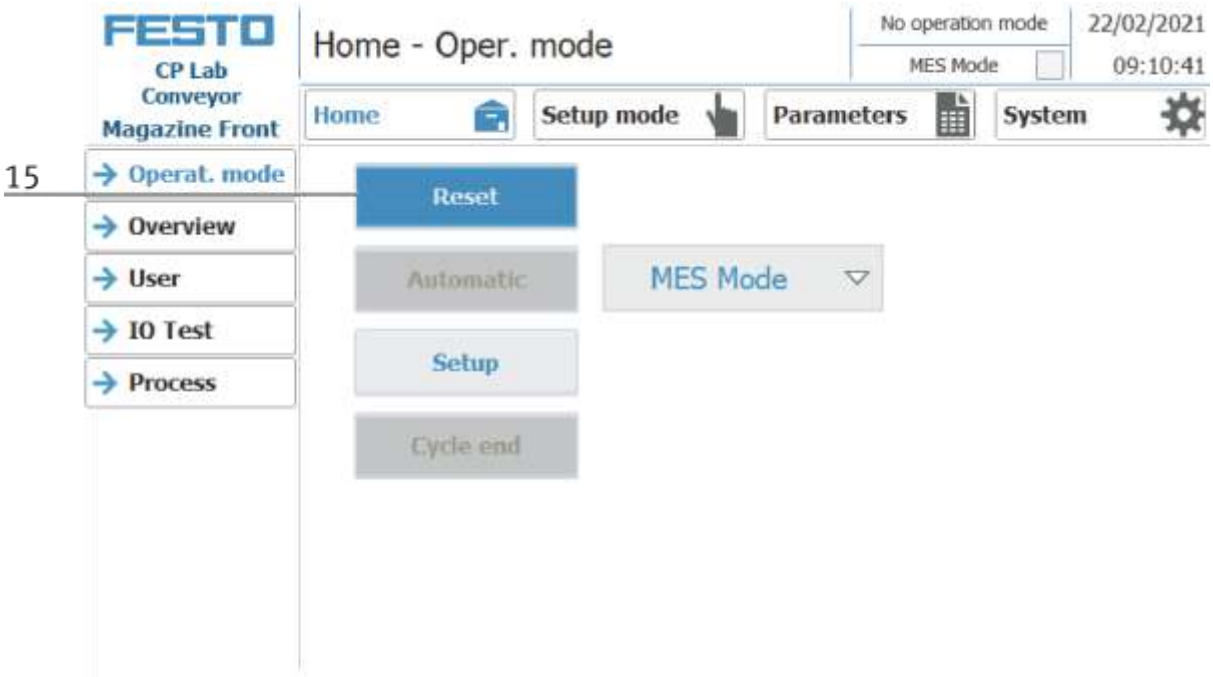
13. The error message is displayed in the main window. After the error situation has been remedied, it can be acknowledged by pressing the RESET button.



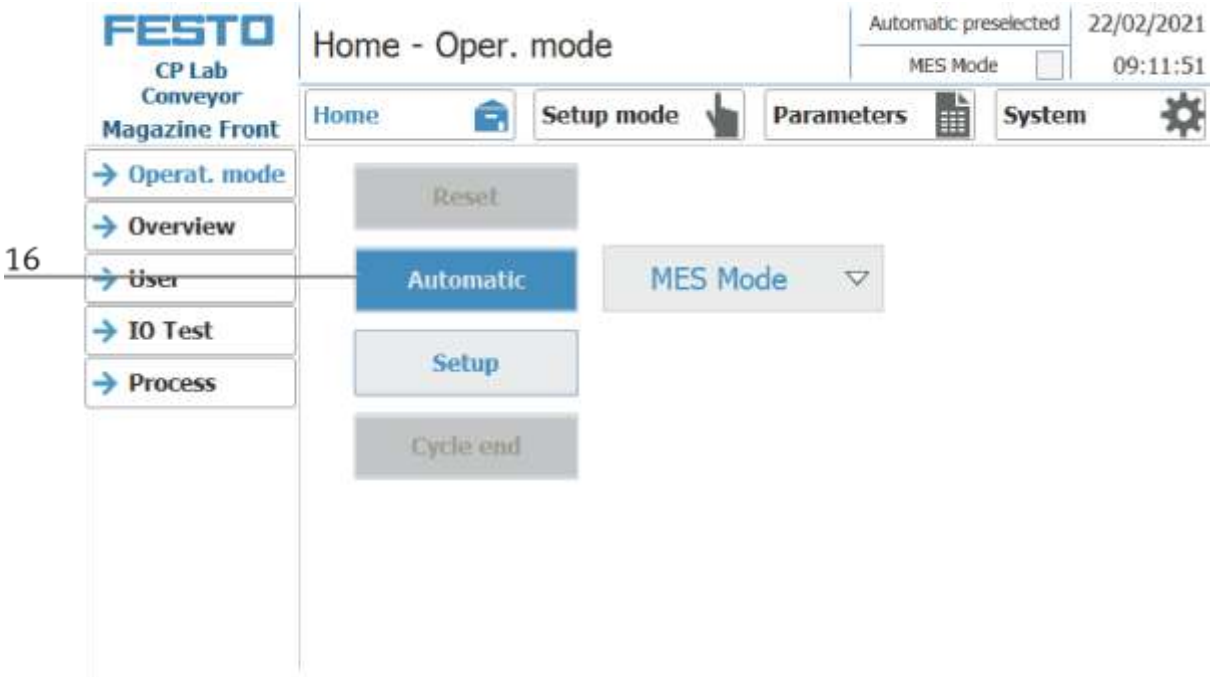

14. Press Home Button



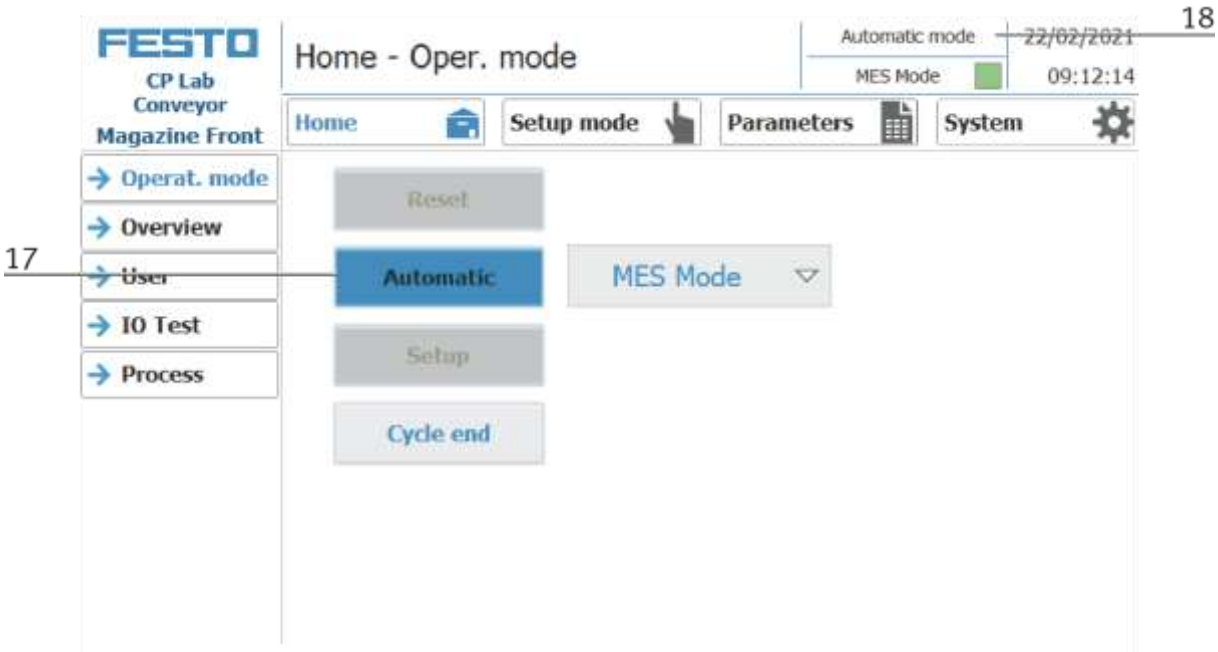
15. Press the flashing RESET Button. Station/application moves in home position.




16. Press the flashing AUTOMATIC Button



17. AUTOMATIC Button lights up
18. Automatic mode is active



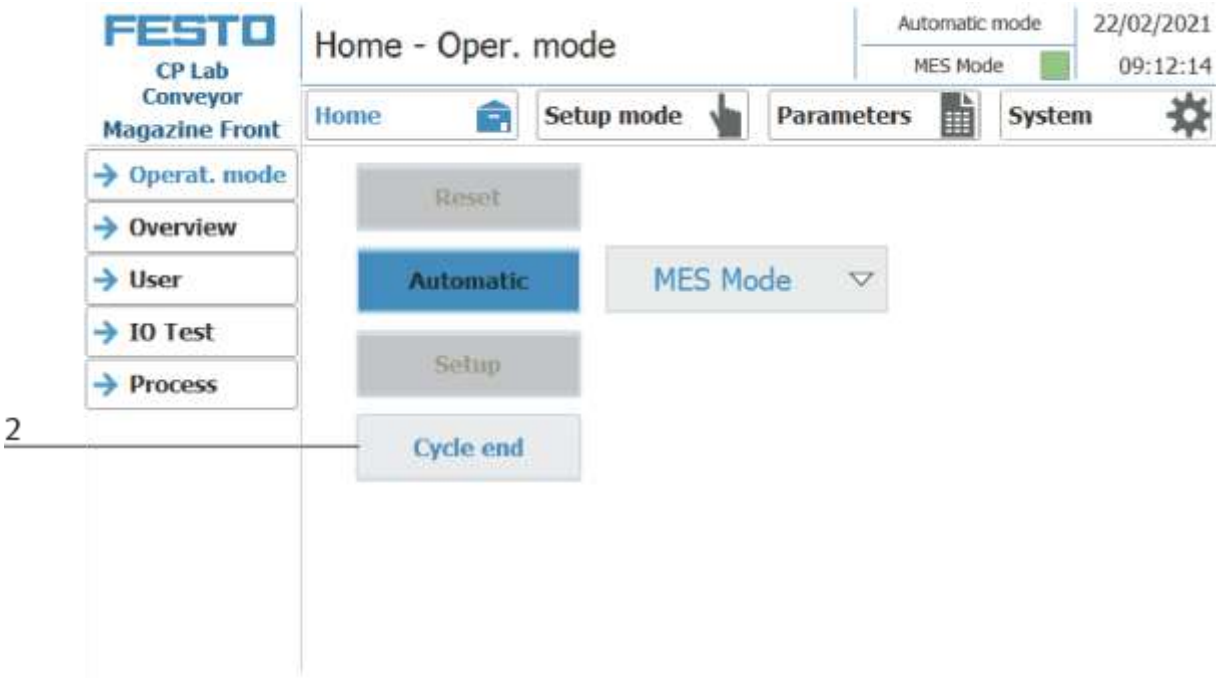

### 9.4.2 Sequence Description Automatic

If the automatic sequence was started,

1. The automatic button lights up blue
2. Stoppers are retracted
3. The workpiece is transported in circulation mode
4. If a carrier moves into the module / application module, this will execute your automatic process. The operation of the module / application module is, however, only started if the operation in MES is intended for this resource and the resource can also carry out this operation.
5. The busy displays become active.
6. During this time, the automatic sequence is executed in the application.
7. The next resource and operation are written to the RFID chip
8. When the module / application module is ready, the display changes back to the original state and the stopper is retracted
9. The carrier moves out of the working position and is available to further modules / application modules.

### 9.4.3 Process description Cycle End

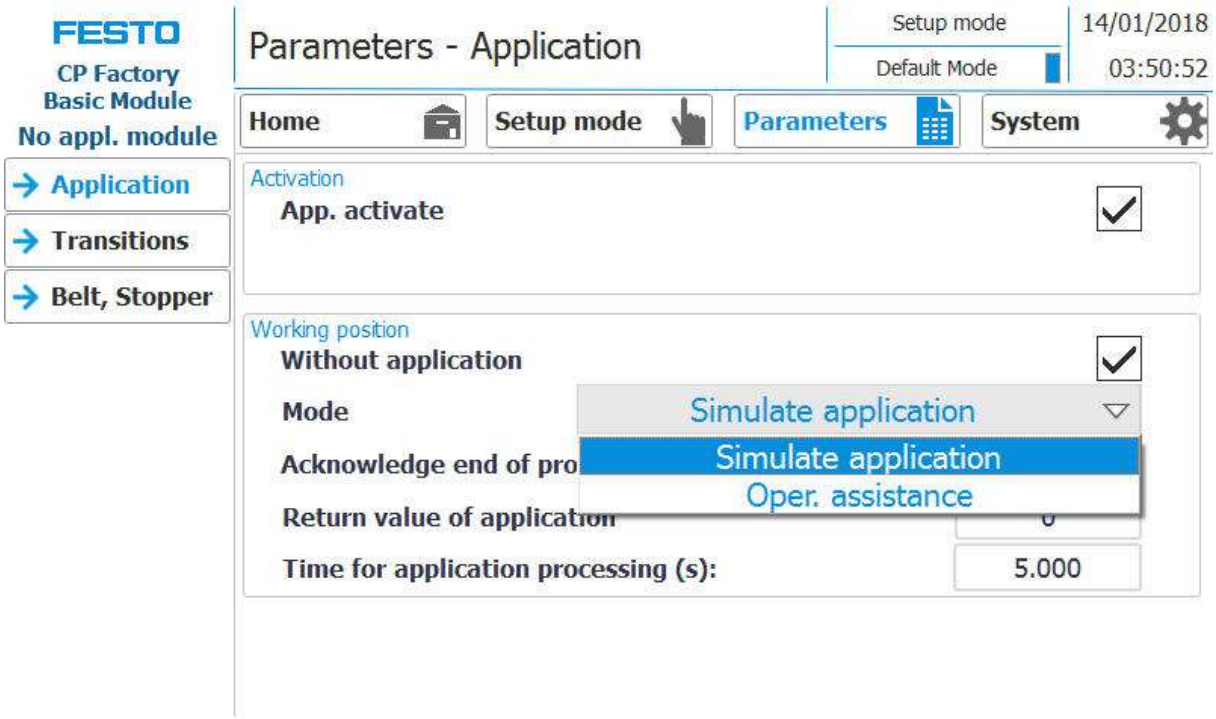
1. An automatic cycle is active.
2. Press the button Cycle End.




3. The module/application module will execute the run until cycle end. During this time, the button Cycle End has got a red background.
4. The stoppers are extended.
5. The conveyors are stopped.

### 9.5 Operator assistance and simulate application on free AP

The following chapter is valid for all basic modules (Bypass, Linear, branch). It is explained by way of example on the basic module Linear.




Selection of the mode via the touch panel

Each free application position, which is not equipped with an application module, can provide a simple operator assistance and a simulate application.

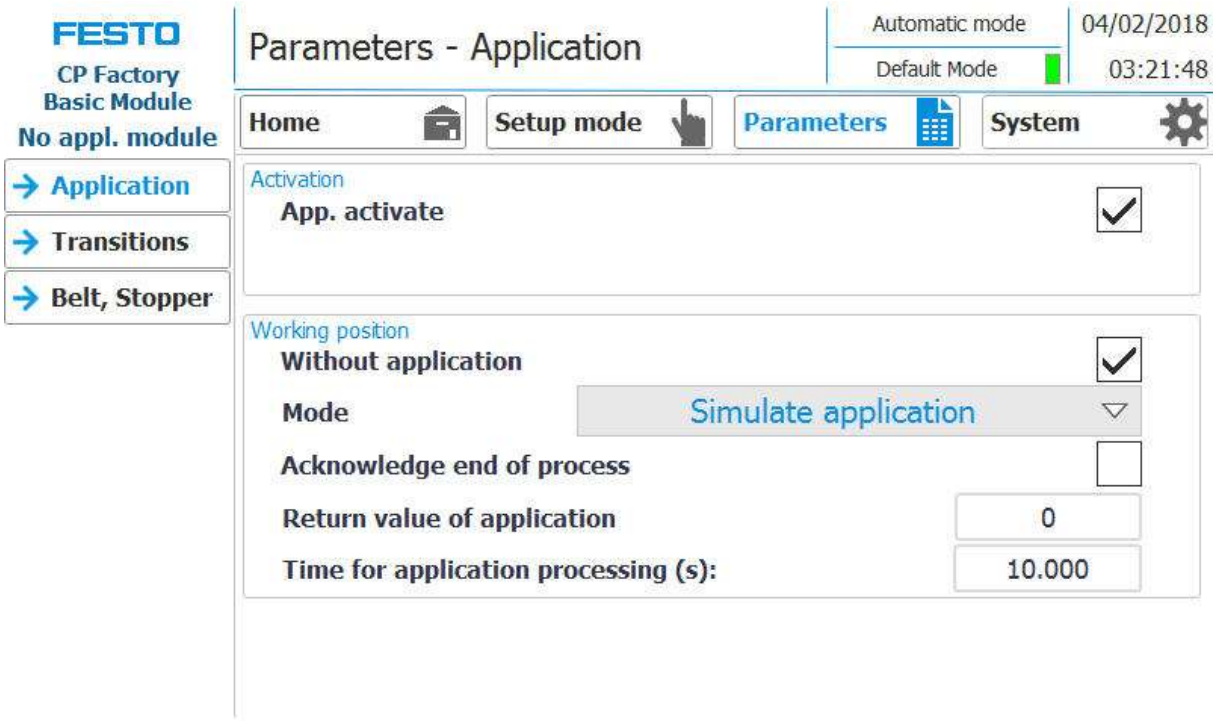
Thus every free AP provides the following functions in default mode as well as in MES mode:

1. Generic sequence simulation
2. Operator assictance

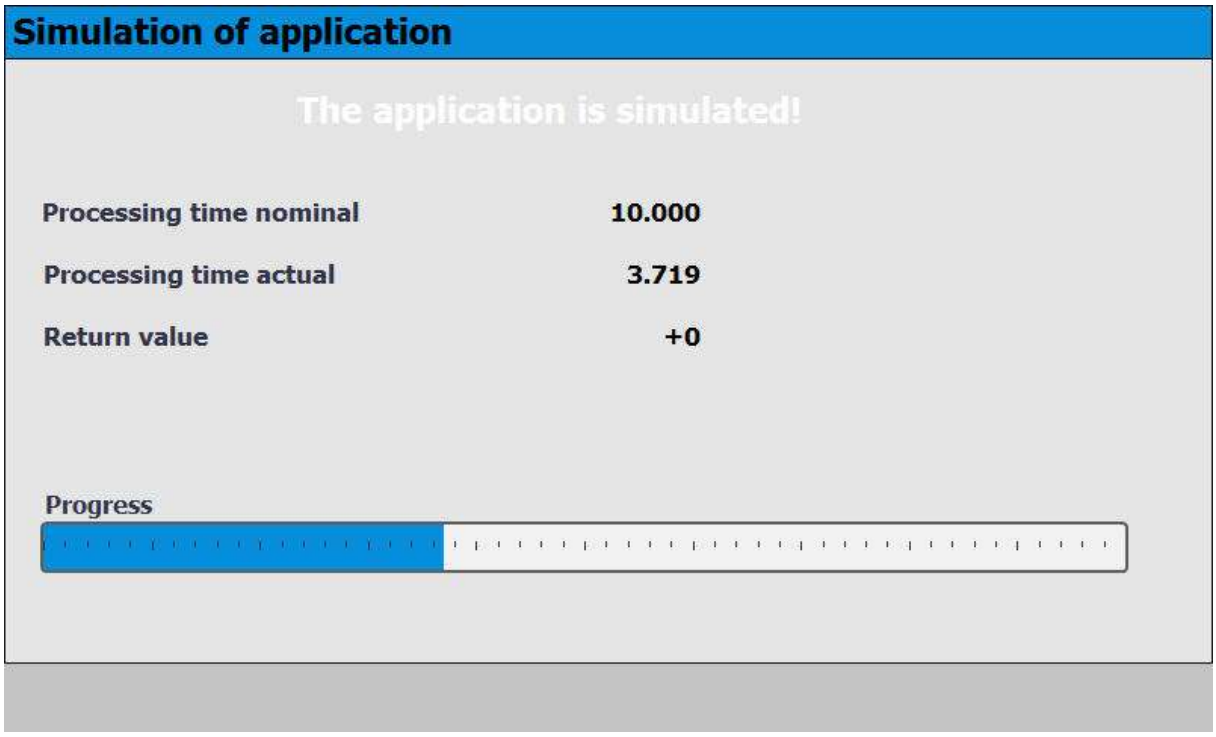
The application function is added with a fitted application module

1. Process simulation of the application
2. Operator assictance
3. Application Function

### 9.5.1 Generic sequence simulation

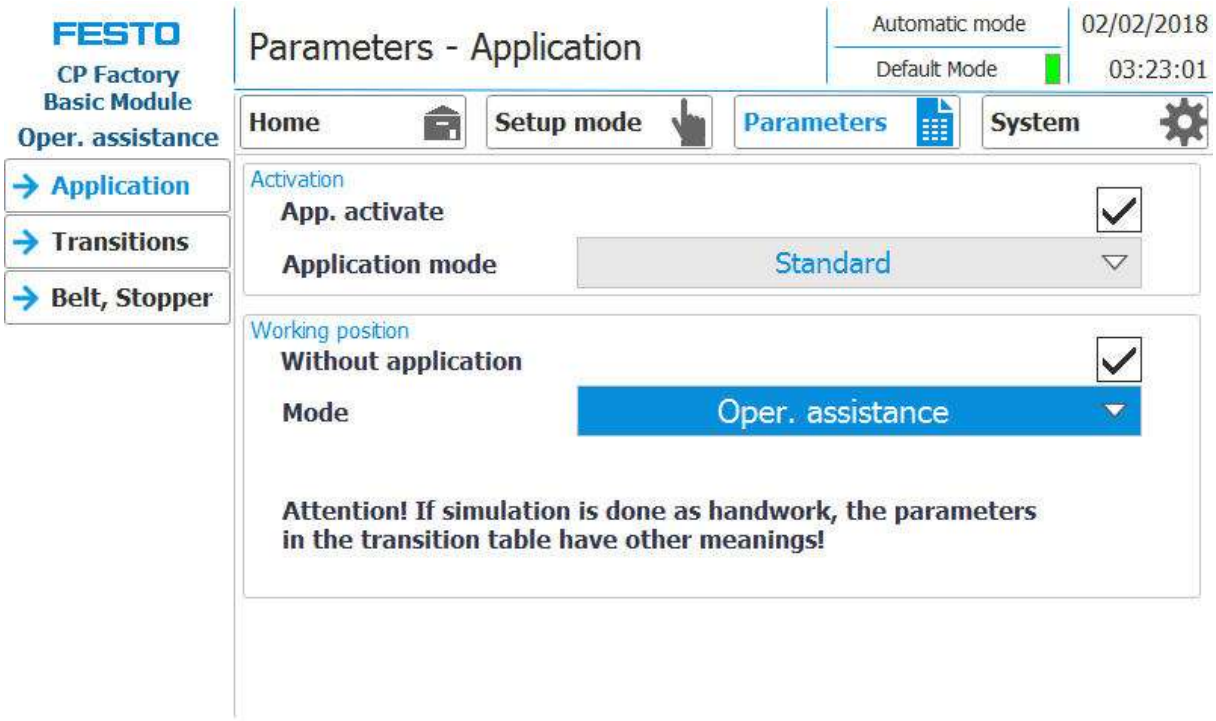



1. If the mode is simulate application and a carrier moves into the application, it is stopped. The application procedure is simulated, this is indicated by the following screen.



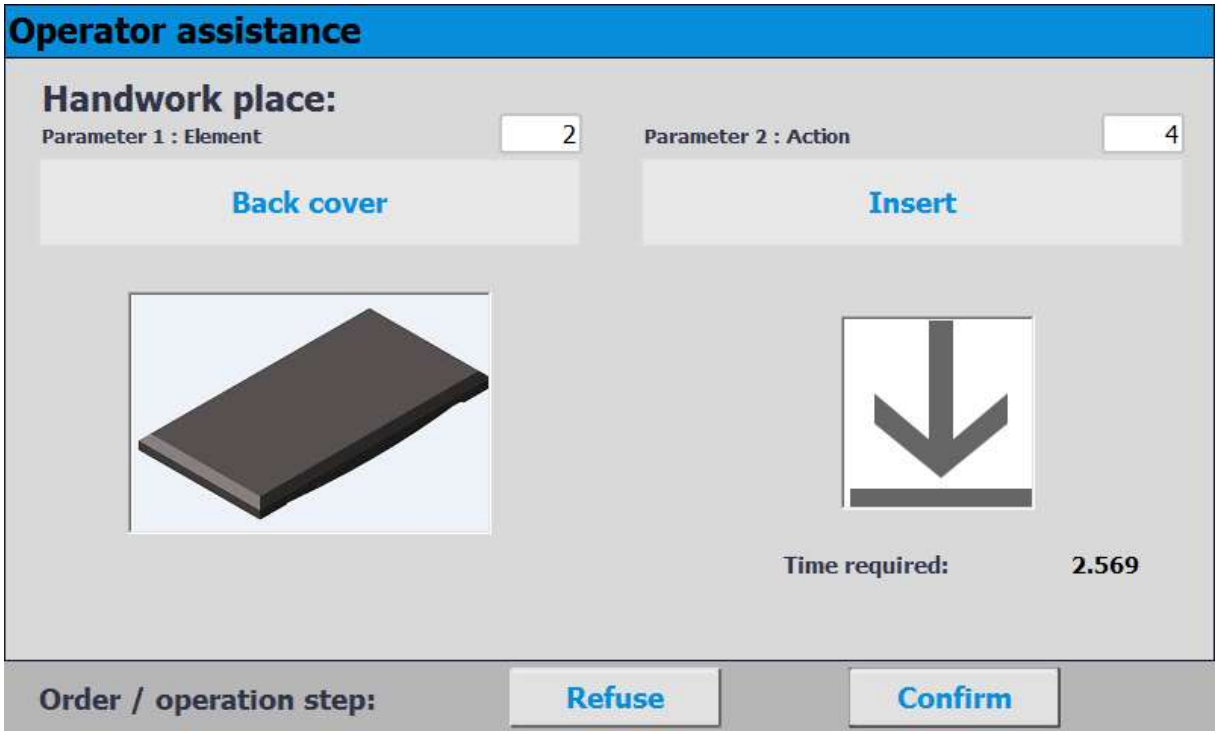

2. The processing time in this case is 10 sec. This can be set in the parameters. The current time is indicated by the bar in progress. At the end of the simulation, the return value is transferred to MES.
3. The carrier is released from the application position.

### 9.5.2 Operator assistance with display of pictures



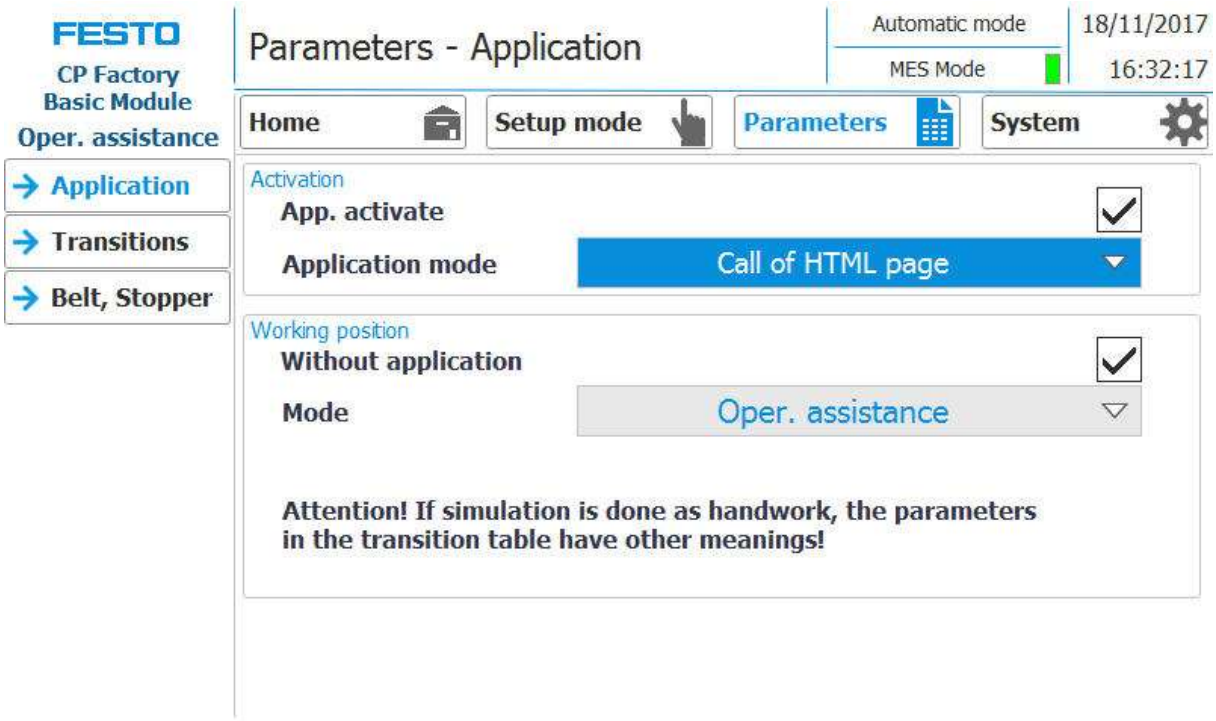

1. If the mode is set to operator assistance (application mode must be set to Standard) and a carrier moves into the application, it will be stopped.
2. The worker now has to complete the specified work task. This is specified in the transition table and consists of the element (parameter 1) and the action (parameter 2).

| Parameter 1 / Element | | Parameter 2 / Aktion | |
|---|---|---|---|
| 0 | No element | 0 | No action |
| 1 | Front cover | 1 | Check |
| 2 | Back cover | 2 | Extract |
| 3 | Printed circuit board | 3 | Assemble |
| 4 | Front fuse (in direction of transport) | 4 | Insert |
| 5 | Rear fuse (in direction of transport) | 5 | Apply |
| 6 | Both fuses | 6 | Rework |
| 7 | Workpiece | 7 | Reserve_7 |
| 8 | Reserve_8 | 8 | Reserve_8 |
| 9 | Reserve_9 | 9 | Reserve_9 |
| 10 | Reserve_10 | 10 | Reserve_10 |




3. In this case, element 2 and action 4 are specified in the transitions. The worker must insert a backcover.
4. If the worker has completed the task, he must press the Confirm button to complete the task. The data is transmitted to MES
5. The carrier is released from the application position.

### 9.5.3 Operator assistance with call of htm-page



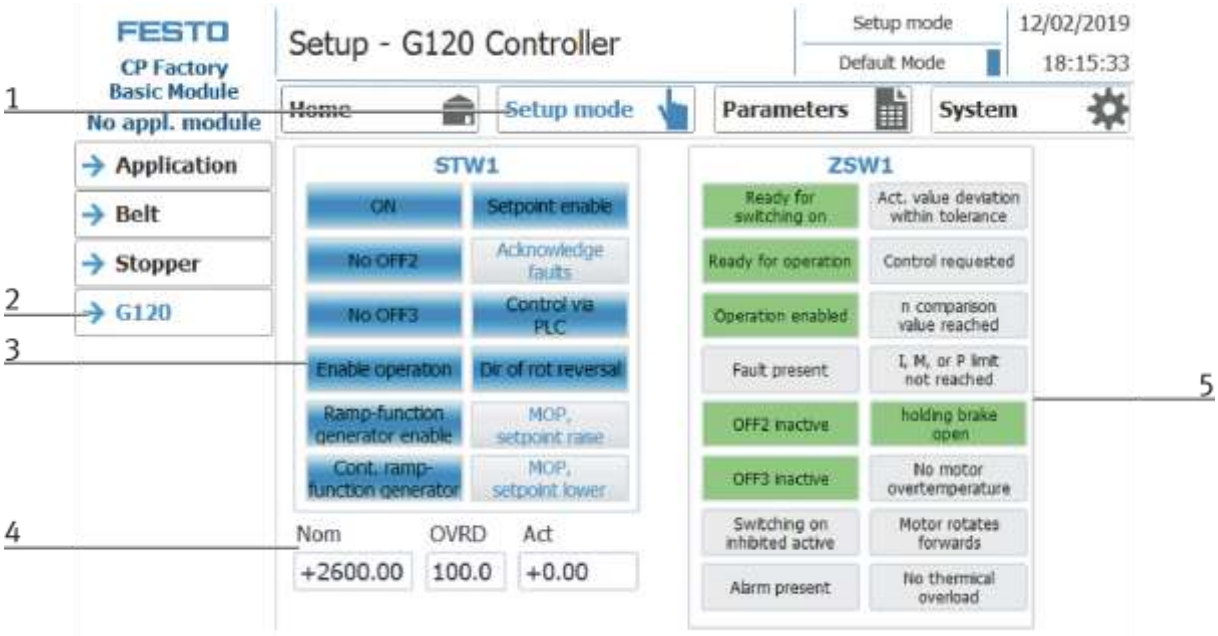

1. If the mode of the application is set to "operator assistance" (application mode must be set to call of HTML page / only possible in MES mode) and a carrier moves into the application, it will be stopped.
2. The worker now has to complete the specified work task. This is described on a html page, which must be created by the customer. The URL of this page, which must be present on the MES PC, can be specified in the work plan of the MES. This worker guide (depending on the html page content) is started if the OpNo 510 is selected for the AP in the work plan and the URL points to this URL link in the work step


3. In this case, the html page was designed so that a work instruction for mounting the front fuse appears in the worker's guidance.
4. If the worker has completed the task, he must press the Confirm button to complete the task. The data is transmitted to MES
5. The carrier is released from the working position.

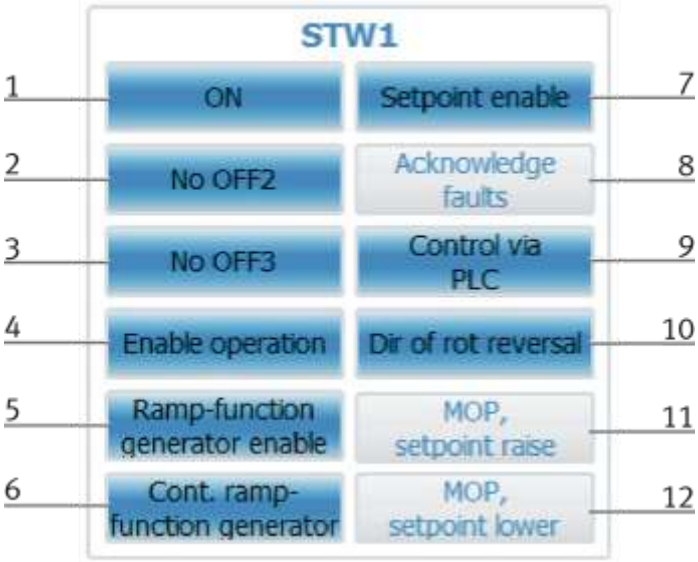
### 9.6 HMI extension with G120 frequency converter

The extension with one frequency converter requires a different motor, the DC motor is replaced by a controllable AC motor. The control is taken over by a frequency converter. Here comes a G120 used. The frequency converter can be controlled manually in set-up mode. The control signals are automatically set in automatic mode. The state of previously set signals in the setup is overwritten.
It is possible to specify a speed setpoint for the belt.

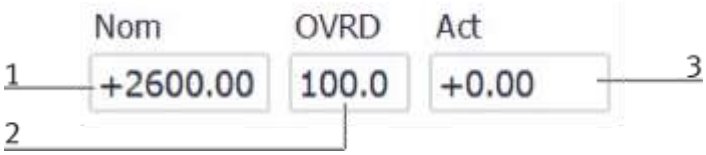
1. To do this, switch to setup mode
2. Select the G120
3. The outputs can be switched in this field (control word 1) (explanation below)
4. The override can be set in this field (explanation below)
5. The inputs / signals are displayed in this field (status word 1) (explanation below)



If the outputs are set, they are highlighted in blue. See training manual G120 page 124.



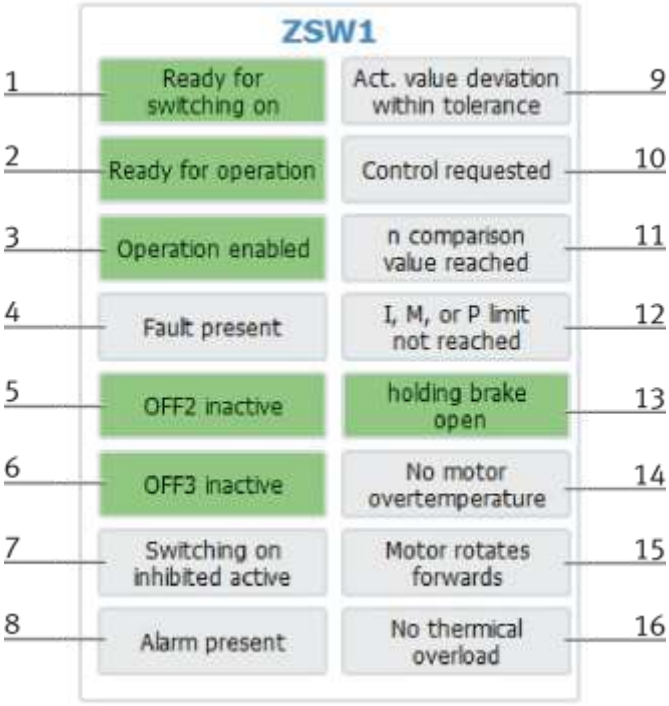

| Position | Description |
|---|---|
| 1 | ON - Set the inverter to the "Ready to run" state, the direction of rotation must be set via Bit11. |
| 2 | No OFF2 - Coast to a standstill, immediate pulse inhibit, drive spins to a stop. |
| 3 | No OFF3 - Quick stop, fast stop: Shut down with the fastest possible deceleration rate. |
| 4 | Enable operation Control and inverter pulses are enabled. |
| 5 | Ramp-function generator enable |
| 6 | Enable HLG - enable ramp function generator |
| 7 | Enable setpoint - the value selected at the HLG input is enabled. |
| 8 | Acknowledge fault - A fault is acknowledged with a positive edge, and the inverter then switches to the "start-up inhibit" state. |
| 9 | Guidance by PLC - Control via interface, process data valid |
| 10 | Direction reversal - motor will run counterclockwise in response to a positive setpoint. |
| 11 | MOP higher - set the motor potentiometer higher |
| 12 | MOP lower - Lower the motor potentiometer |




The setpoint can only be changed in set mode. However, this setpoint is also adopted for automatic mode. It is thus possible to adapt the conveyor belt speed to the respective conditions.

| Position | Description |
|---|---|
| 1 | Setpoint value - entry of the setpoint value by clicking in the field - an input mask appears and the desired setpoint can be entered. Only changeable in setup mode [rpm] |
| 2 | Display of override - Change between 50/100 depending on the area code in the conveyor belt setup |
| 3 | Actual value - display of the current override |

Display of inverter status, active displays are highlighted in green.
See training manual G120 - page 125.




| Position | Description |
|---|---|
| 1 | Ready for switching on - power supply is switched on, electronics are initialized, pulses are blocked. |
| 2 | Ready for operation - Inverter is switched on (ON command is pending), no fault is active, inverter can start as soon as the command "Enable operation" is given. See control word 1, bit = |
| 3 | Operation enabled - drive follows setpoint. See control word 1, bit 3. |
| 4 | Fault present - drive faulty. There is a fault in the drive, which means that it is not in operation and switches to the "startup inhibit" state after successful rectification and acknowledgment of the fault. |
| 5 | OFF2 inactive - "coast to standstill" command is pending. |
| 6 | OFF3 inactive - Quick stop command is active. |
| 7 | Switch-on disable active - The drive is only switched back to the "switched on" state if the commands "no coast down" AND "no quick stop" - followed by "ON" - are given. |
| 8 | Alarm present - drive still in operation; Warning in service / maintenance parameter; no acknowledgment; see alarm parameter r2110. |
| 9 | Act. value deviation within tolerance - setpoint-actual value deviation within the tolerance range. |
| 10 | Control requested - The automation system is requested to take over control. |
| 11 | N comparison value reached |
| 12 | I, M, or P-limit not reached |
| 13 | Holding brake open - signal can be used to control a holding brake |
| 14 | No motor overtemperature |
| 15 | Motor rotates forwards |
| 16 | No thermical oveload |

# 10 Components

## 10.1 Touch panel CP-L-HMI-T7 (option)

You control the system with the touch panel. The upper control row is optionally available.

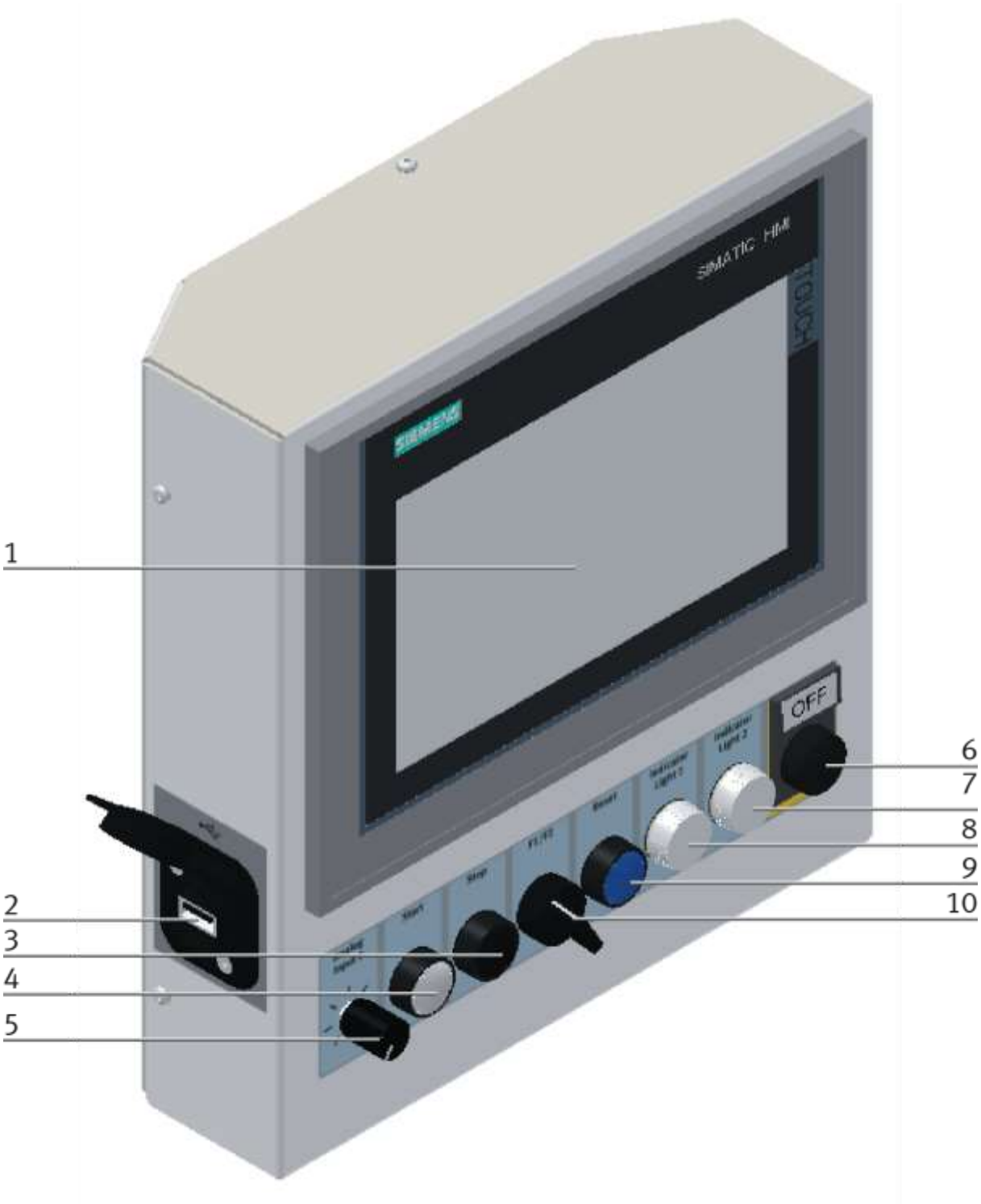



Illustration similar

| Position | Description | X2 Sub D 15 pole/ input | X2 Sub D 15pole /output |
|---|---|---|---|
| 1 | Touch screen | | |
| 2 | USB socket X6 | | |
| 3 | STOP button black /button SF2 | SF2 / X2: 3 / I1 | |
| 4 | START illuminated push-button white/ button SF1/ light PF1 | SF1 / X2: 1 / I0 | PF1 / X2: 2 / Q0 |
| 5 | Potentiometer RA 1 | | |
| 6 | OFF button SF5 – at M12 panel plug | | |
| 7 | Q2 indicator light white / light PF4 | | PF4 / X2: 8 / Q3 |
| 8 | Q1 indicator light white / light PF3 | | PF3 / X2: 6 / Q2 |
| 9 | RESET illuminated push-button blue / button SF4 / light PF2 | SF4 / X2: 7 / I3 | PF2 / X2: 4 / Q1 |
| 10 | Selector switch 00 Auto/F1/SF3 | SF3 / X2:5 / I2 | |

### 10.1.1 Front PCB XZ1

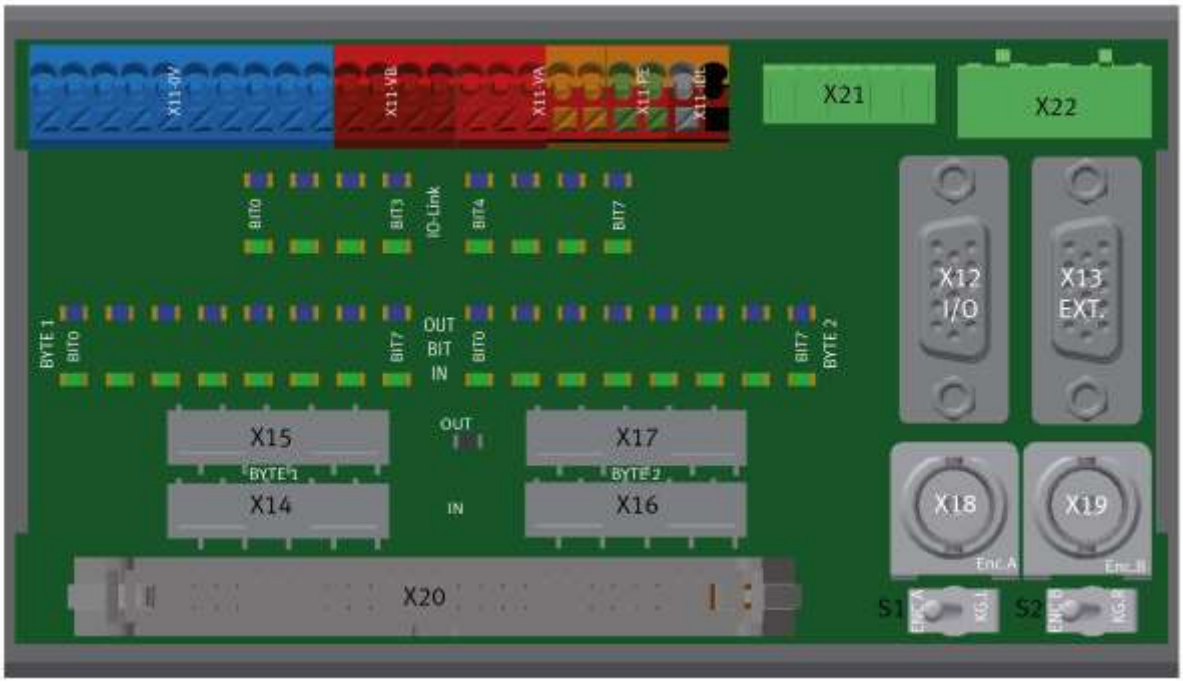



Illustration similar

**XZ1 PCB operation panel connection**

| Function | XZ1 |
|---|---|
| Start Button / SF1 | X12:1 |
| Stop button / SF2 | X12:3 |
| Switch operation panel / SF3 | X12:5 |
| Reset button / SF4 | X12:7 |
| Start lamp / PF1 | X12:2 |
| Reset lampn / PF2 | X12:4 |
| Lamp Q1 / PF3 | X12:6 |
| Lamp Q2 / PF4 | X12:8 |

-XZ1-X17 = Output-Byte 2
-XZ1-X16 = Input-Byte 2
-XZ1-X15 = Output-Byte 1
-XZ1-X14 = Input-Byte 1  1
-XZ1-X12 = controlpanel basic functions
-XZ1-X13 = controlpanel additional buttons
-XZ1-X18 = incremental encoder BNC-Connector 1
-XZ1-X19 = incremental encoder BNC-Connector 2
-XZ1-X11 = terminals PCB front side
-XZ1-X20 = connection to opposite PCB
-XZ1-X1 = connection to opposite PCB
-XZ1-X21 = Powersupply HMI and external OFF Button
-XZ1-X22 = 24VA and 24VB for external interconnection

### 10.1.2 Back PCB XZ2

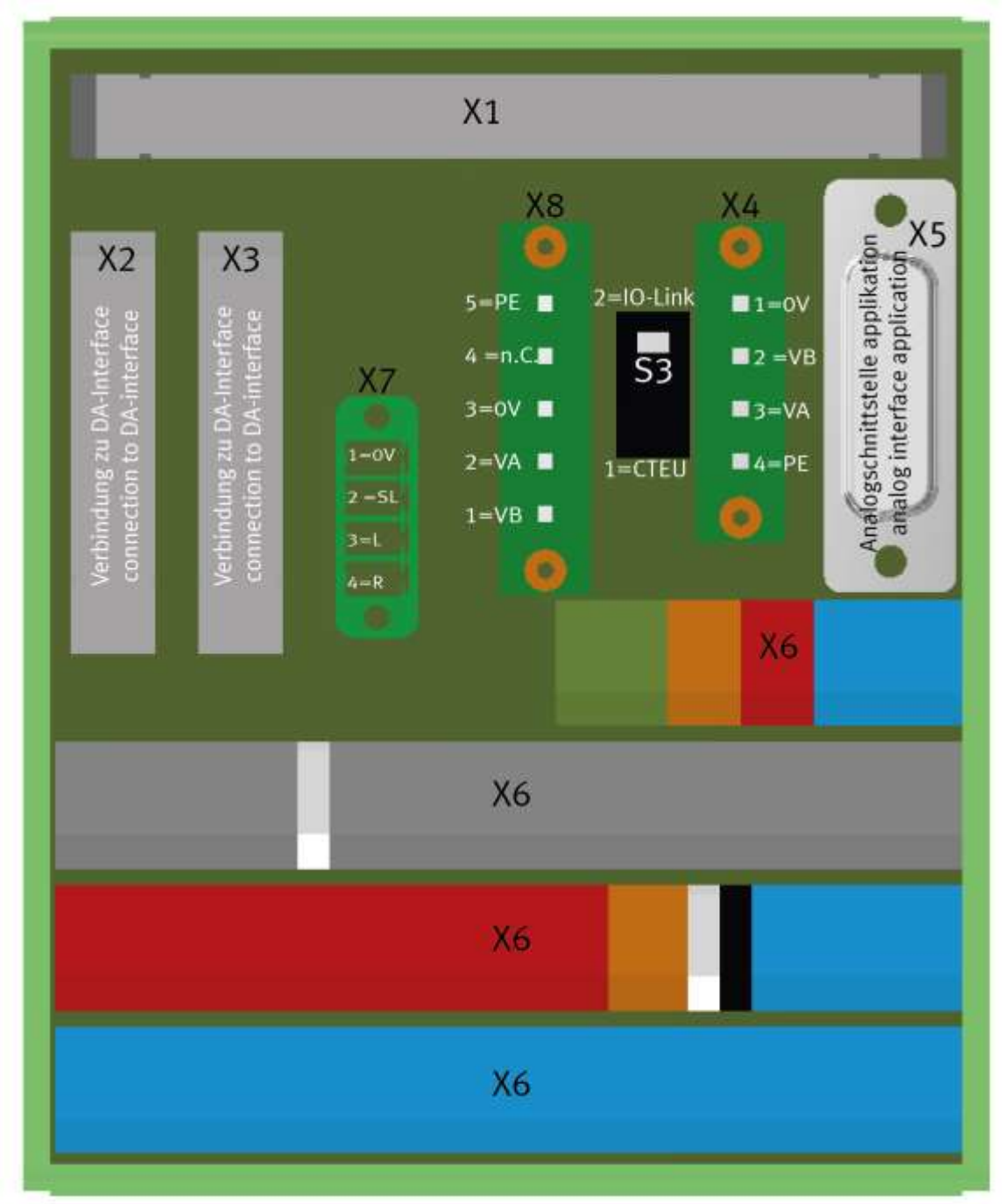



Illustration similar

-XZ2-X4 = power supply
-XZ2-X2 = connection 1 to DA-Interface
-XZ2-X3 = connection 2 to DA-Interface
-XZ2-X5 = analog signals for application
-XZ2-X6 = terminals PCB rear side
-XZ2-X7 = connection to external Motorcontroller
-XZ2-X8 = 24V application modules

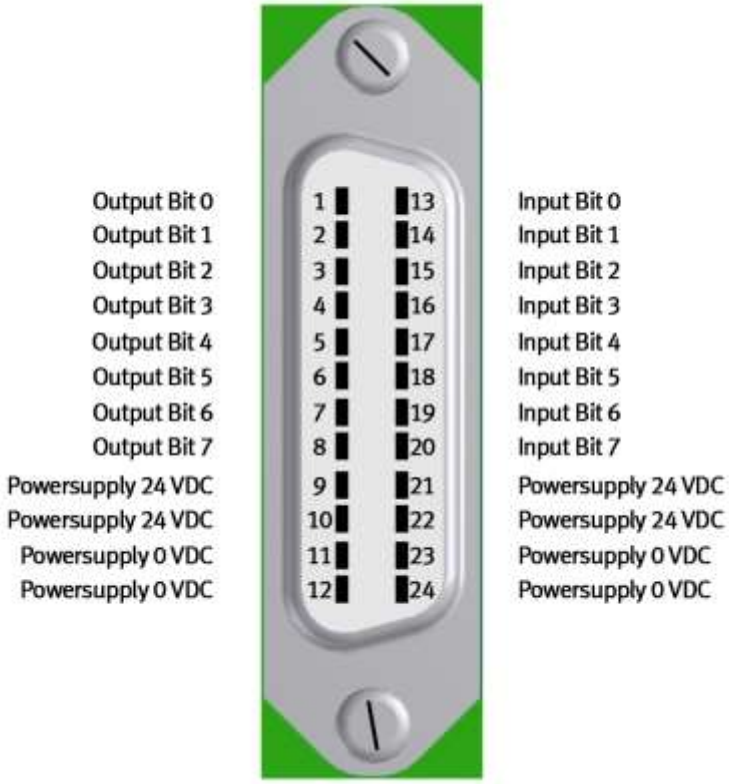
### XZ2 Connections to PLC

| Function | Controller | XZ2 in | XZ2 out | Sensor / Actor |
|---|---|---|---|---|
| Identcode Bit 0 | KF21:I18.0 / XZ3:A1 | X2:1 | X6:1 | BG1 / Identcode Bit 0 |
| Identcode Bit 1 | KF21:I18.1 / XZ3:A3 | X2:3 | X6:2 | BG2 / Identcode Bit 1 |
| Identcode Bit 2 | KF21:I18.2 / XZ3:A5 | X2:5 | X6:3 | BG3 / Identcode Bit 2 |
| Identcode Bit 3 | KF21:I18.3 / XZ3:A7 | X2:7 | X6:4 | BG4 / Identcode Bit 3 |
| Reserve | KF21:Q18.0 / XZ3:A1 | X2:2 | X6:19 | |
| Reserve | KF21:Q18.1 / XZ3:A3 | X2:4 | X6:20 | |
| Reserve | KF21:Q18.2 / XZ3:A5 | X2:6 | X6:21 | |
| Reserve | KF21:Q18.3 / XZ3:A7 | X2:8 | X6:22 | |

| Function | Controller | XZ2 out | Sensor / Actor |
|---|---|---|---|
| Pallet at left end | KF3:I1.6 / XG3:7 | X6:13 | BG5 |
| Pallet at right end | KF3:I1.7 / XG3:8 | X6:14 | BG6 |
| Transport direction to right | KF5:Q1.4 / XG5:5 | X6:27 | QA1:RE motor controller |
| Transport direction to left | KF5:Q1.5 / XG5:6 | X6:28 | QA1:LI motor controller |
| Transport slow speed | KF5:Q1.6 / XG5:7 | X6:29 | QA1:SL motor controller |
| Open stopper | KF5:Q1.7 / XG5:8 | X6:30 | QM1-MB1 |

| Function | Controller | XZ2 in | XZ2 out | Sensor / Actor |
|---|---|---|---|---|
| Coupling receiver right | KF21:I18.4 / XZ3:B1 | X3:1 | X6:5 | KG1 |
| Coupling receiver left | KF21:I18.5 / XZ3:B3 | X3:3 | X6:6 | KG2 |
| Stopper opened | KF21:I18.7 / XZ3:B7 | X3:7 | X6:8 | BG9 |
| Coupling sender left | KF21:Q18.4 / XZ3:B2 | X3:2 | X6:23 | GF1 |
| Coupling sender right | KF21:I18.5 / XZ3:B4 | X3:3 | X6:24 | GF2 |

### 10.1.3 SYS link Cable - Interface




Syslink – allocation

| SYSlink PIN | Bit | Name | | Syslink PIN | Bit | Function |
|---|---|---|---|---|---|---|
| 01 | 0 | Output AX.0 | | 13 | 0 | Input EX.0 |
| 02 | 1 | Output AX.1 | | 14 | 1 | Input EX.1 |
| 03 | 2 | Output AX.2 | | 15 | 2 | Input EX.2 |
| 04 | 3 | Output AX.3 | | 16 | 3 | Input EX.3 |
| 05 | 4 | Output AX.4 | | 17 | 4 | Input EX.4 |
| 06 | 5 | Output AX.5 | | 18 | 5 | Input EX.5 |
| 07 | 6 | Output AX.6 | | 19 | 6 | Input EX.6 |
| 08 | 7 | Output AX.7 | | 20 | 7 | Input EX.7 |
| 09 | 24V | Power supply | | 21 | 24V | Power supply |
| 10 | 24V | Power supply | | 22 | 24V | Power supply |
| 11 | 0V | Power supply | | 23 | 0V | Power supply |
| 12 | 0V | Power supply | | 24 | 0V | Power supply |

### 10.1.4 RFID Read/Write system

The RFID read-write head describes and/or reads the data from a RFID data storage medium which is located on the bottom of the carrier. Any information concerning the workpiece can be read or transmitted.
The read-write head is directly connected to the I/O link of the ET200SP.

Read-write head RF210R IO-Link / illustration similar

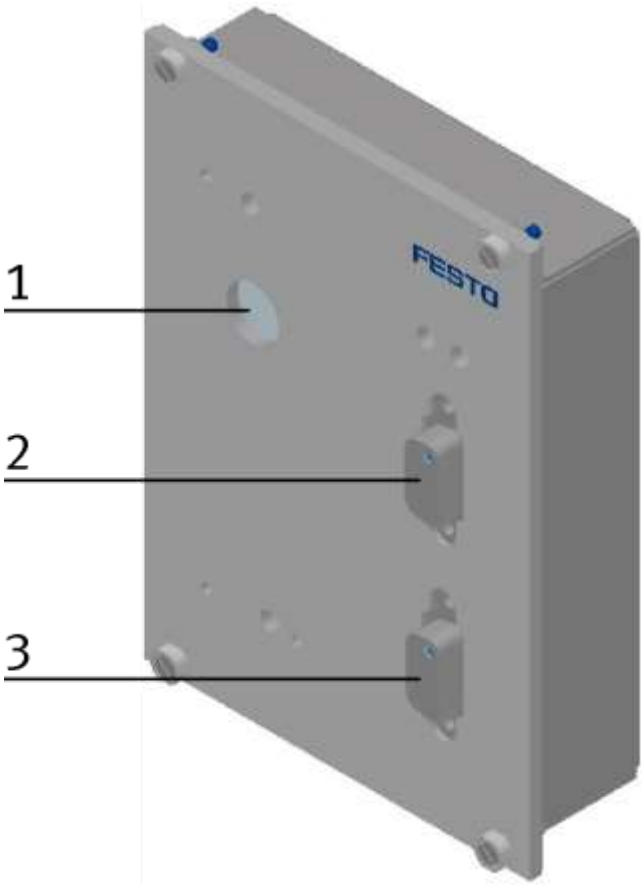
There are 2 different read / write heads which are addressed differently in the software, this must be considered.
Reader RF210R, order number 6GT2821-1AC32 with interface IO-Link V1.0
Reader RF210R, order number 6GT2821-1BC32 with interface IO-Link V1.1

TW-R16-B128 RFID data storage medium / illustration similar

| Clamp read-write head | Cable | I/O Link |
|---|---|---|
| TF1:1 / 24 V | XTF1:1 / BN | XG1/X12:1 - L+ |
| TF1:3 / 0V | XTF1:3 / BU | XG1/X12:3 - L- |
| TF1:4 / Data | XTF1:4 / BK | XG1/X12:2 - C/Q |

### 10.1.5 IO-Link DA-Interface (digital-analogue interface)

The I- port is an interface between the ET200SP and the sensors and actuators wired on the mini I/O terminals. The order number is 8038559.




I-Port KF11 / illustration similar

| Position | Description |
|---|---|
| 1 | I-Port –here the data are transmitted to the I/O link of the ET200SP. It is possible to remove the 5 pole cable and to replace it by an adapter plug. With the help of the CTEU bus knot it will be possible to adapt different bus systems to the system.<br>The following bus systems are available presently: PN, PB, CC-Link, CAN, DeviceNet, Ether Cat<br>The allocation of the 5 pole cable is as follows:<br>Clamp 1 – 24 VB / cable has a brown stranded wire<br>Clamp 2 – 24 A / cable has a white stranded wire<br>Clamp 3 – OVB / cable has a blue stranded wire<br>Clamp 4 – Data / cable has a black stranded wire<br>Clamp 5 – OVA / cable has a grey stranded wire |
| 2 | Data channel A |
| 3 | Data channel B |

### 10.2 Scalance Ethernet Switch

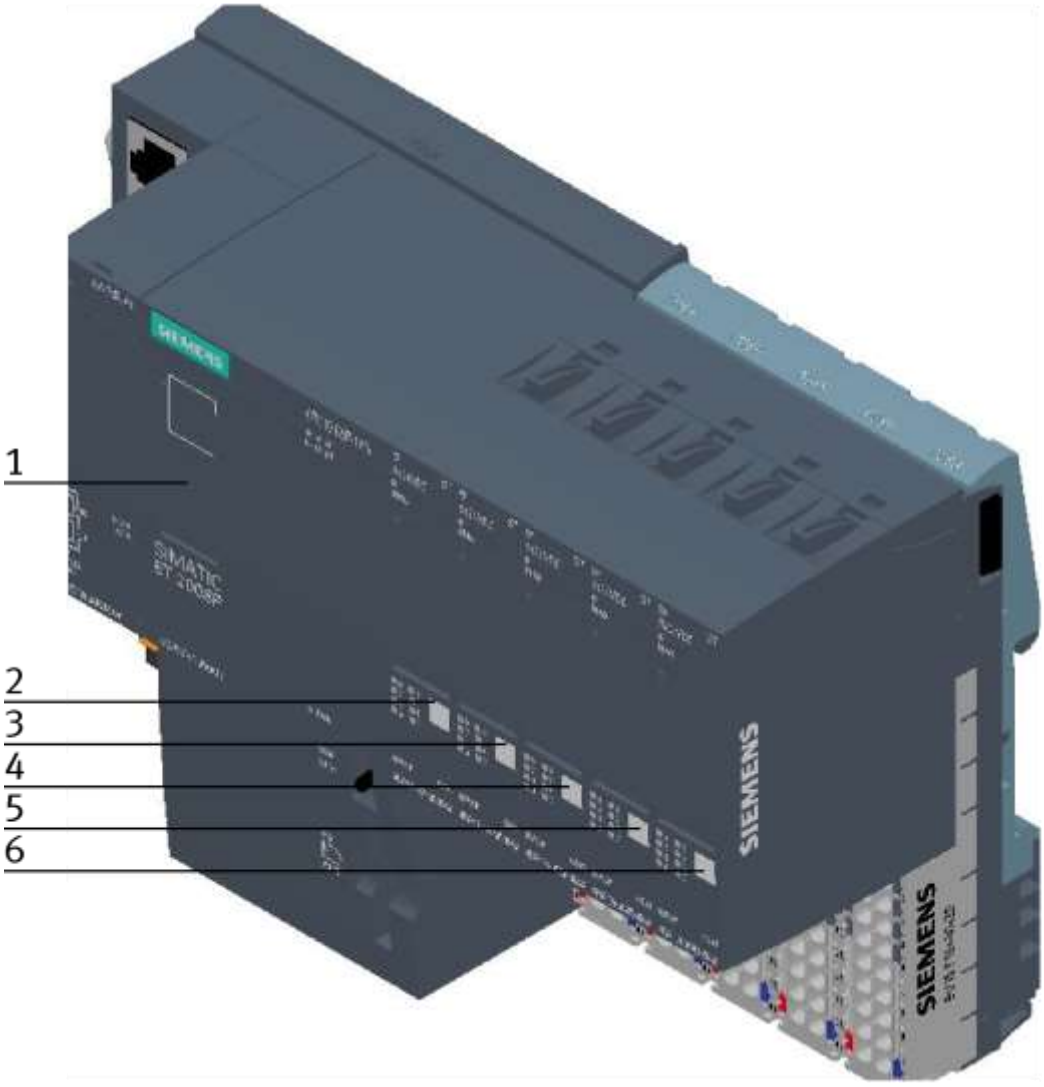

Siemens Scalance Ethernet switch / illustration similar

The SCALANCE X208 has eight RJ-45 jacks for the connection of end devices or other network segments.

### 10.2.1 Control systems

The control unit regulates all processes as well as the communication in the CP Lab conveyor. Different control systems can be used.
It is possible that a I/O Terminal is installed instead of an controller.

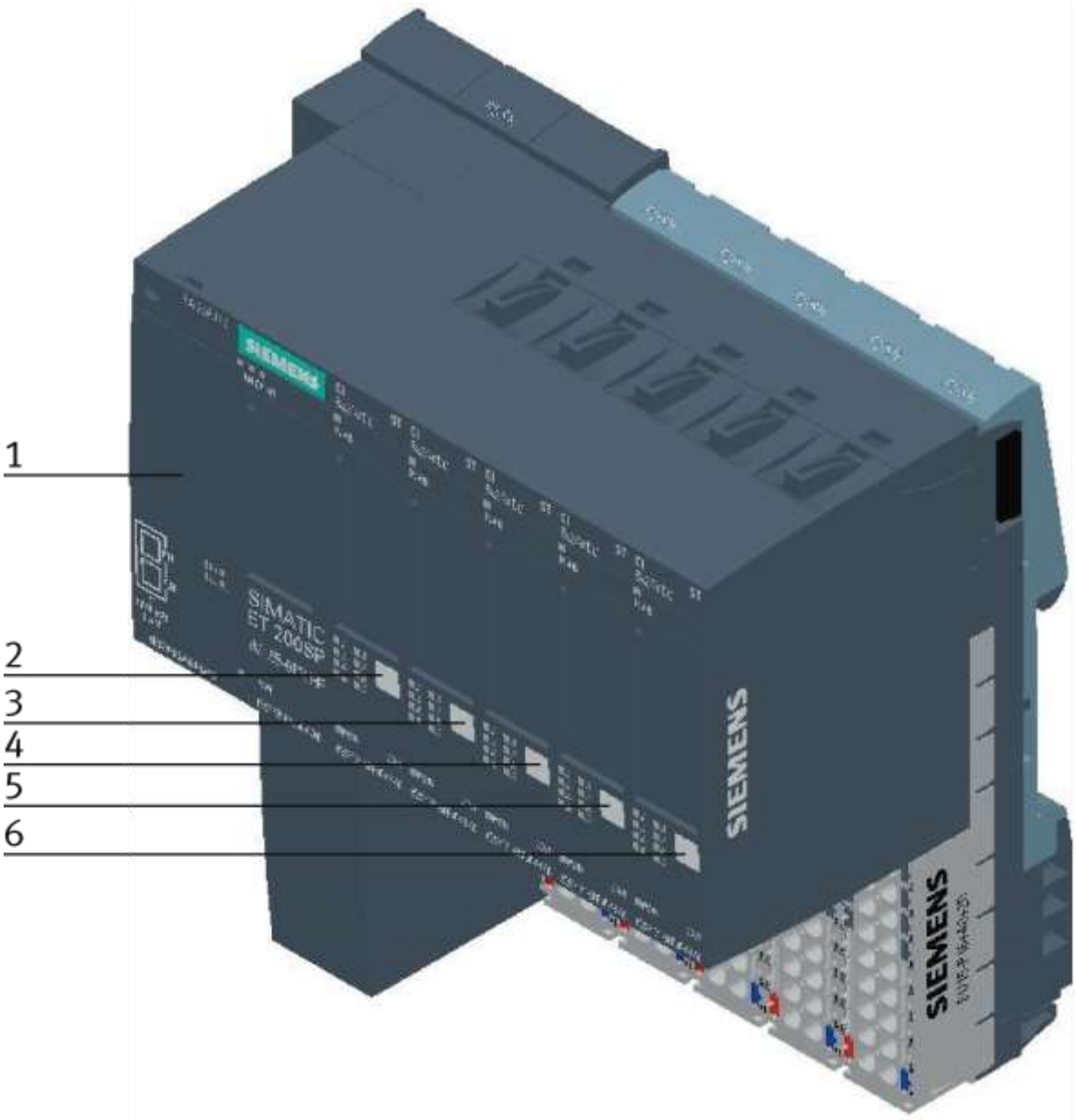
**ET200SP with CPU1512**




ET200 SP / illustration similar

| Position | Description |
|---|---|
| 1 | ET200SP / CPU1512SP F-1PN / K1-KF1 / 6ES7512-1SK00-0AB0 |
| 2 | DI / 8x 24VDC / K1-KF2 / 6ES7131-6BF00-0CA0 |
| 3 | DI / 8x 24VDC / K1-KF3 / 6ES7131-6BF00-0CA0 |
| 4 | DO / 8x 24VDC 0,5A / K1-KF4 / 6ES7132-6BF00-0CA0 |
| 5 | DO / 8x 24VDC 0,5A / K1-KF5 / 6ES7132-6BF00-0CA0 |
| 6 | CM / 4x IO-Link ST / K1-KF6 / 6ES7137-6BD00-0BA0 |

### ET200SP with IM155




ET200 SP / illustration similar

| Position | Description |
|---|---|
| 1 | ET200SP / IM155-6 PN HF / K1-KF1 / 6ES7155-6AU00-0CN0 |
| 2 | DI / 8x 24VDC / K1-KF2 / 6ES7131-6BF00-0CA0 |
| 3 | DI / 8x 24VDC / K1-KF3 / 6ES7131-6BF00-0CA0 |
| 4 | DO / 8x 24VDC 0,5A / K1-KF4 / 6ES7132-6BF00-0CA0 |
| 5 | DO / 8x 24VDC 0,5A / K1-KF5 / 6ES7132-6BF00-0CA0 |
| 6 | CM / 4x IO-Link ST / K1-KF6 / 6ES7137-6BD00-0BA0 |

### 10.2.2 Signal Converter

The signal converter is a fibre optic unit with a teachable switching point.

Signal converter 552796 / SOE4-FO-L-HF2-1P-M8 / illustration similar

WARNING

Not to be used as a safety component! Electric voltage! Before you work on the electricity, you have to switch off the voltage.

**Mounting and Setting**

Connecting the plastic fibre optic cable

1. Open the clamp strap.
2. Insert the fibre optic cable to the stop into the holder (you have to overcome the resistance when inserting at the O ring)
3. Close clamp strap.

**Setting sensitivity in a running process (turning conveyor motor)**

1. Adjust the fibre optic cable to the object: => LED green is flashing, LED yellow is undefined.
2. Only the running process is in the optical path; press the button for approx. 3s until both LEDs are flashing simultaneously.
3. Press button again until there is at least one process cycle executed in the optical path.
   a) green LED is flashing for a short time and starts lighting up, => sensitivity settings are saved, sensor is ready for operation.
   b) both LEDs are flashing simultaneously => Sensor cannot detect the object, no sensitivity settings are saved.

**Setting the start function (N.O. / N.C.)**

1. Press button for approx. 13 s => LEDs are flashing alternately.
2. Release button: => green LED is flashing.
3. While the green LED is flashing, on every pressing of the button, the start function is inverted. The current function is indicated by the yellow LED.
4. Don't press the button for 10 s: => set function is saved, sensor is ready for operation.

**Factory setting / maximum sensitivity (default)**

1. No object in the sensing range. Press button for approx. 3 s until both LEDs are flashing simultaneously.
2. No object in the sensing range. Press button for approx. 1 s.
   => Sensor is set at maximum sensitivity.
   => Sensor has its factory setting again

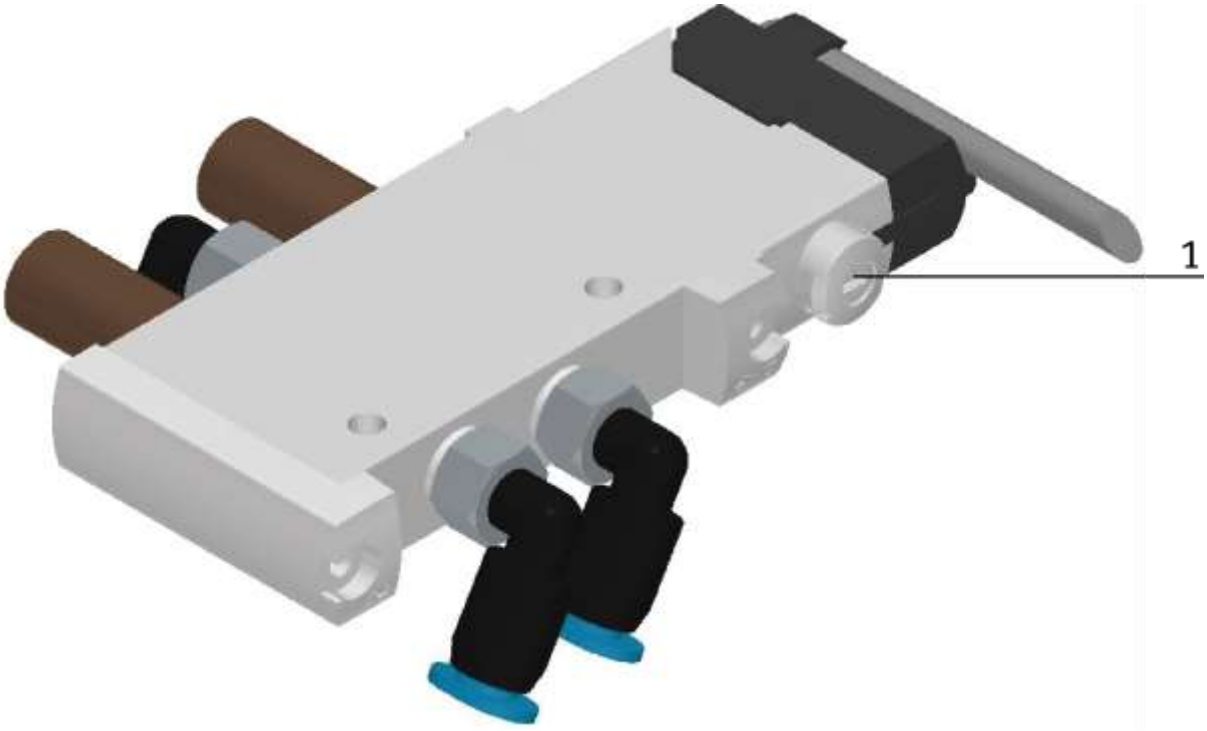
**Pilot line (ET) / Process of external Teach-in**

- 3 s at $+U_B$ / determine teach point 1
- open
- 3 s at $+U_B$ / determine teach point 2
- open setting saved, end of external Teach

### 10.2.3 Solenoid valve

The solenoid valve controls the cylinder of the stopper unit. The solenoid valve has got a manual override (see pos.1).

When you press it (non-locking), the cylinder drives the stopper unit down as long as you press it. When you press the manual override and turn it (locking), the cylinder drives down with long-lasting effect.




Solenoid valve 574351 / VUVG-L10-M52-MT-M5-1P3 / illustration similar

# 11 Extensions

## 11.1 Extension with an active corner

In order to make a circulation of several CP Lab conveyors, it is possible to assemble the CP Lab conveyors in the rectangle and to connect the conveyors with active corners. A motor drives the corner and the carrier is transported to the following CP Lab conveyor. The active corners are connected in parallel to the motor used, the corner is mounted on the left side of the CP Lab conveyor. The coupling sensors of the conveyors are simply forwarded to the following CP Lab conveyor using light guide bridges.

Example concatenation 4 CP Lab conveyors with active corners / illustration similar

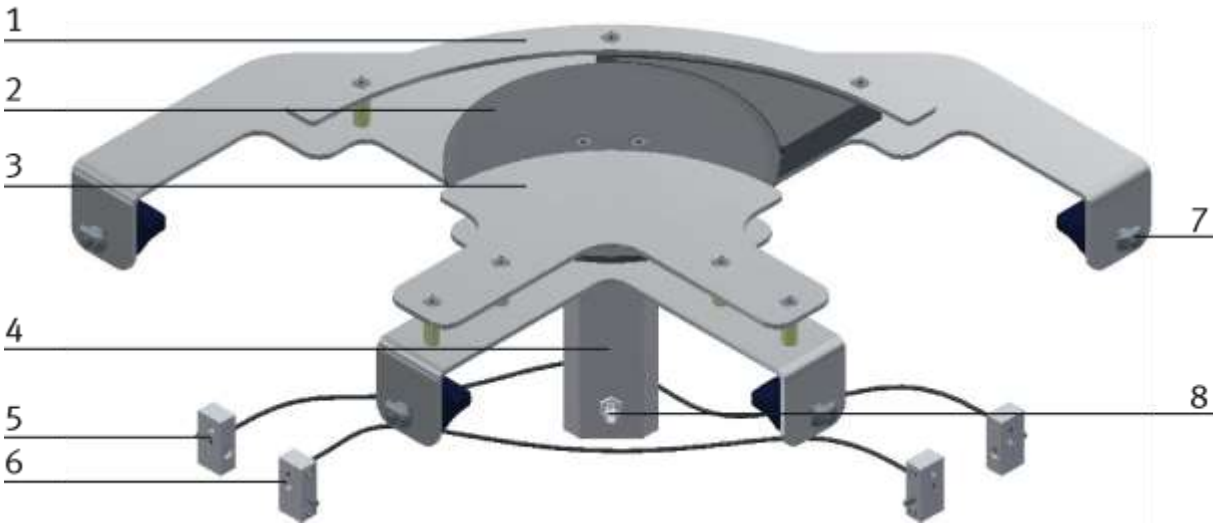



illustration similar

| Position | Description |
|---|---|
| 1 | Outside guard railing |
| 2 | Turning table |
| 3 | Inside guard railing |
| 4 | Motor |
| 5 | Coupling sensor transmission |
| 6 | Coupling sensor transmission |
| 7 | Screw |
| 8 | Motor connection (see Circuit diagram p.13) |

### 11.2 Extension with a passive corner

In order to achieve a circulation from several CP Lab conveyors, it is possible to assemble the CP Lab conveyor in the rectangle and to connect the conveyors with passive corners. The corners are equipped with balls which enable the carrier to be transported without drive to a further band mounted at a right angle. The coupling sensors of the conveyors are simply forwarded to the following CP Lab conveyor using light guide bridges.

illustration similar

Example concatenation 6 CP Lab conveyors with passive corners

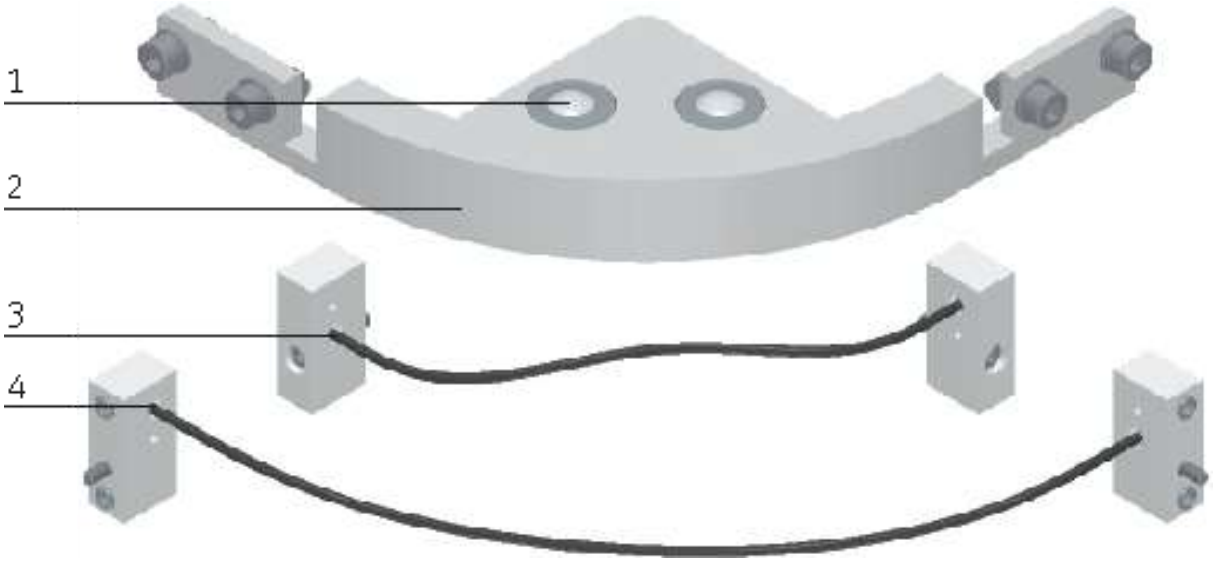



illustration similar

| Position | Description |
|---|---|
| 1 | Ball caster |
| 2 | Passive guard railing |
| 3 | Coupling sensor transmission |
| 4 | Coupling sensor transmission |

### 11.3 Robotino docking extension

To dock a robotino to a CP Lab conveyor, a small profile construction is necessary. The necessary sensors are already available on the conveyor. Although they are not disassemled, the inputs of the coupling sensors are now used for the coupling of the robotinos.


illustration similar

| Position | Description |
|---|---|
| 1 | Coupling sensor robotino |
| 2 | Profile construction to dock a robotino on the left side |
| 3 | Coupling sensor robotino |
| 4 | Profile construction to dock a robotino on the right side |


illustration similar

At positions 1 and 2 the deactivated sensors can be seen, they remain at the conveyor but are no longer connected.

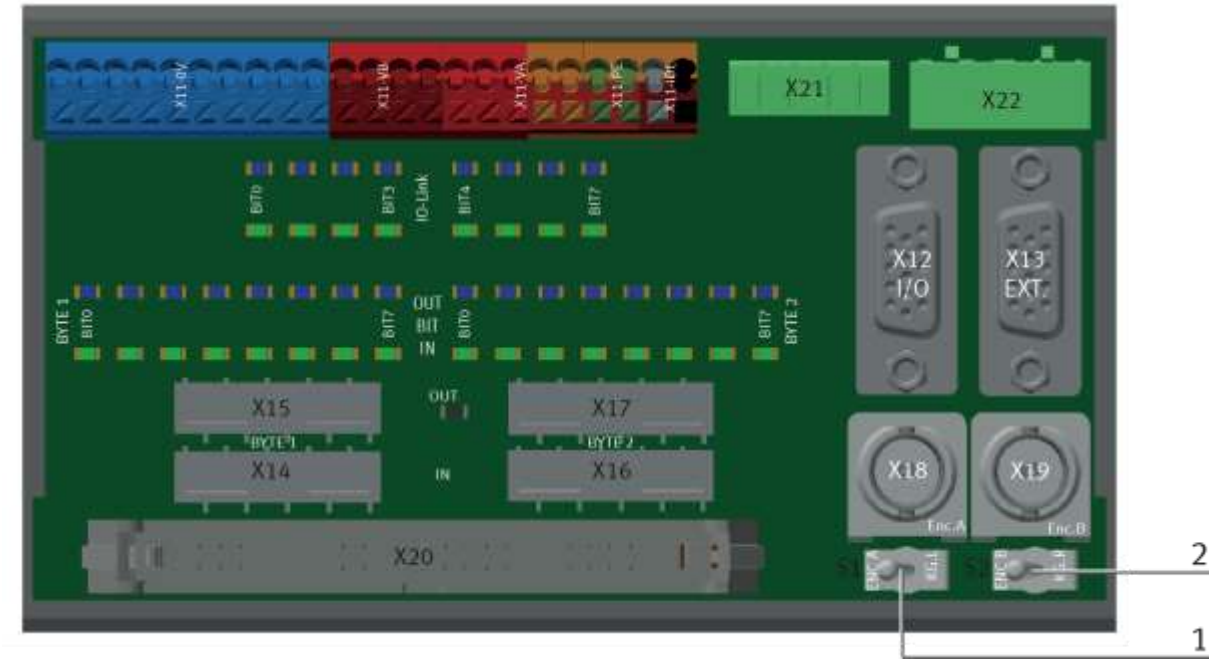



illustration similar

| Position | Description |
|---|---|
| 1 | Switch S1 |
| 2 | Switch S2 |

If the docking extension is used for the robotino, the two toggle switches S1 and S2 must be changed over.
Left position - encoder is used / docking extension deactivated
Right position - Encoder is not used / docking extension activated

# 12 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

## 12.1 Message texts

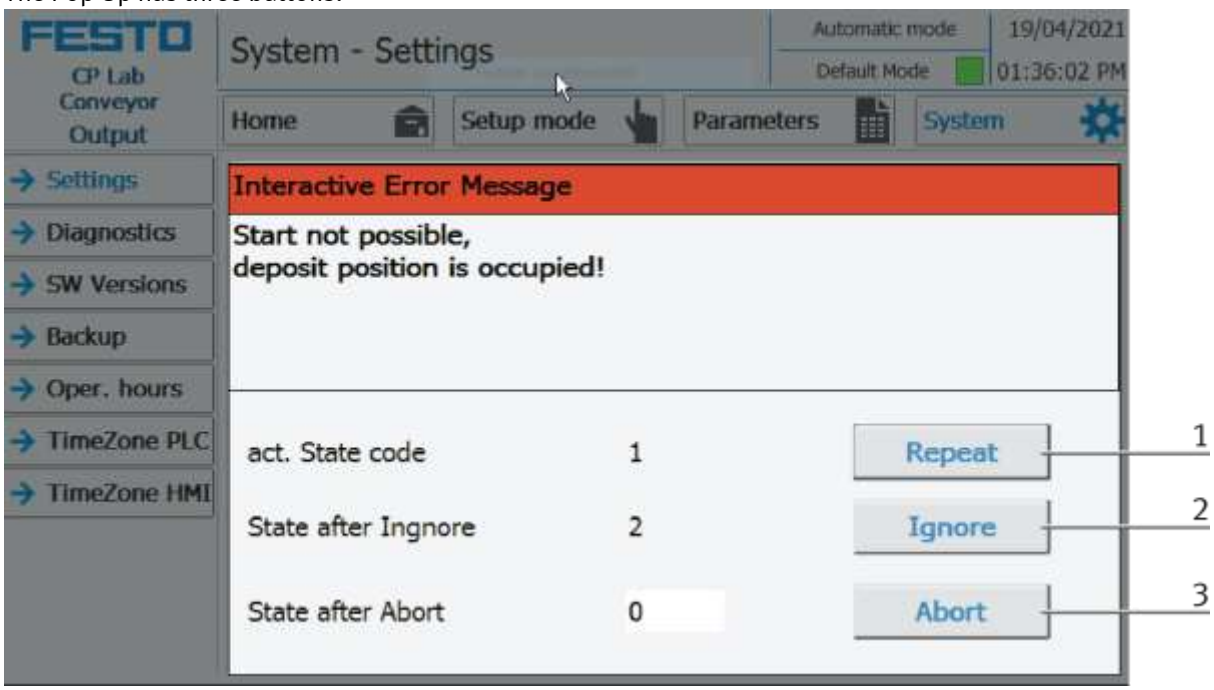
Actually there are now message texts available.

## 12.2 Interactive error messages

### 12.2.1 Default operation

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

The Pop Up has three buttons.



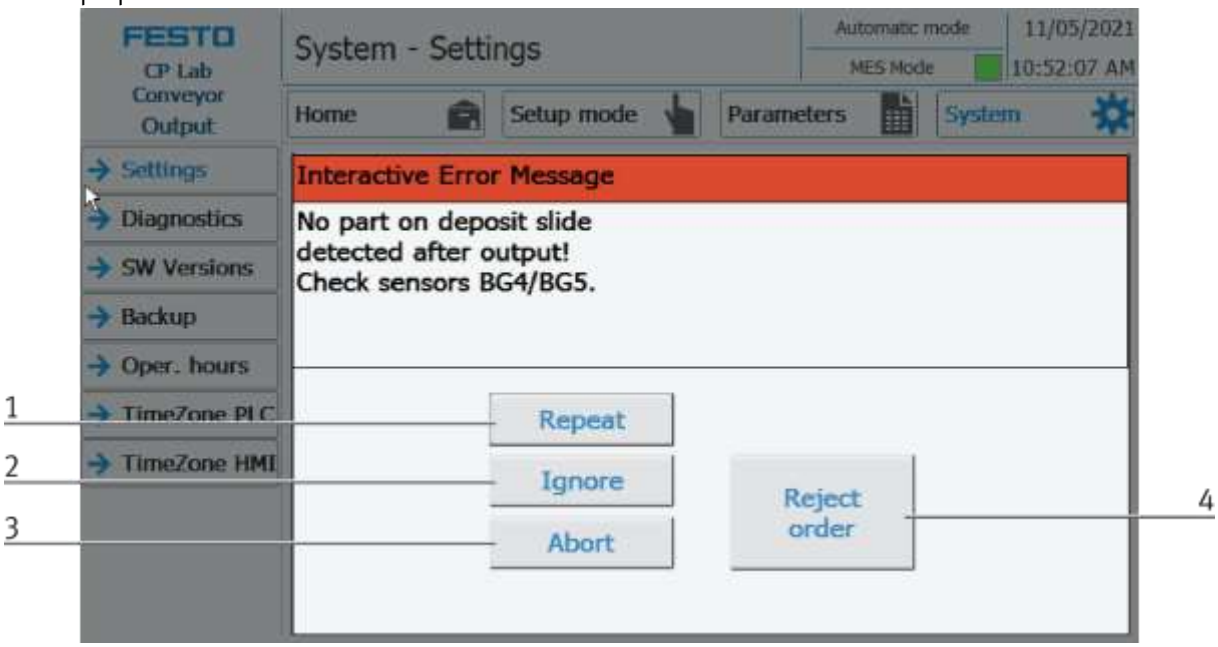

Example application module output - interactive error message in default mode

| Position | Note |
|---|---|
| 1 | Repeat - An attempt is made to run the application again. |
| 2 | Ignore – The error status is ignored; the workpiece carrier receives the status code as indicated in the transition table in the "Initial status" column. The application is no longer executed. |
| 3 | Abort – The error status is ignored; the workpiece carrier receives the status code as shown in the input / output field next to the value displayed. This can be changed in this interactive error message window. |

### 12.2.2 MES Operation

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

The Pop Up has four buttons.




Example application module output - interactive error message in default mode

| Position | Note |
|---|---|
| 1 | Repeat - An attempt is made to run the application again with the same parameters. |
| 2 | Ignore – The application is not executed, but is treated in the MES as if the order step had been executed without errors. |
| 3 | Abort – The application is no longer executed. In the MES, this order position is terminated with an error and canceled, depending on whether an error step has been defined or not. |
| 4 | Reject order - the application will not be executed. In the MES, the step of this order position is reset and restarted the next time the workpiece carrier arrives. |

### 12.2.3 General

| Value | Text | Fix error |
|---|---|---|
| 100 | Order aborted with errors! | Start order again |

# 13 Spare part list

## 13.1 Electric parts

| Description | Part number | Res.Ident | Use |
|---|---|---|---|
| Proximity sensor SIEN-M8NB-PS-S-L | 150395 | BG1 | Identcode Bit0 |
| Proximity sensor SIEN-M8NB-PS-S-L | 150395 | BG2 | Identcode Bit1 |
| Proximity sensor SIEN-M8NB-PS-S-L | 150395 | BG3 | Identcode Bit2 |
| Proximity sensor SIEN-M8NB-PS-S-L | 150395 | BG4 | Identcode Bit3 |
| Capacitve sensor | 117066 | BG5 | Pallet at left end |
| Capacitve sensor | 117066 | BG6 | Pallet at right end |
| Light guide unit D: SOEG-E-Q30-PS-S-2L | 165323 | KG1 | coupling receiver right (n.c.) |
| Light guide unit D: SOEG-E-Q30-PS-S-2L | 165323 | KG2 | coupling receiver left (n.c.) |
| Proximity sensor SMT-8M-A-PS-24V-E-0,3-M8D | 574334 | BG9 | Stopper opened |
| Light guide unit D: SOEG-S-Q30-S-L | 165353 | GF1 | coupling sender left |
| Light guide unit D: SOEG-S-Q30-S-L | 165353 | GF2 | coupling sender right |
| Start-up current limiter | 150768 | QA1 | Conveyor motor |
| Fibre-optic unit SOE4-FO-L-HF2-1P-M8 | 552796 | BG7 | incremental encoder Ch. A |
| Fibre-optic unit SOE4-FO-L-HF2-1P-M8 | 552796 | BG8 | incremental encoder Ch. B |

## 13.2 Pneumatic parts

| Description | Part number | Res.Ident | Use |
|---|---|---|---|
| Valve solenoid valve VUVG-L10-M52-MT-M5-1P3 | 574351 | MB 1 | Stopper down |

# 14 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.

# 15 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

# 16 Disposal

**NOTE**

Electronic waste contains recyclable materials and must not be disposed of with the domestic waste. Bring electronic waste to a designated municipal collection point.

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