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SC CP LAB STD CFG 10

FESTO

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Original operating instructions

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

⚠	⚠ **CAUTION**
	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 – hot surface

Warning – optical radiation

Warning – laser radiation

Warning – hand injuries

Warning – risk of entanglement

Warning – potentially explosive substances

Warning – magnetic field

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

	⚠ **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

	⚠ **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.

	⚠ **CAUTION**
⚠	• **Danger from breaking a device roll!** The device rolls are no transport rolls! The device rolls are only intended for the placement of the station. – Safety shoes must always be worn when transporting the station!

	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 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)

4.12 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 vakuu-tuksen kohde on asiaa koskevan unionin yhdenmukais-tamislainsäädännön 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 felelőssége mellett adják ki. Az ismertetett nyilatko-zat tárgya megfelel a vonatkozó uniós har-monizációs 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) Ši atitikties deklaracija išduota tik gamintojo atsakomybe. Aprašytas deklaracijos objektas atitinka susijusius derinamuosius 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 desbe-treffende 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 Belgesi tamamen üreticinin sorumluluğu altındadır. Belgede açıklanan obje, Birliğin 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.

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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

FESTO

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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 this 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	20140917	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 61000-4-1	2019
ETSI EN 301 489-3	V2.1.1	EN IEC 61000-4-2	2019
EN 55011 + A1 + A21	2016/2017/2020	EN 61000-4-3 + A1	2007/2011
EN 55032 + A11 Class A/B	2015/2020	EN IEC 61000-4-4	2019
EN 55035 + A11	2017/2020	EN IEC 61000-4-6	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

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

4.13 General machine safety

⚠	**⚠ 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.

4.14 General product safety

⚠	**⚠ WARNING**

	• **General product safety, CE conformity**
	  – Product safety for the products 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 in the event of significant changes. The operator must re-evaluate the safety and determine the CE conformity.

4.15 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.

4.15.1 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.

4.15.2 Emergency stop

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

4.15.3 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

Parameter	Value
Electrics	
Operating voltage	1-phase 230 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, Voltage for small actuators	24 V DC 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. 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 EMC Directive RoHS Directive
EMC environment	Industrial environment, Class A (in acc. with EN 55011)
Subject to change	

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

can convey in a practice-oriented manner. In addition, the ability to work in a team, the willingness to cooperate and organizational skills can be trained.

The CP Lab 400 complete systems include four predefined systems.

These are compiled based on the experience of many implemented CP Lab systems, and form typical, logical combinations for an introduction to the world of Industry 4.0.

Fully-equipped with the application modules, each system represents a production process. This enables the diverse areas of Industry 4.0 to be clearly illustrated and taught.

The configurations build upon one another, creating useful processes from even the smallest system.
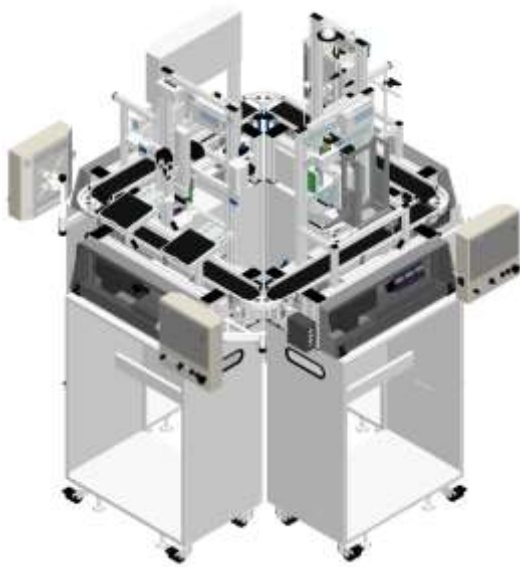
CP Lab 404-1
Process operation:
Feeding components
Quality inspection I, SPC
Flexible production with parameters
Flexible handling, logistics
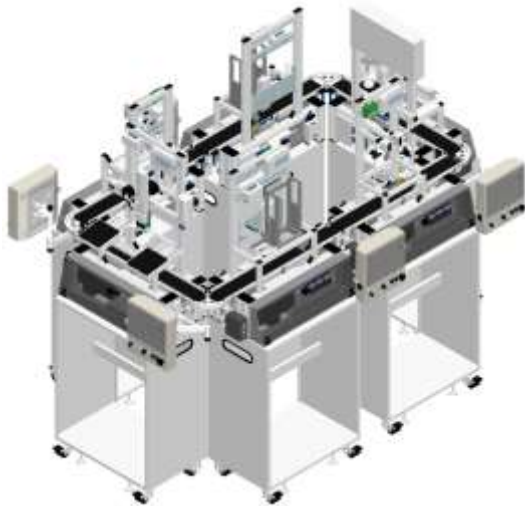
CP Lab 406-1
Process operation:
Feeding components
Quality inspection I, SPC
Flexible production with parameters
Feeding components, assembly
Connecting components, assembly
Flexible handling, logistics
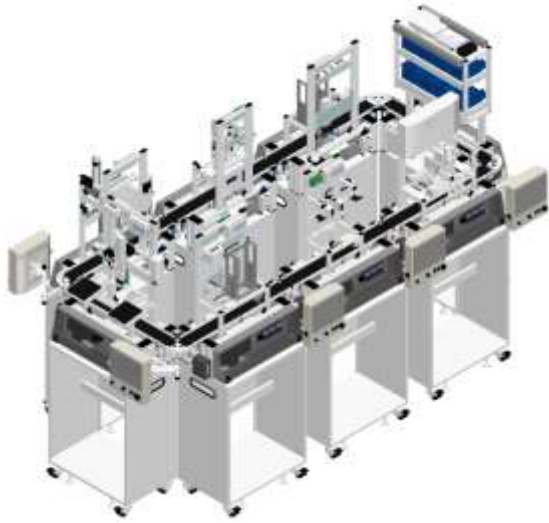
CP Lab 408-1

CP Lab 408-2

Process operation:
Feed components
Quality inspection I, SPC
Flexible production with parameters
Feeding components, assembly
Connecting components, assembly
Process dependent operation
QR code, UID, product tracking
Flexible handling, logistics
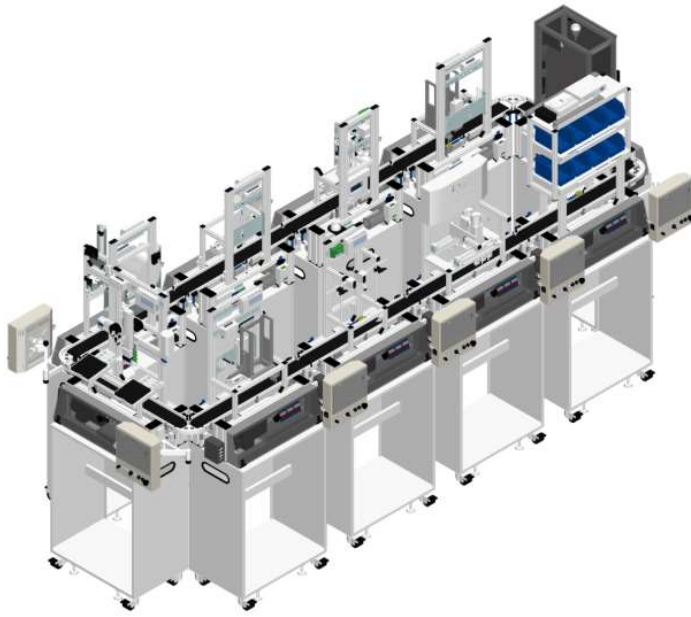
CP Lab 410-1

Process operation:

Feed components

Quality inspection I, SPC

Flexible production with parameters

Worker guidance, PCB assembly

Quality inspection II

Feeding components, assembly

Connecting components, assembly

Process dependent operation

QR code, UID, product tracking

Flexible handling, logistics

For example:

Identification and object-related data

Clear product labeling, or UID (Unique Identification), and the storage of product and production data in digital product memory, form the foundation of all flexible and customized production systems. CP Lab 400 uses industry standard technologies, such as RFID, QR code, data matrix, and databases.

Next generation HMI – AR, smart glasses

The universal availability of decision-relevant and role-specific data and information is an important success factor in varied production. The latest human-machine communication technologies and use of visual data processing are integrated in the CP Lab 400.

6.1.1 Industry 4.0 topics

- Digital product memory
- RFID, QR, Datamatrix
- UID product identification*
- Cyber Physical Systems
- Embedded Controller
- Web technology
- IP communication
- Open Industry Standards
- Web Standards
- Plant design
- Plant simulation
- SIL/HIL*
- Energy Efficiency
- Energy monitoring*
- Energy management*
- Plant management
- Virtual Reality*
- Augmented reality
- Fault monitoring
- Maintenance Planning*
- Predictive Maintenance *
- Modern, decentralized control technology
- HMI, Touch Panels
- Secure networking*
- Remote service concepts*
- Cloud applications*
- MES
- ERP*
- Web Shop*
- Data Analytics*

*Optional additions for CP Lab 400

6.1.2 CP Lab conveyor

The task of the CP Lab conveyor is to carry workpiece carriers and to receive application modules.

illustration similar

6.1.3 Application modules

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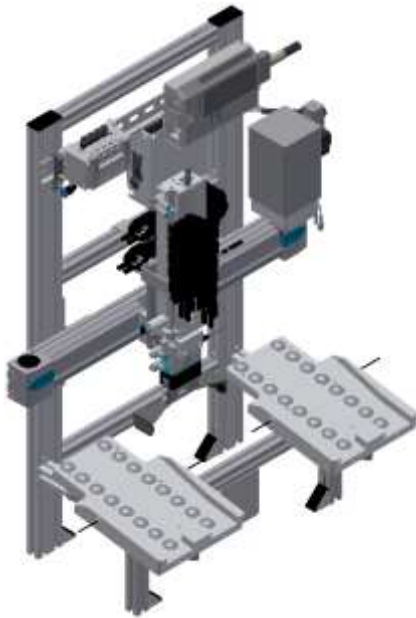
Illustration similar

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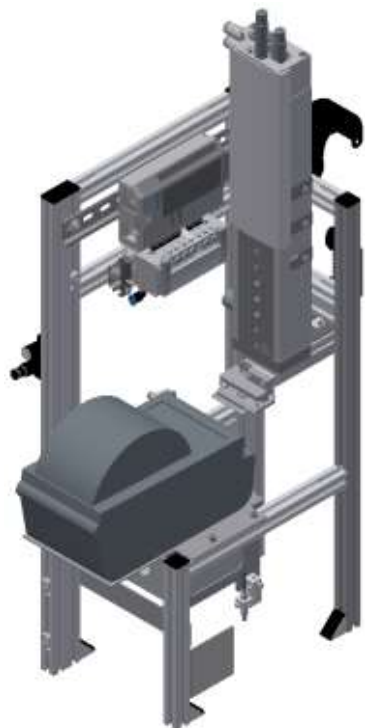
Illustration similar

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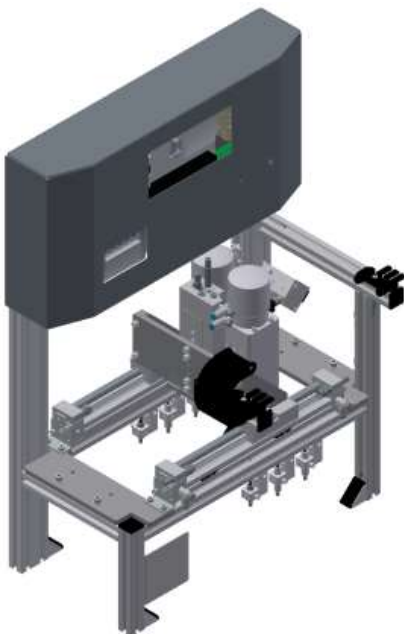
Illustration similar

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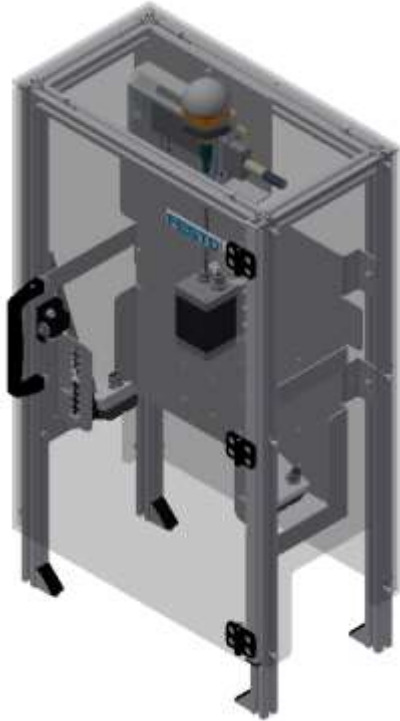
illustration similar

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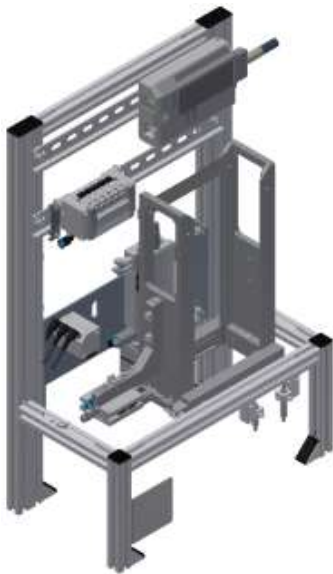
Illustration similar

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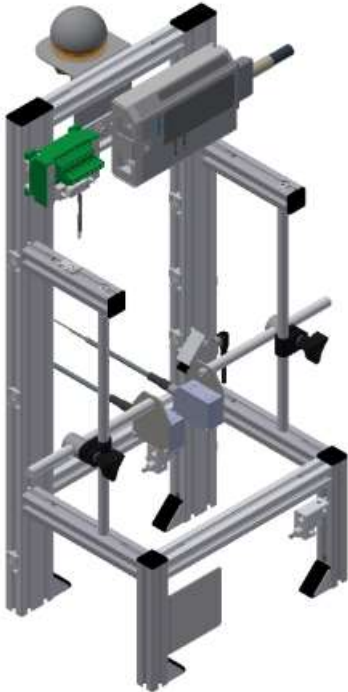
Illustration similar

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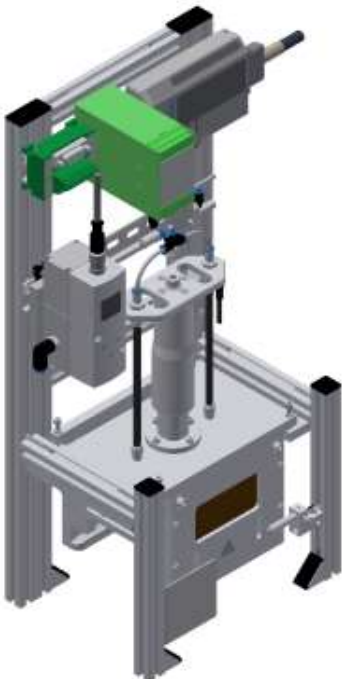
Illustration similar

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

Illustration similar

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

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
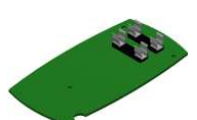
Pallet / illustration similar

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 No. 101		CP back cover blue No. 113
	CP raw material grey No. 102		CP back cover red No. 114
	CP raw material blue No. 103		CP – board No. 120
	CP raw material red No. 104		CP fuse No. 130
	CP front cover red No. 107		CP front cover black 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 No. 108		CP front cover black without fuses No. 211
	CP front cover grey No. 109		CP front cover black with fuse left No. 212
	CP front cover black No. 110		CP front cover black with fuse right No. 213
	CP back cover black No. 111		CP front cover black with both fuses No. 214
	CP back cover grey No. 112		

Workpieces	Description	Workpieces	Description
	CP front cover grey 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 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 No. 311		CP front cover red without fuses No. 511
	CP front cover grey with fuse left No. 312		CP front cover red with fuse left No. 512
	CP front cover grey with fuse right No. 313		CP front cover red with fuse right No. 513
	CP front cover grey with both fuses No. 314		CP front cover red with both fuses No. 514
	CP front cover blue 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 No. 1200
	CP front cover blue without fuses No. 411		CP part customer No. 1210 freely selectable
	CP front cover blue with fuse left No. 412		CP part black with no fuse No. 1211
	CP front cover blue with fuse right No. 413		CP part black with fuse on the left No. 1212
	CP front cover blue with both fuses No. 414		CP part black with fuse on the right No. 1213
			CP part black with both fuses 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 |
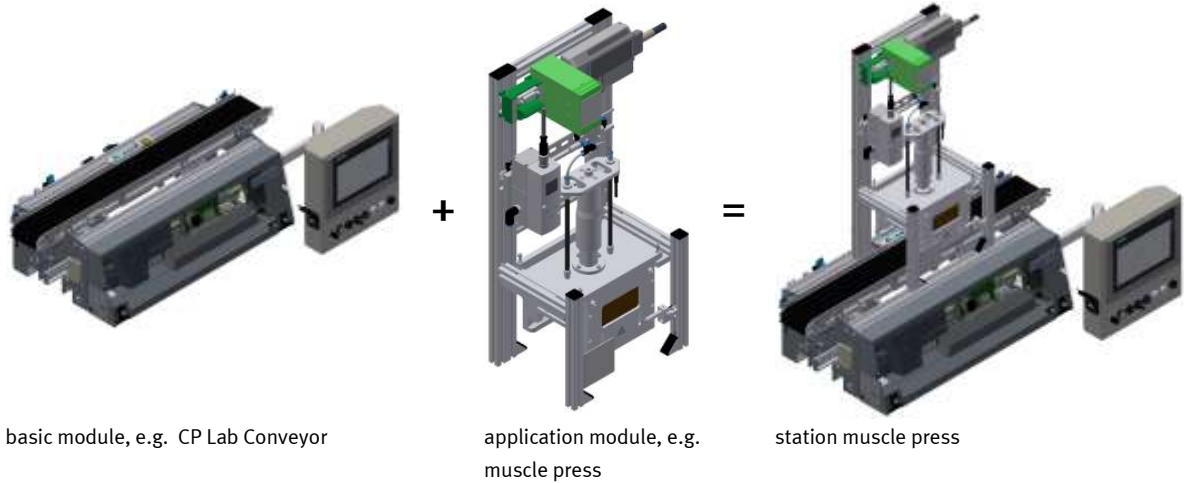
If several stations are put in a row one behind the other, this will form a production line.

| 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 |
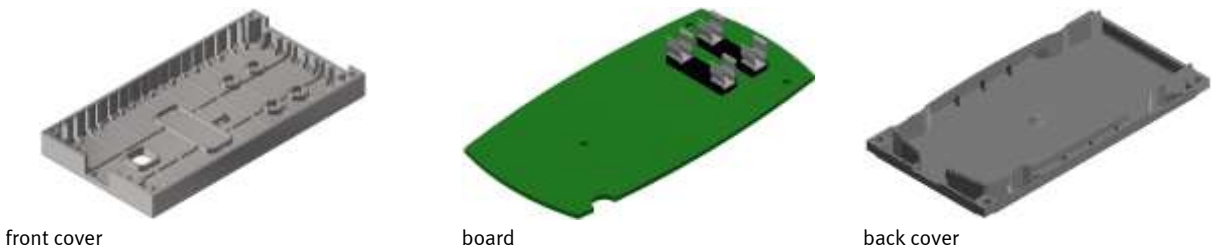
7.3 Assembly
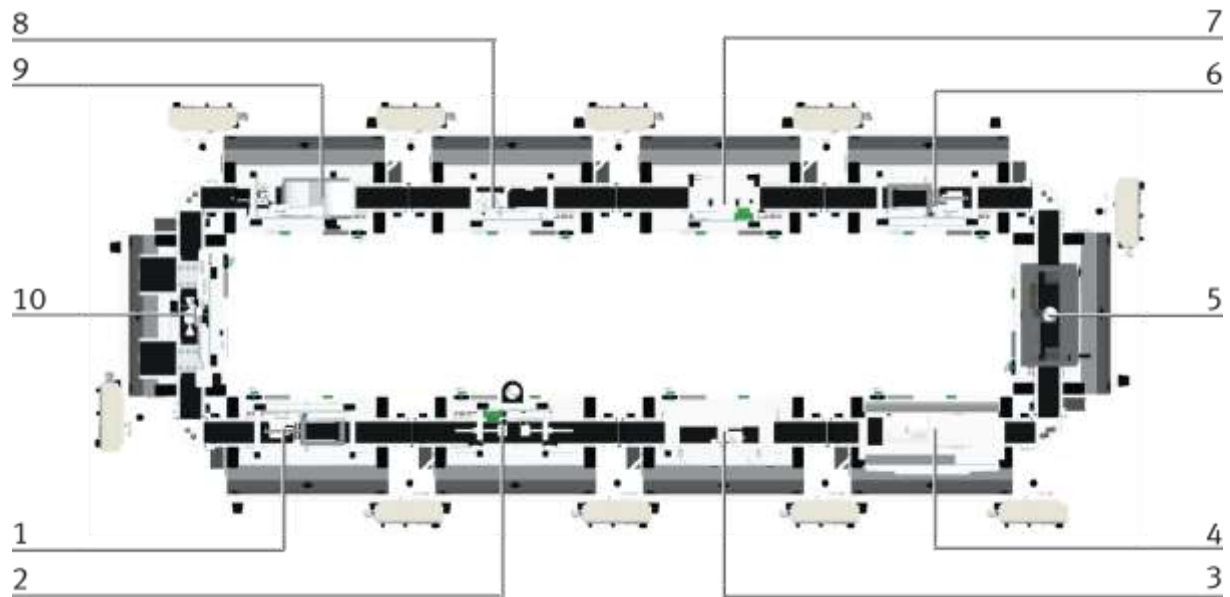
Overview

Position	Description
1	CP Lab Conveyor with application module magazine front cover
2	CP Lab Conveyor with application module measuring
3	CP Lab Conveyor with application module iDrill
4	CP Lab Conveyor with application module pick by light
5	CP Lab Conveyor with application module camera inspection
6	CP Lab Conveyor with application module magazine back cover
7	CP Lab Conveyor with application module muscle press
8	CP Lab Conveyor with application module turnover
9	CP Lab Conveyor with application module labeling
10	CP Lab Conveyor with application module output

7.3.1 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.
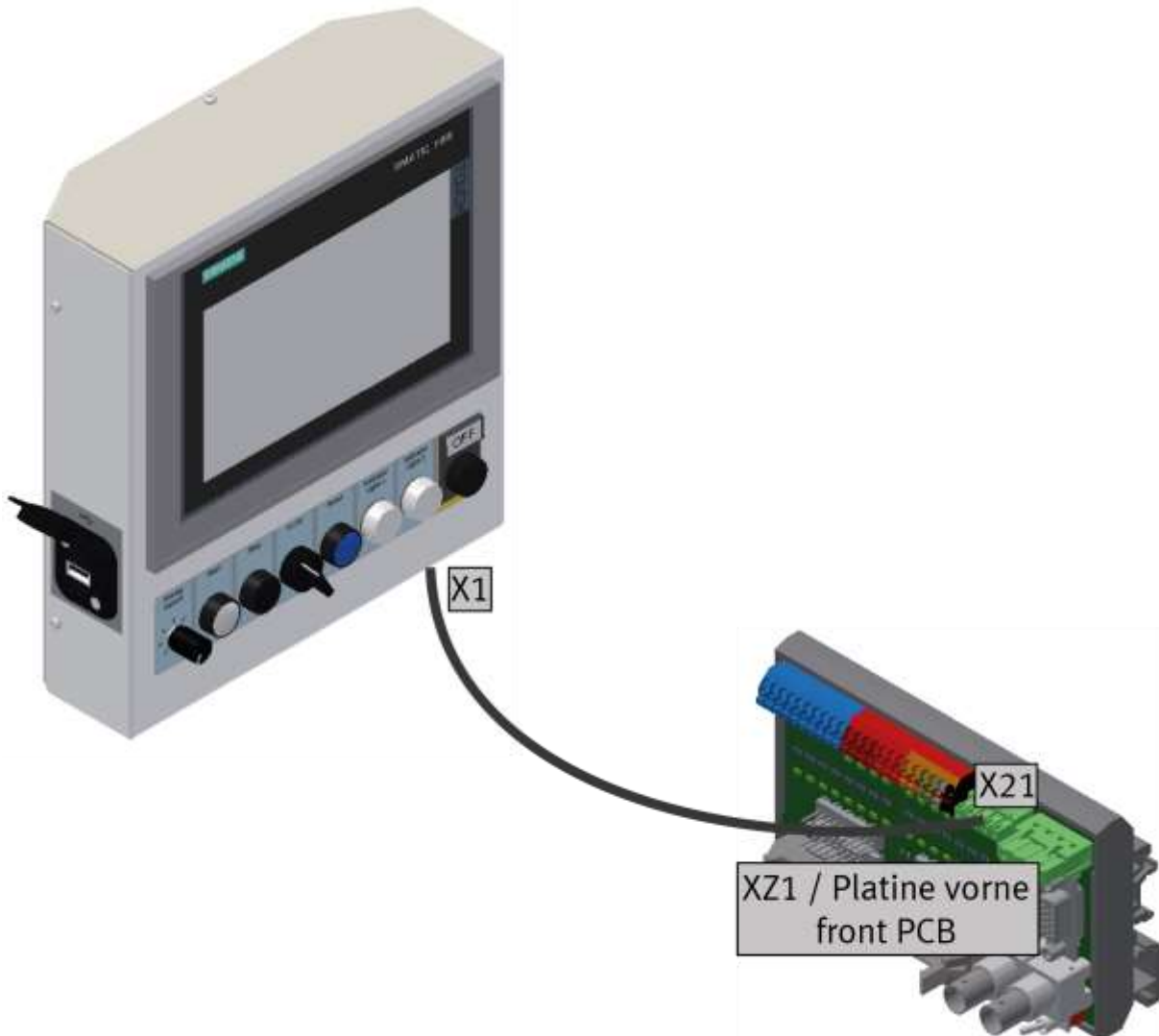
illustration similar

Acknowledge emergency stop messages

If a emergency stop, or the OFF-button is pressed, an error message appears on the HMi. If you click on the message line at the top, the error message appears in the main window.

1. The emergency stop situation is displayed in the message line. With a click on the line, the message appears in the main window.
2. Display of the emergency stop situation
3. Once the emergency stop situation has been remedied, the emergency stop button must be pulled out. Then the blue illuminated pushbutton "RESET" must be pressed. Now the message can be acknowledged by pressing the button on the HMI. The module can be restarted.
4. If the module is connected to other modules, the emergency stop acts on all stations. After the error has been rectified, the illuminated pushbutton "RESET" must be pressed on the HMIs of all stations and the emergency stop situation must be acknowledged.

7.4 IP-addresses

- Network mask general: 255.255.192.0
- Default Gateway general: 172.20.0.230
- Network general: System
- The third byte of the IP address corresponds to the number of the station in which the components are installed.

No	Station description	Component	Type	Index	Name	IP address
0	MES4, Fleetmanager (PC)	MES-PC	PC	1		172.21.0.90
0	Virtual Server Station (SERVER)	Access Point	Access Point	1	Access Point	172.21.0.200
1	CP Lab Conveyor (CP-L-CONV) with CP application module magazine (CP-AM-MAG)	PLC S7-1512SP	PLC	1	plcMag	172.21.1.1
1	CP Lab Conveyor (CP-L-CONV) with CP application module magazine (CP-AM-MAG)	TP 700 Comfort	TP	1	hmiMag	172.21.1.10
2	CP Lab Conveyor (CP-L-CONV) with CP application module measuring (CP-AM-MEAS)	PLC S7-1512SP	PLC	1	plcMeas	172.21.2.1
2	CP Lab Conveyor (CP-L-CONV) with CP application module measuring (CP-AM-MEAS)	TP 700 Comfort	TP	1	hmiMeas	172.21.2.10
3	CP Lab Conveyor (CP-L-CONV) with CP application module iDrill (CP-AM-iDRILL)	PLC S7-1512SP	PLC	1	plciDrill	172.21.3.1
3	CP Lab Conveyor (CP-L-CONV) with CP application module iDrill (CP-AM-iDRILL)	TP 700 Comfort	TP	1	hmiiDrill	172.21.3.10
3	CP Lab Conveyor (CP-L-CONV) with CP application module iDrill (CP-AM-iDRILL)	FESTO CECC	PLC	2	CECC-iDrill	172.21.3.2
4	CP Lab Conveyor (CP-L-CONV) with CP application module PickByLight (CP-AM-PICK)	PLC S7-1512SP	PLC	1	plcpick	172.21.4.1
4	CP Lab Conveyor (CP-L-CONV) with CP application module PickByLight (CP-AM-PICK)	TP 700 Comfort	TP	1	hmipick	172.21.4.10
4	CP Lab Conveyor (CP-L-CONV) with CP application module PickByLight (CP-AM-PICK)	CECC	PLC	2		172.21.4.2
5	CP Lab Conveyor (CP-L-CONV) with CP application module camera inspection (CP-AM-CAM)	PLC S7-1512SP	PLC	1	plccam	172.21.5.1
5	CP Lab Conveyor (CP-L-CONV) with CP application module camera inspection (CP-AM-CAM)	TP 700 Comfort	TP	1	hmicam	172.21.5.10
5	CP Lab Conveyor (CP-L-CONV) with CP application module camera inspection (CP-AM-CAM)	VISOR	Camera	1	Camera inspectioncam	172.21.5.50

No	Station description	Component	Type	Index	Name	IP address
6	CP Lab Conveyor (CP-L-CONV) with CP application module magazine (CP-AM-MAG)	PLC S7-1512SP	PLC	1	plcMag	172.21.6.1
6	CP Lab Conveyor (CP-L-CONV) with CP application module magazine (CP-AM-MAG)	TP 700 Comfort	TP	1	hmiMag	172.21.6.10
7	CP Lab Conveyor (CP-L-CONV) with CP application module muscle press (CP-AM-MPRESS)	PLC S7-1512SP	PLC	1	plcmpress	172.21.7.1
7	CP Lab Conveyor (CP-L-CONV) with CP application module muscle press (CP-AM-MPRESS)	TP 700 Comfort	TP	1	hmimpress	172.21.7.10
8	CP Lab Conveyor (CP-L-CONV) with CP application module turnover (CP-AM-TURNOVER)	PLC S7-1512SP	PLC	1	plcturnover	172.21.8.1
8	CP Lab Conveyor (CP-L-CONV) with CP application module turnover (CP-AM-TURNOVER)	TP 700 Comfort	TP	1	Hmiturnover	172.21.8.10
9	CP Lab Conveyor (CP-L-CONV) with CP application module labeling (CP-AM-LABEL)	PLC S7-1512SP	PLC	1	plclabel	172.21.9.1
9	CP Lab Conveyor (CP-L-CONV) with CP application module labeling (CP-AM-LABEL)	TP 700 Comfort	TP	1	hmilabel	172.21.9.10
9	CP Lab Conveyor (CP-L-CONV) with CP application module labeling (CP-AM-LABEL)	Zebra label printer	Additional	1		172.21.9.70
10	CP Lab Conveyor (CP-L-CONV) with CP application module Output (CP-AM-OUT)	PLC S7-1512SP	PLC	1	plcout	172.21.10.1
10	CP Lab Conveyor (CP-L-CONV) with CP application module Output (CP-AM-OUT)	TP 700 Comfort	TP	1	hmiout	172.21.10.10
10	CP Lab Conveyor (CP-L-CONV) with CP application module Output (CP-AM-OUT)	CMMS-ST	Motor Control	1	outxaxis	172.21.10.30

7.4.1 Basic information

Assignment of device addresses depending on the components

Type	max. Number	First address	Last address	Default GW hostpart
PLC	9	1	9	230
TouchPanel	10	10	19	
RFID	10	20	29	
Motor controller	10	30	39	
Robot controller	10	40	49	
Camera	10	50	59	
Further	30	60	89	
PC	10	90	99	
I/O module	50	100	149	
DHCP	50	150	199	
AccessPoint	10	200	209	

Reserved network segments

The system occupies a predefined network segment (subnet 1) ex works. If optional network devices (NetLab network extensions) are added to the system, then - depending on the NetLab expansion stage - further subnets are defined by the additional network devices (subnet 2 - 9).

It is therefore generally recommended to reserve the address range 172.21.0.0/16 for the system.

System	Prefix	mask	min. address	max. address	Description
1	172.21.0.0/18	255.255.192.0	172.21.0.1	172.21.63.254	Production
2	172.21.200.0/24	255.255.255.0	172.21.200.1	172.21.200.254	Energy / Io
3	172.21.210.0/24	255.255.255.0	172.21.210.1	172.21.210.254	Network Mgmt.
4	172.21.215.0/24	255.255.255.0	172.21.215.1	172.21.215.254	Transfer
5	172.21.220.0/24	255.255.255.0	172.21.220.1	172.21.220.254	DMZ
6	192.168.110.0/24	255.255.255.0	192.168.110.1	192.168.110.254	Maintenance LAN 1
7	192.168.120.0/24	255.255.255.0	192.168.120.1	192.168.120.254	Maintenance LAN 2
8	192.168.130.0/24	255.255.255.0	192.168.130.1	192.168.130.254	Optional Cell 1
9	192.168.140.0/24	255.255.255.0	192.168.140.1	192.168.140.254	Optional Cell 1

    809286 SC CP LAB STD CFG 10

8 Operation

8.1 general

An "initial commissioning" has already been carried out ex works for the system. Carry out the following steps so that you can work with the modules and the applications:

1. Each CP-Lab station has its own power supply unit, which are connected via a corresponding distribution strip.
2. The CP-Lab stations are connected via a separate air supply.
3. Now you can work with the system.

8.2 Process description

1. process start: removal of the front shell from the magazine
2. at the measuring station, two laser distance sensors are mounted above the workpiece on an adjustable measuring tripod and can be directed partially specifically to 2 measuring points.
3. 2 pairs of holes (simulated) can be drilled into a workpiece with the Drilling module.
4. with the module Pick by Light the worker gets indicated by lights in which order he should assemble what.
5. inspection of the workpiece by means of a camera
6. retrieval of the back shell from the second magazine
7. pressing of the front and rear shells. The pressing process is carried out by means of a proportional pressure control.
8. the pressed workpiece is turned over.
9. the labeling module automatically applies a freely printable self-adhesive label to the offered workpiece.
10. end of process: The Output module is equipped with a two-axis handling system and is used to output cubic workpieces onto two roller conveyors.

8.3 CP Lab

8.3.1 Requirements

1. Single stations are mechanically connected to each other.
2. Power supply from each station is guaranteed via 24V power supplies.
3. A nominal pressure of 6 bar is available at each station.
4. Stations are connected to the MES PC via network cables.

8.3.2 CP-Lab system start conditions

1. Switch on the individual stations using the power switch and wait for them to start up.
2. Check the emergency stop button on the HMI.
3. Acknowledge errors on the HMI.
4. Set the applications to their basic position by reset them on the HMI.
5. Select MES mode on HMI.
6. Select the automatic operating mode.

8.3.3 Additional start conditions application modules

Labeling application: Printer must be switched on separately. Printer is ready as soon as the warning on the HMI disappears.

8.3.4 Start conditions via MES

1. Switch on the MES PC and wait for it to boot up, login password: festo
2. Start MES 4 and select the database
3. Select the part to be produced (New customer / production order) via Add position and specify the quantity to be produced.
4. The order is started with Start Order, the orders are now visible in the current orders.

8.4 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.

8.4.1 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. (see following graphic)
2. The mode can also be set on the Home / Operating mode page.
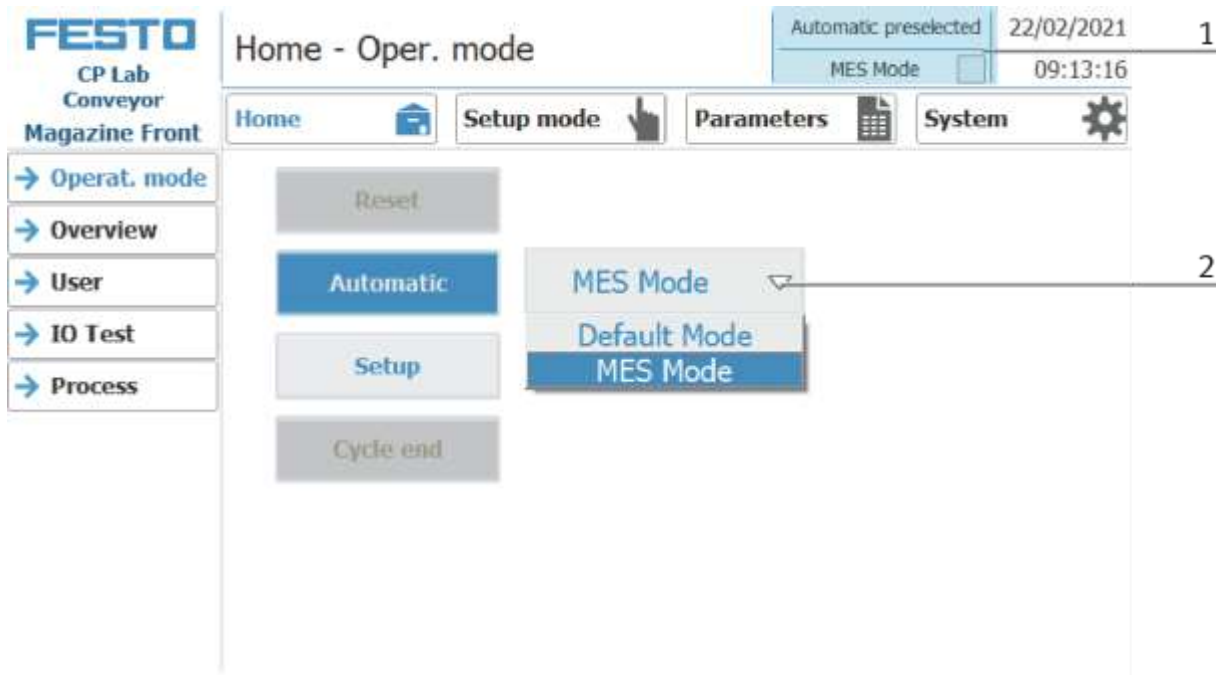
Possibilities of mode

- 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.

8.5 Start the automatic process

The operation is the same for all application modules and modules; the basic module with a application module magazine is used for the description.

8.5.1 General navigation menu

General operating instructions

- White buttons with blue letters - function is active
- White buttons with black letters - function is not active
- Blue buttons - function is active - waiting for input
- Gray buttons with dark gray letters - function not available at the moment
- Gray buttons with blue letters - function can be carried out
- Green notice - sensor / function is active
- Orange notice - Indicates an actuator

8.6 CP-Lab conveyor

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:
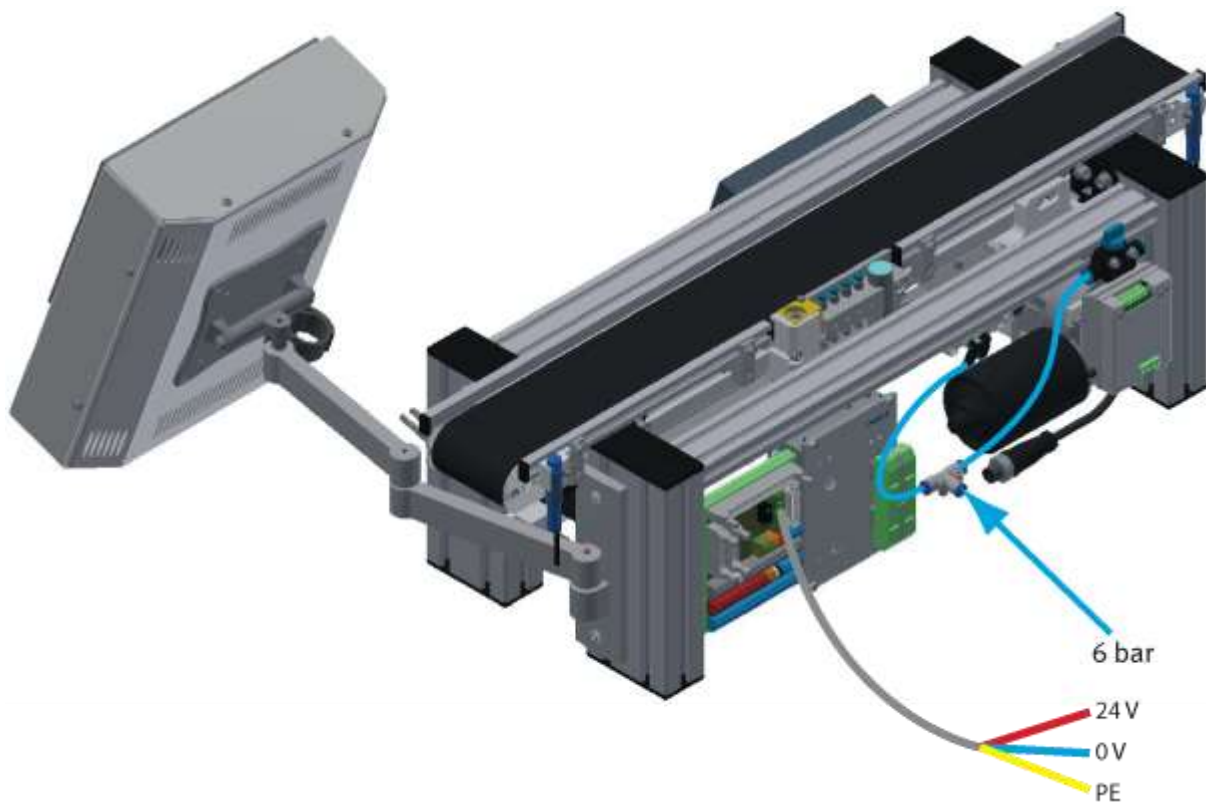
Illustration similar

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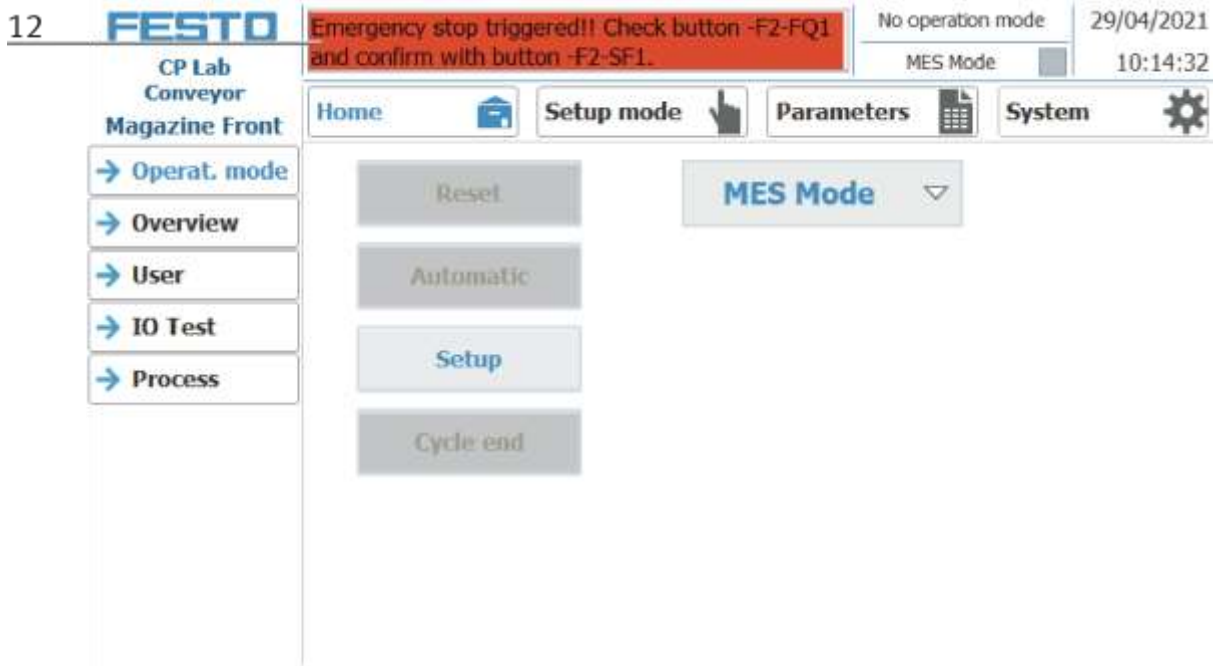
13. The error message is displayed in the main window. After the error situation has been remedied, it can be acknowledged by pressing the RESET button.

14. Press Home Button
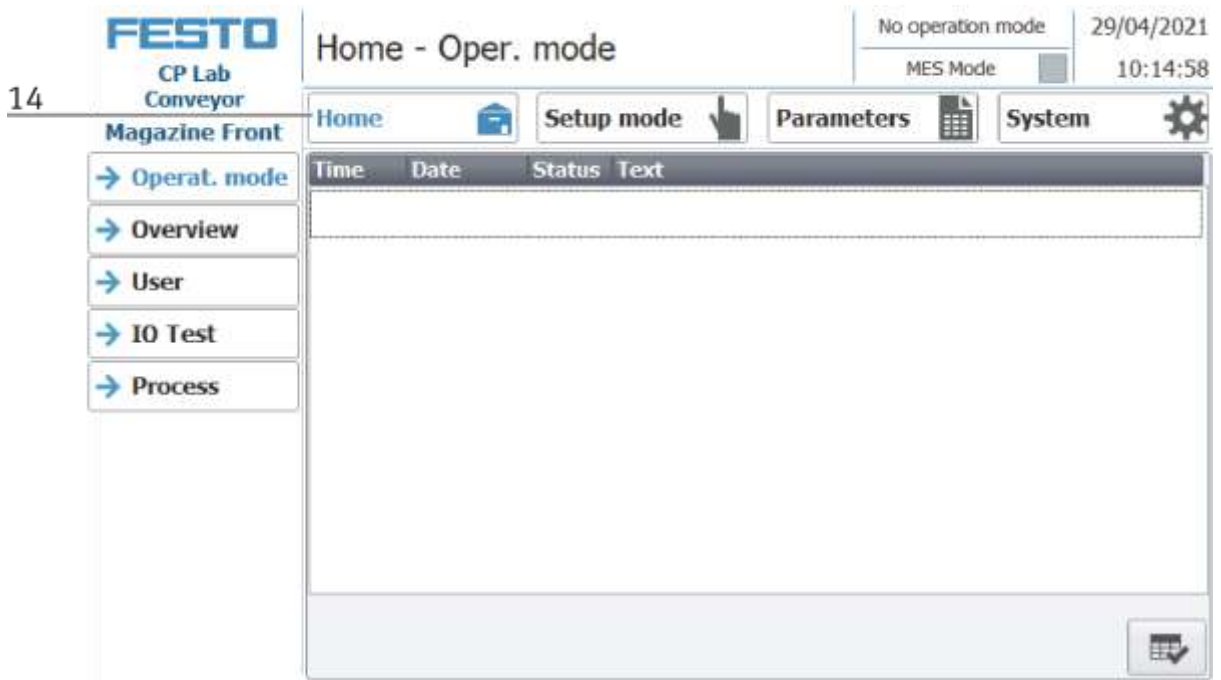
15. Press the flashing RESET Button. Station/application moves in home position.
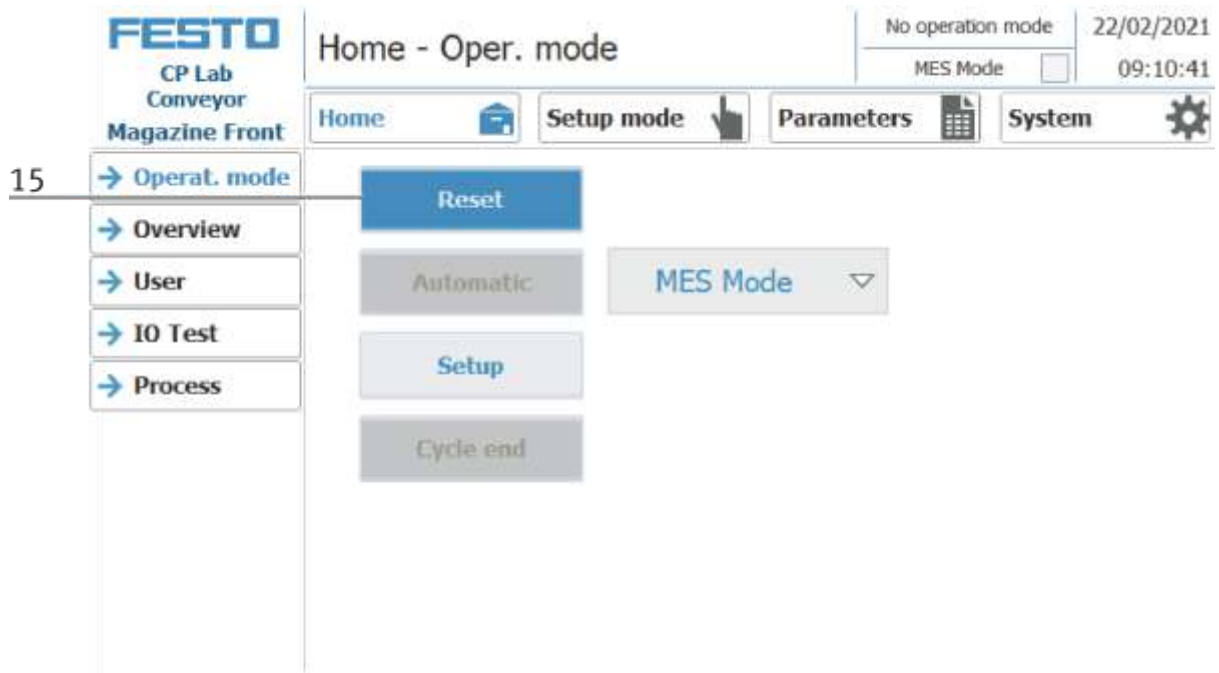
16. Press the flashing AUTOMATIC Button
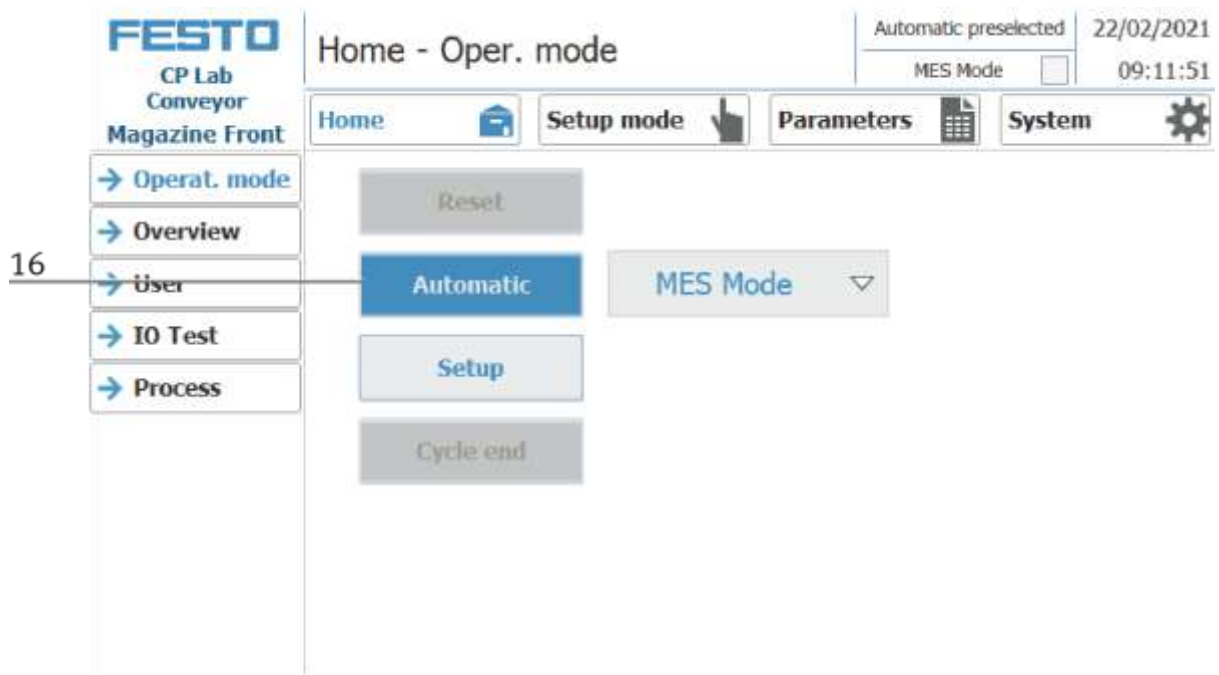
17. AUTOMATIC Button lights up
18. Automatic mode is active
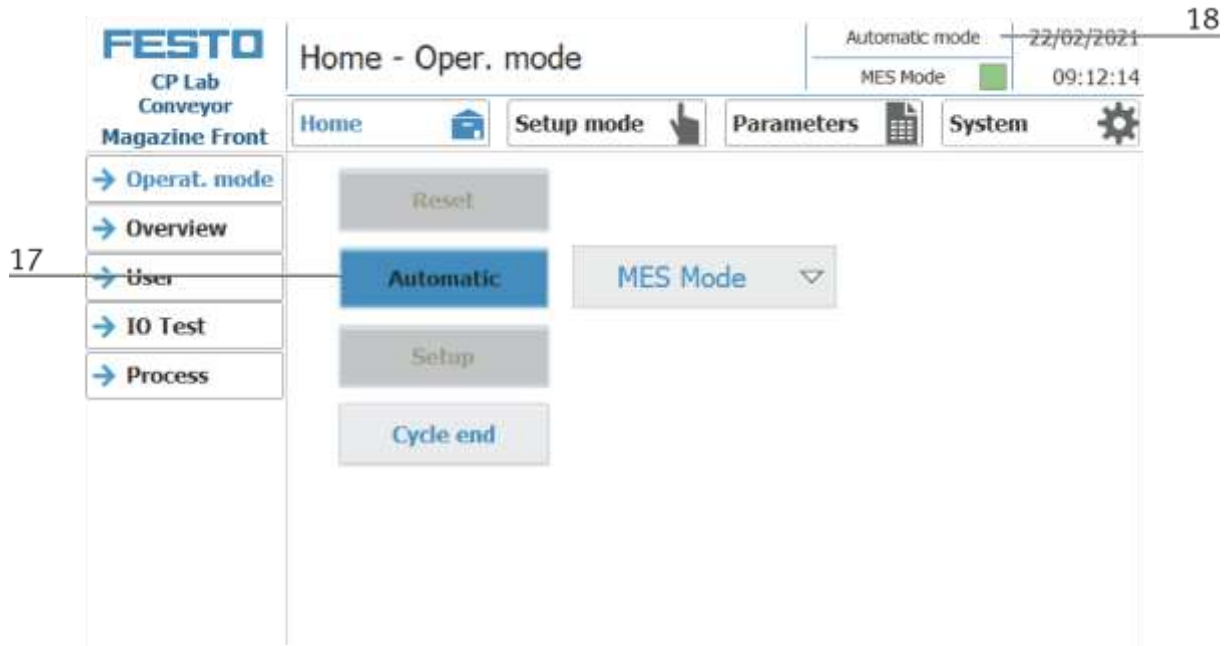
8.7 Error handling

8.7.1 General

- System cannot be switched on =› check power supply.
- Application cannot be reset =› check compressed air supply.
- Automatic mode cannot be selected =› The "Setup" operating mode may have been selected. Press the end button and change the operating mode.
- HMI message "EMERGENCY STOP is activated" cannot be acknowledged =› check the emergency stop button and unlock it if necessary.
- When resetting, an error message appears on the HMI =› Check sensors of the application.
- HMI warning "No communication to MES" is present =› MES mode is not selected on the HMI / MES4 has not started.

8.7.2 Labeling application

- Warning message on the HMI "Printer is not switched on" =› Switch on printer manually. Warning message disappears when printer is ready.
- Printer does not print =› printer is not switched on. Turn on the printer
- Printer does not print properly on the label =› printer must be calibrated, see printer documentation
- The label is not gripped by the vacuum gripper =› adjust the orientation of the blow unit. Increase the pressure of the blow unit
- The label is not stuck cleanly onto the workpiece =› adjust / align the Z axis

8.7.3 Measuring application

- Application always reports bad result =› sensors are not correctly adjusted to the workpiece, see manual Check values for the upper and lower limits in the MES

8.7.4 Pick by Light application

- No connection to the application =› Check the connection status on the HMI. Re-establish the connection manually.
- Program is not started =› check program number in MES / check the presence of the program on the HMI, Prog. Execute

8.8 Writing on the RFID tag manually

In order to describe a pallet carrier with a specific ID, or to get information on which data is stored on the
pallet carrier, it is possible to read this data or to describe the tag.

For this, it is necessary that a pallet carrier with a functioning tag is at one of the stopper positions and the
station is switched on.

The following example is guilty for all read out positions where pallet carriers can be read out.
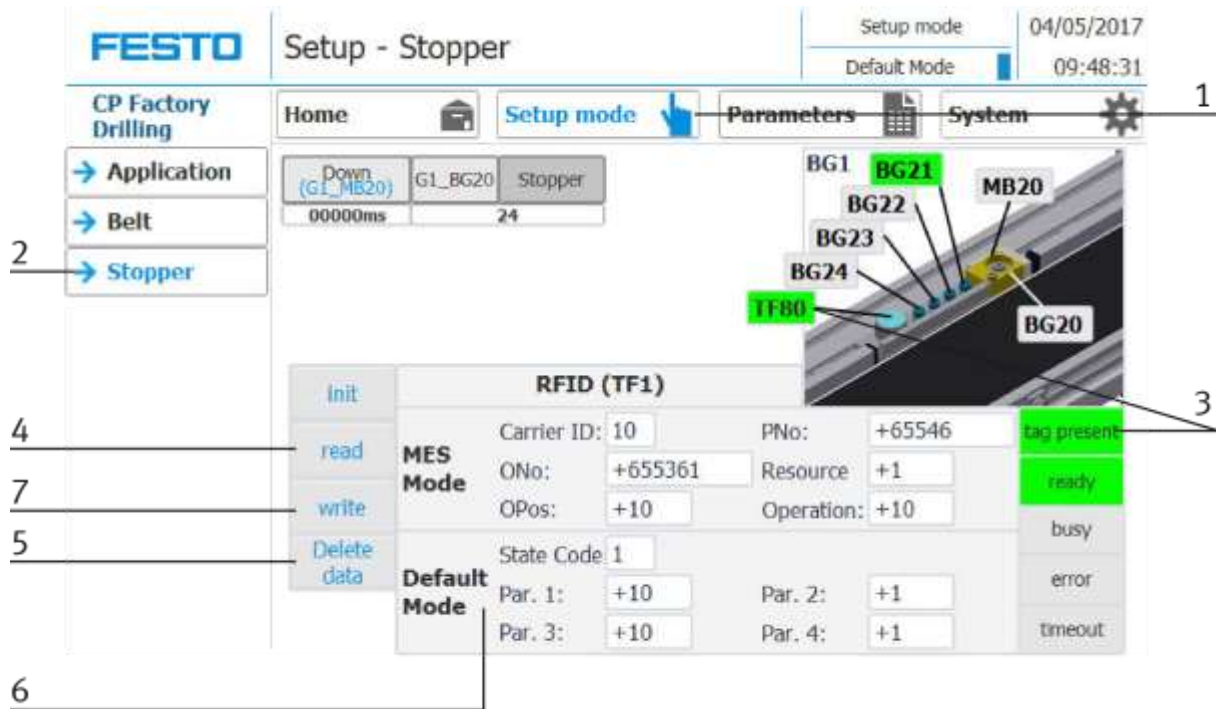
1. Select the Setup mode
2. Select the stopper from the setup menu on the left
3. If an RFID is detected, this is indicated by "tag present". (TF80 and button "tag present" are green)
4. The data of the RFID tag can be read out and displayed by pressing the "read" button.
5. Press the Delete Data button
   For easier input, all data is only deleted in the input mask, the data remains on the tag itself.

6. Enter the desired data in the field (all fields which are white in background can be edited)

   MES Mode

   Carrier ID - displays or enter the carrier number

   ONo - the order number is displayed or entered here

   OPos - the order position is displayed or entered here

   PNo - the part number is displayed or entered here

   Resource - here the resource is displayed or entered

   Operation - the number of the operation is displayed or entered here

   DefaultMode

   State code - here the state code for the start condition is entered, if these match the transition tables, the parameters are read out and the automatic sequence of the application is started.

   Parameter 1 =   Input of parameter value (e.g., 1 / left side drilling)

   Input of parameter value (e.g., 2 / right side drilling)

   Input of parameter value (e.g., 3 / both sides drilling)

   Parameters 2 - 4 - not used in this example

7. Press the "Write" button to write the changes made to the tag.

8.9 Schematic process flow

1. Wait for the workpiece carrier
2. Has the inductive sensor BG1 recognized the workpiece carrier?
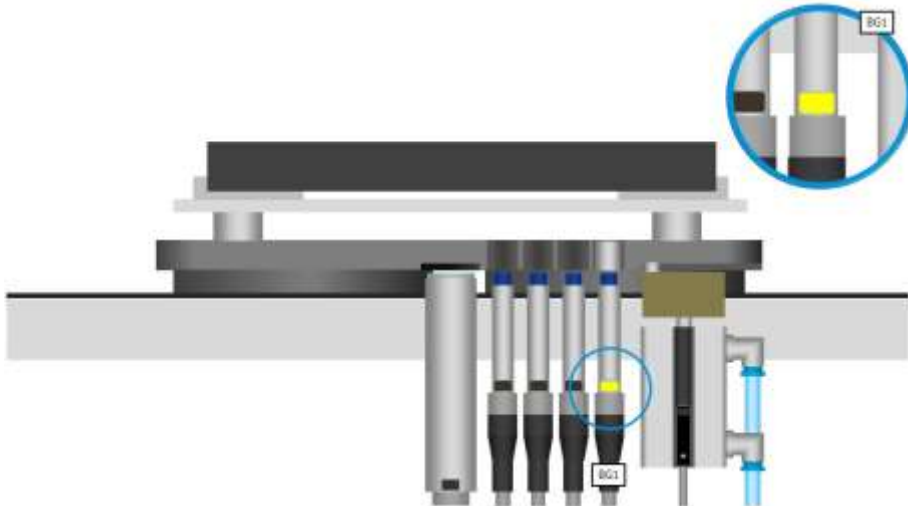
3. Read information from RFID-transponder
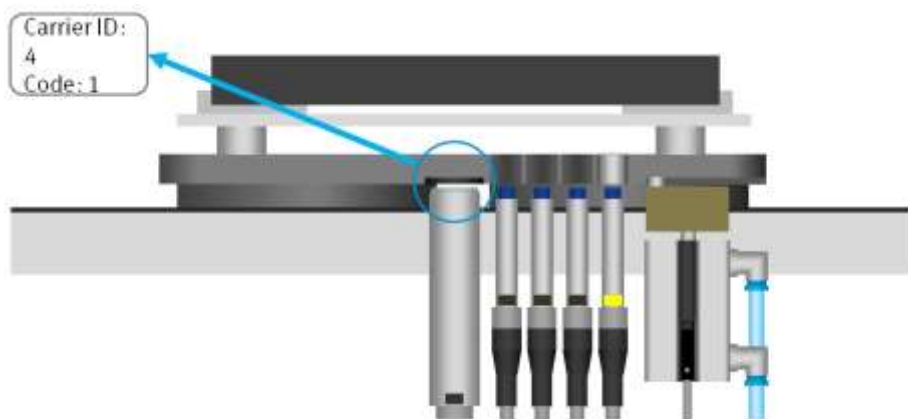
4. Information in the default mode: Carrier number and status code
5. Search the transition table for the status code
6. Does the state code match the start condition of a transition table series?

No.	Start condition	Application execute	Parameter Drill Mode	---	End condition
Init	none		0		
1	①	✓	①		
2	2	✓	2	0	3
3	3	✓	3	0	1
4	0		0	0	0

Carrier ID:
4
Code ①

Program 4: drill both sides

7. Is the application released (checkbox "enable application")?
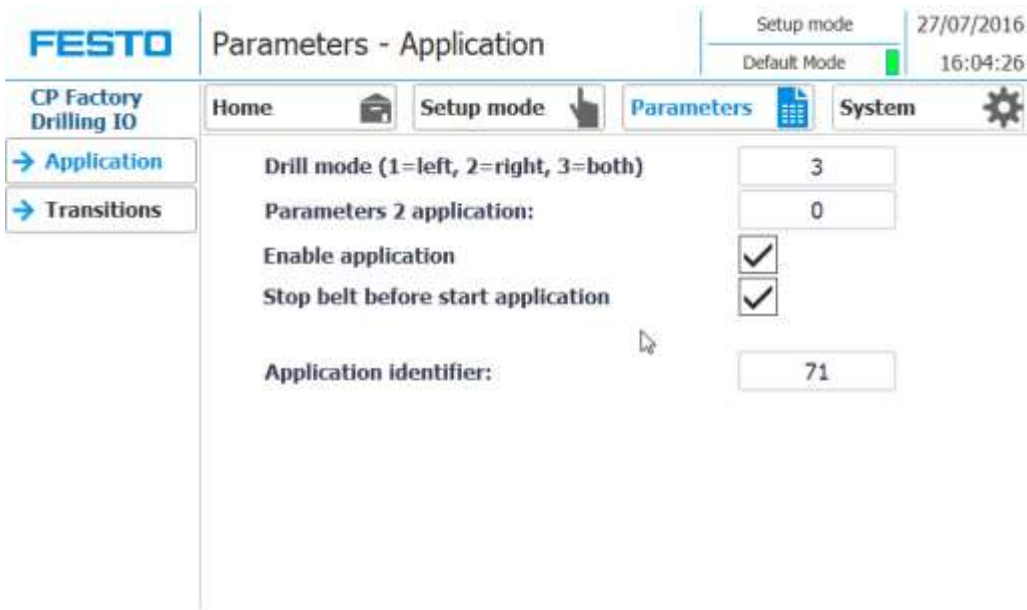
8. Start the application with the parameters from the transition table
9. Here: Program number 3: Drill both sides
10. Enter the final state (new state code) of the transition table

11. Write the end state as a new status code to the RFID transponder
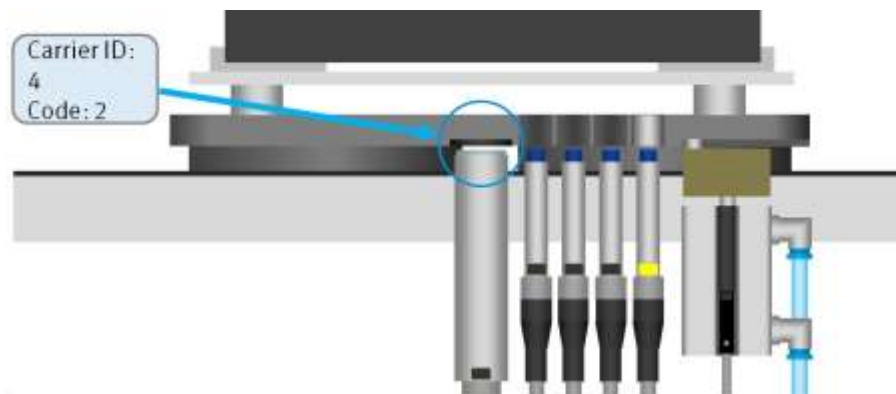
12. Move the stopper cylinder downwards and release the workpiece carrier
13. If the inductive sensor BG1 no longer detects the workpiece carrier, the stopper cylinder again assumes the basic position

8.10 Example process in the default mode

The processes and the associated transitions as well as the parameters can be freely defined.

To start a process, it is necessary to initialize the workpiece carriers. Via a checkbox in the menu Home / Overview the initialization of one or more carriers can be activated. If this option is activated, each incoming workpiece carrier is processed with the settings of the "Init" line of the transition table, regardless of the RFID status code.

In this context, the variable "number" determines how many workpiece carriers are to be initialized according to the above-mentioned method.

Position	Description
1	Select the default mode, select the default mode
2	Switch to Home view
3	Select the overview
4	The current Carrier ID is displayed here
5	Here you can see which parameters of the workpiece carriers must have to carry out the initialization
6	This shows which parameters are written to the workpiece carrier when the initialization has been carried out
7	Here, you can choose whether the workpiece carrier is to be initialized.
8	Display / input as many of the workpiece carriers are to be initialized and how many are already initialized.

The corresponding values must first be entered in the transition table. In the top line (Init), the values for the initialization of the workpiece carrier can be specified. In the Init line generally no start conditions are necessary, the next incoming workpiece carrier is described with these values.

By means of two examples, we consider the way in which the "initialize WT" works.

The two examples refer to the CP application module drilling. Our consideration assumes that the option "initialize WT" is activated and the target number of the workpiece carrier to be activated has not yet been reached.

8.10.1 Example 1:

If the "App. of the init transition is inactive, each incoming workpiece carrier is described with the final state of the init transition, and the application program is not started in this case. In this example, the value 1 would be written as a state code on the RFID chip of the workpiece carrier. After the RFID has been described, the WT is ejected from the station. After a complete system cycle, the workpiece carrier is returned to the CP application module drilling. The RFID chip is read out and a match of the RFID status code with the 1st transition is detected. Now the content of the 1st transition is evaluated. Since the " execute application" selection is activated, the application program is started with the parameters of this transition (component is drilled only to the left). After the application program is finished, the final state of this transition (here the value 2) is written to the RFID chip and the workpiece carrier leaves the station.

No.	Start condition	Application execute	Parameter Drill Mode	---	End condition
Init	none		0	0	1
1	1	✓	1	0	2
2	2	✓	2	0	3
3	3	✓	3	0	1
4	0		0	0	0
5	0		0	0	0
6	0		0	0	0
7	0		0	0	0
8	0		0	0	0
9	0		0	0	0
10	0		0	0	0

Position	Description
1	Init line - this is the initialize transition Start condition None (it can be any value on the workpiece carrier) Run application inactive (no hock set, no transition executed) Parameter 1 not available / Parameter 2 not available Final state is 1 (this value is written to the RFiD of the workpiece carrier when the initialization has been executed)
2	1 - this is transition 1 Start condition 1 (there must be a 1 on the RFID of the workpiece carrier) execute application is active (hocked, the transition is executed with the corresponding parameters) Parameter 1 drill only left hole / parameter 2 not available Final state is 2 (this value is written to the RFiD of the workpiece carrier when the left hole is drilled)
3	2 - this is transition 2 Start condition 2 (there must be a 2 on the RFID of the workpiece carrier) execute application is active (hocked, the transition is executed with the corresponding parameters) Parameter 1 drill only right hole / parameter 2 not available Final state is 2 (this value is written to the RFiD of the workpiece carrier when the right hole is drilled)
4	3 - this is transition 3 Start condition 3 (there must be a 3 on the RFID of the workpiece carrier) execute application is active (hocked, the transition is executed with the corresponding parameters) Parameter 1 drill both holes / parameter 2 not available Final state is 2 (this value is written to the RFiD of the workpiece carrier when both hole are drilled)

8.10.2 Example 2

The "application execute" selection field in the "Init line" is active, the next incoming workpiece carrier is processed with the corresponding parameters, regardless of its state, first in the application. In this example, a workpiece would be drilled only to the left. After the processing, the corresponding status code is written on the RFID chip, in this case, a 2. The workpiece carrier is released again. The circulation via the transport system would be omitted in this case.

				Setup mode	27/07/2016
FESTO	**Parameters - Transitions**			Default Mode	16:04:44

CP Factory Drilling IO	**Home** 🏠		**Setup mode** 👆		**Parameters** 📄		**System** ⚙

No.	Start condition	Application execute	Parameter Drill Mode	---	End condition
Init	none	✓	0	0	1
1	1	✓	1	0	2
2	2	✓	2	0	3
3	3	✓	3	0	1
4	0		0	0	0
5	0		0	0	0
6	0		0	0	0
7	0		0	0	0
8	0		0	0	0
9	0		0	0	0
10	0		0	0	0

The following example is an example of how the transition table interacts with the process flow.
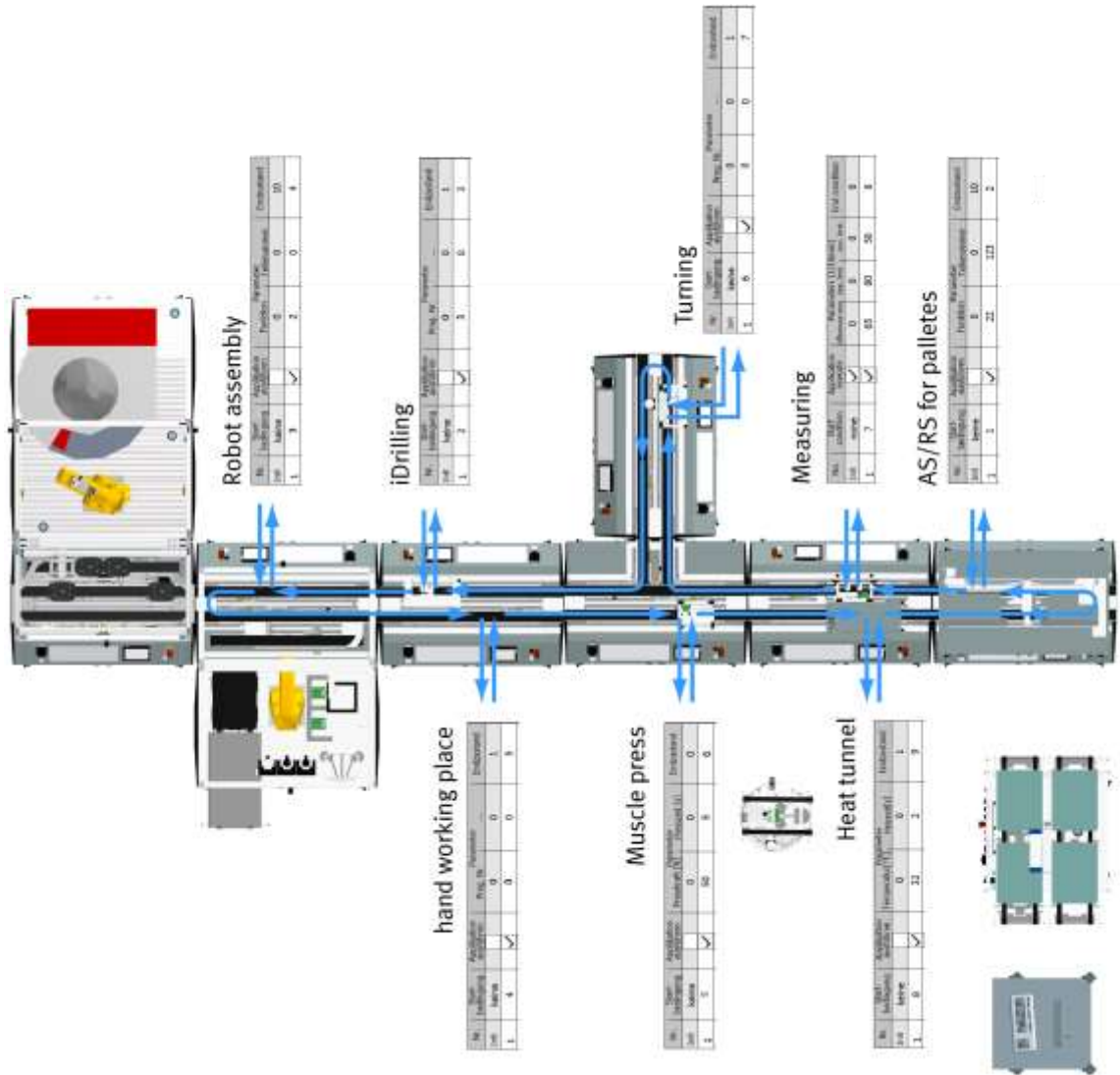
8.10.3 Process flow example

1. Step 1 - Application module AS/RS for workpieces
    Start condition = 1
    Parameter 1 = 0
    Parameter 2 = 0
    Final condition = 2

2. Step 2 - Application module iDrilling
    Start condition = 2
    Parameter 1 = 3 (drill right and left holes)
    Parameter 2 = 0
    Final condition = 3

3. Step 3 - Robot assembly module
    Start condition = 3
    Parameter 1 = 4 (Insert board, fit both fuses)
    Parameter 2 = 0
    Final condition = 4

4. Step 4 - Application module Manual workstation (place back cover)
    Start condition = 4
    Parameter 1 = 0
    Parameter 2 = 0
    Final condition = 5

5. Step 5 - Application module Muscle press
    Start condition = 5
    Parameter 1 = 4 (5 .... 100N Press-in force in N.)
    Parameter 2 = 4 (0.0 .... 30s Press-in time in sec.)
    Final condition = 6

6. Step 6 - Application module Turning
    Start condition = 6
    Parameter 1 = 0
    Parameter 2 = 0
    Final condition = 7

7. Step 7 - Application module Measuring
    Start condition = 7
    Parameter 1 = 0
    Parameter 2 = 0
    Final condition = 8

8. Step 8 - Application module Heat tunnel
    Start condition = 8
    Parameter 1 = 0
    Parameter 2 = 0
    Final condition = 9

8.11 4.7 Example process in MES

The processes can be compiled freely in MES. This is a sample process which has the same process as the process described in Default mode.

1. Start the MES

Double-click the MES button on the desktop to start MES4.

2. The start screen of MES4 appears, click on the Production Control (1).
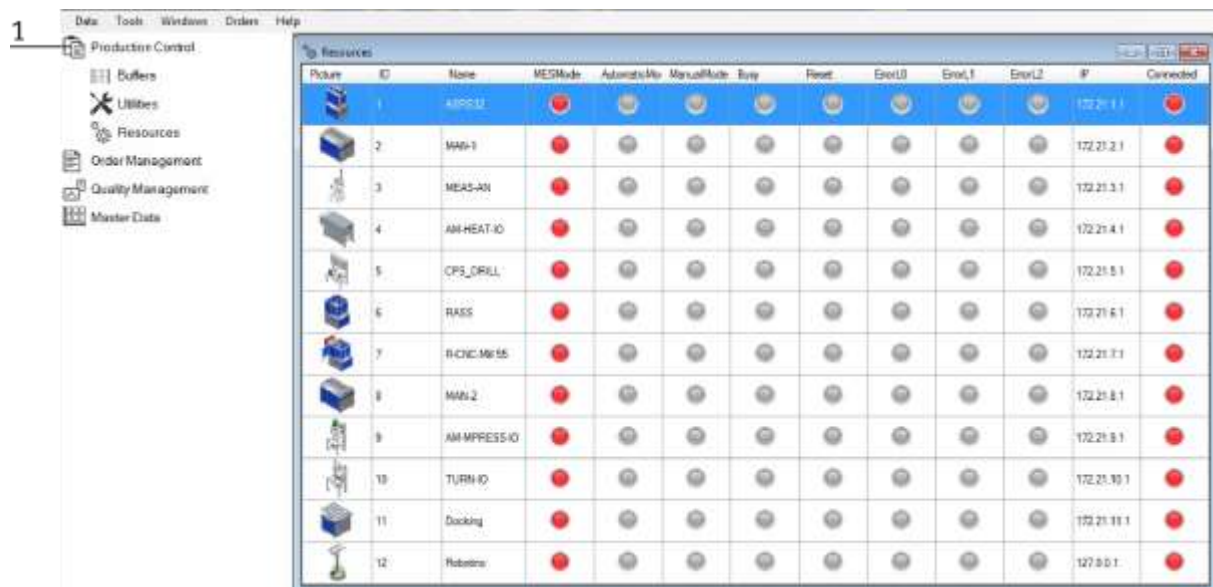
All stations attached to MES will appear. Set all modules (on the HMI) to the MES mode until all the control lamps are green.

3. Switch to Order Management (1)
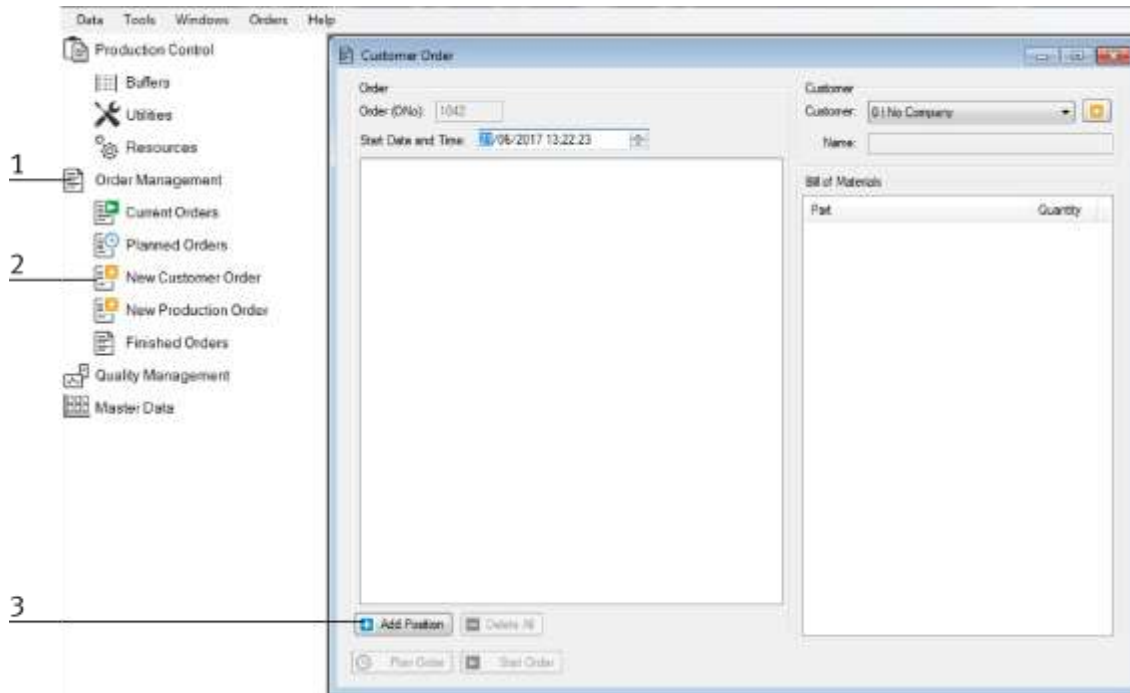
4. Select New Customer Order (2)
5. Then click Add Position (3) to enter a new order.
6. Select the product here (1)
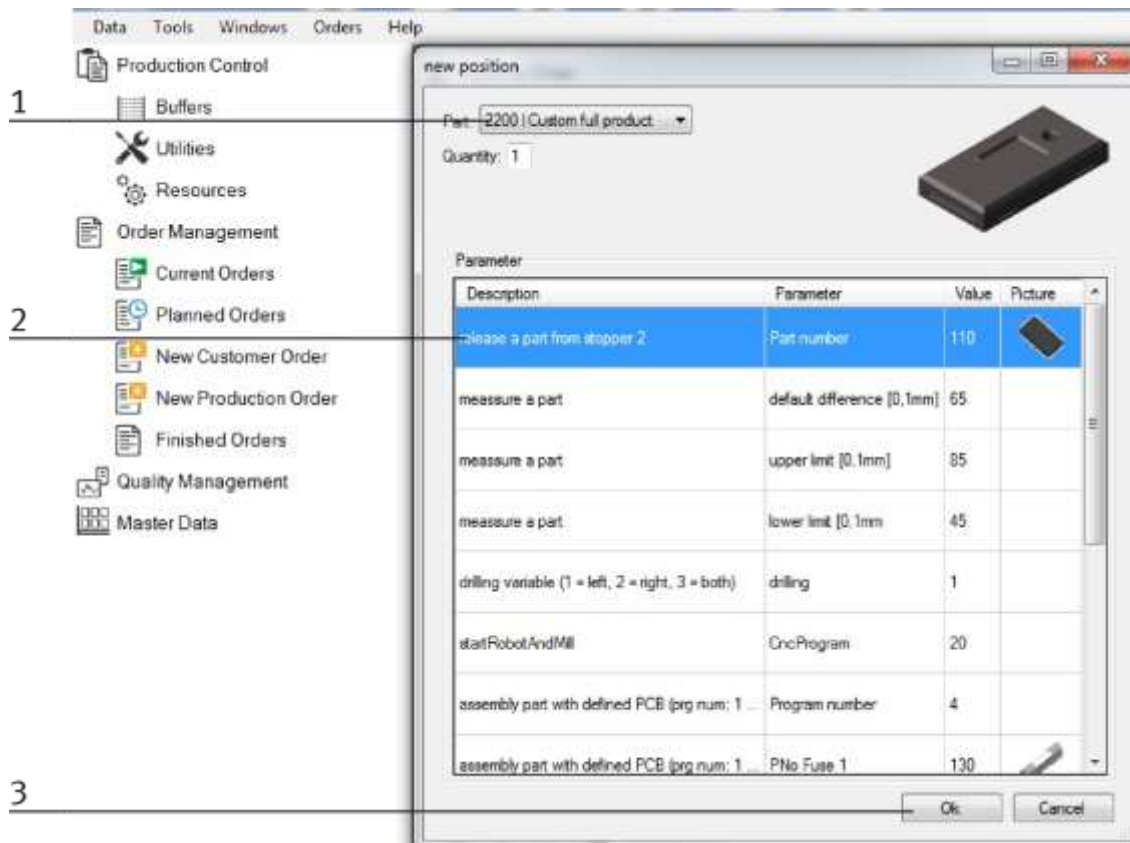
7. The parameters used are displayed here (2)
8. Confirm the order with Ok (3)

9. If the order is preselected, it is displayed with the customer orders (1). The required raw materials are also displayed (2)
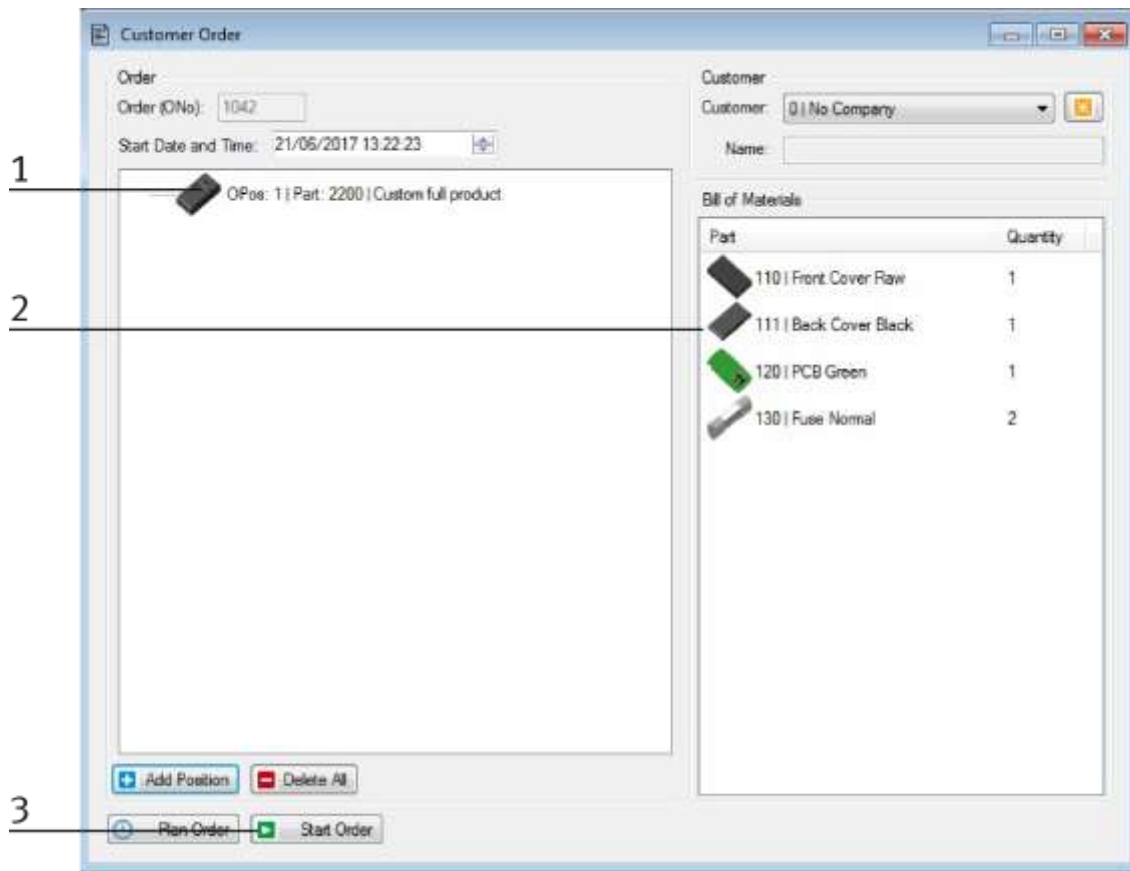
10. Click on the start order button (3) to start the order
11. In order management under Current orders (1), you can now follow the order (2)
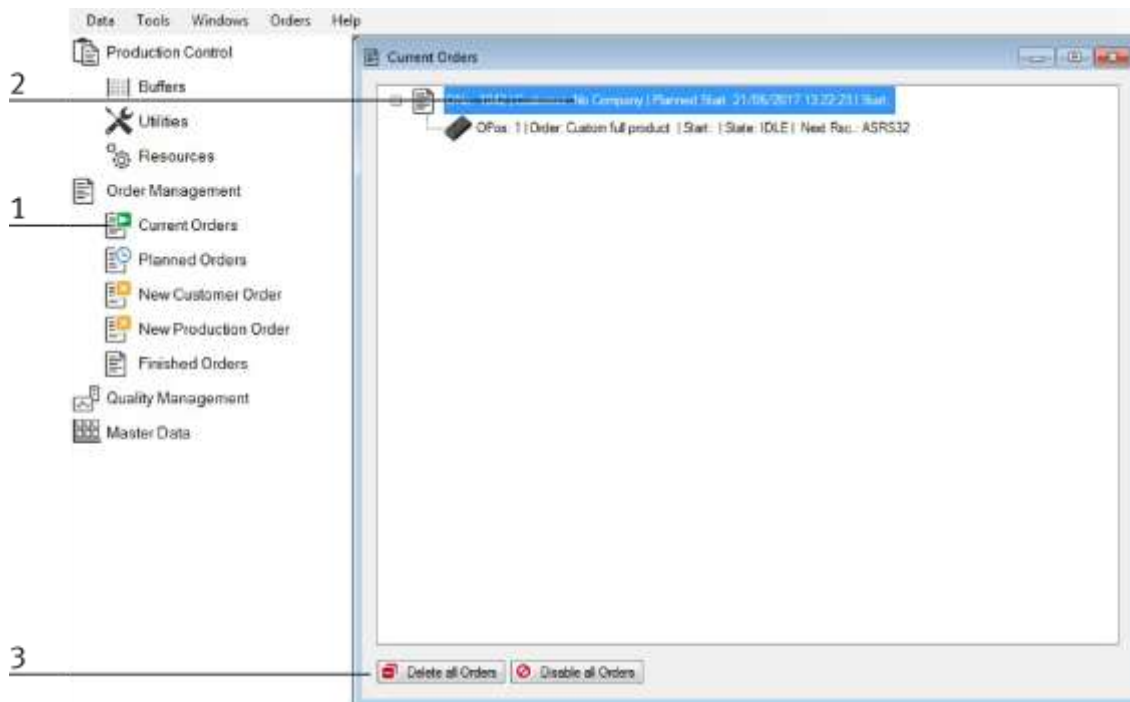
12. You can cancel and delete started orders (3)

13. If an order item is selected (1) and a right-click is executed, the details of the order can be viewed.
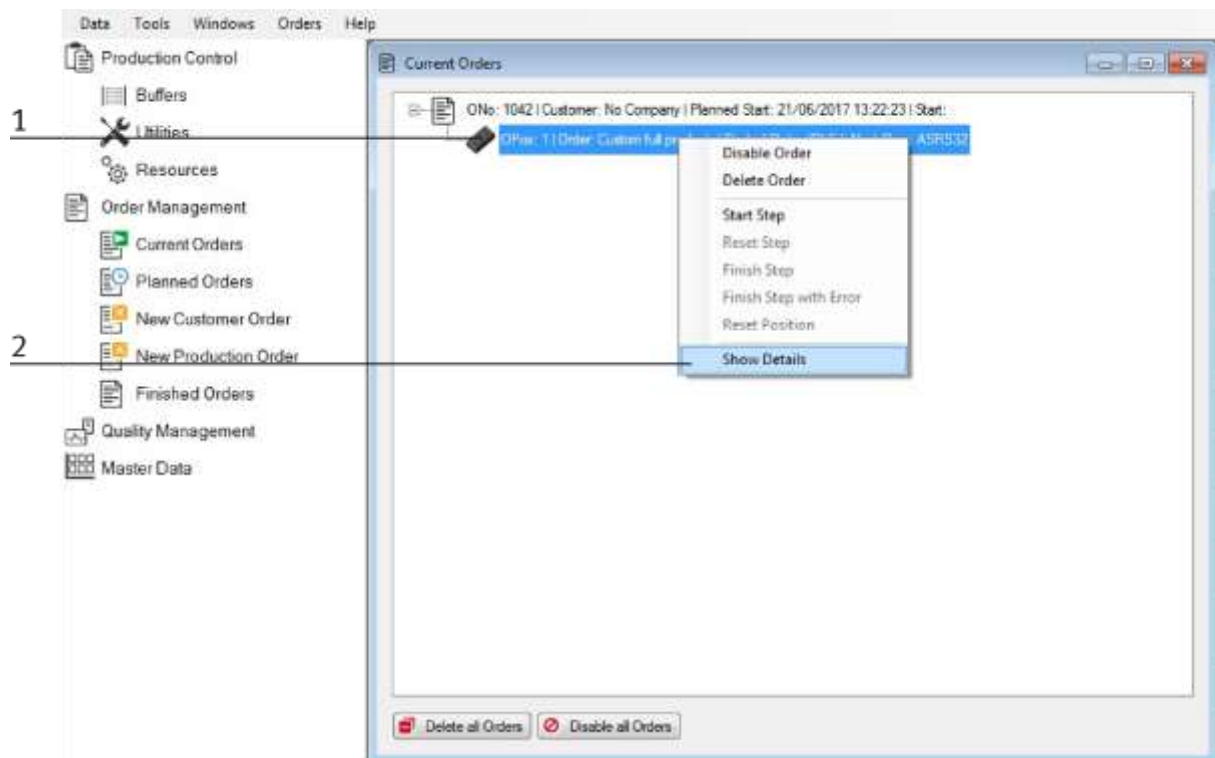
14. Display the order details
15. The order is now carried out using the existing process.

The following example is an example of how the flow is displayed in MES and is combined with the process flow.
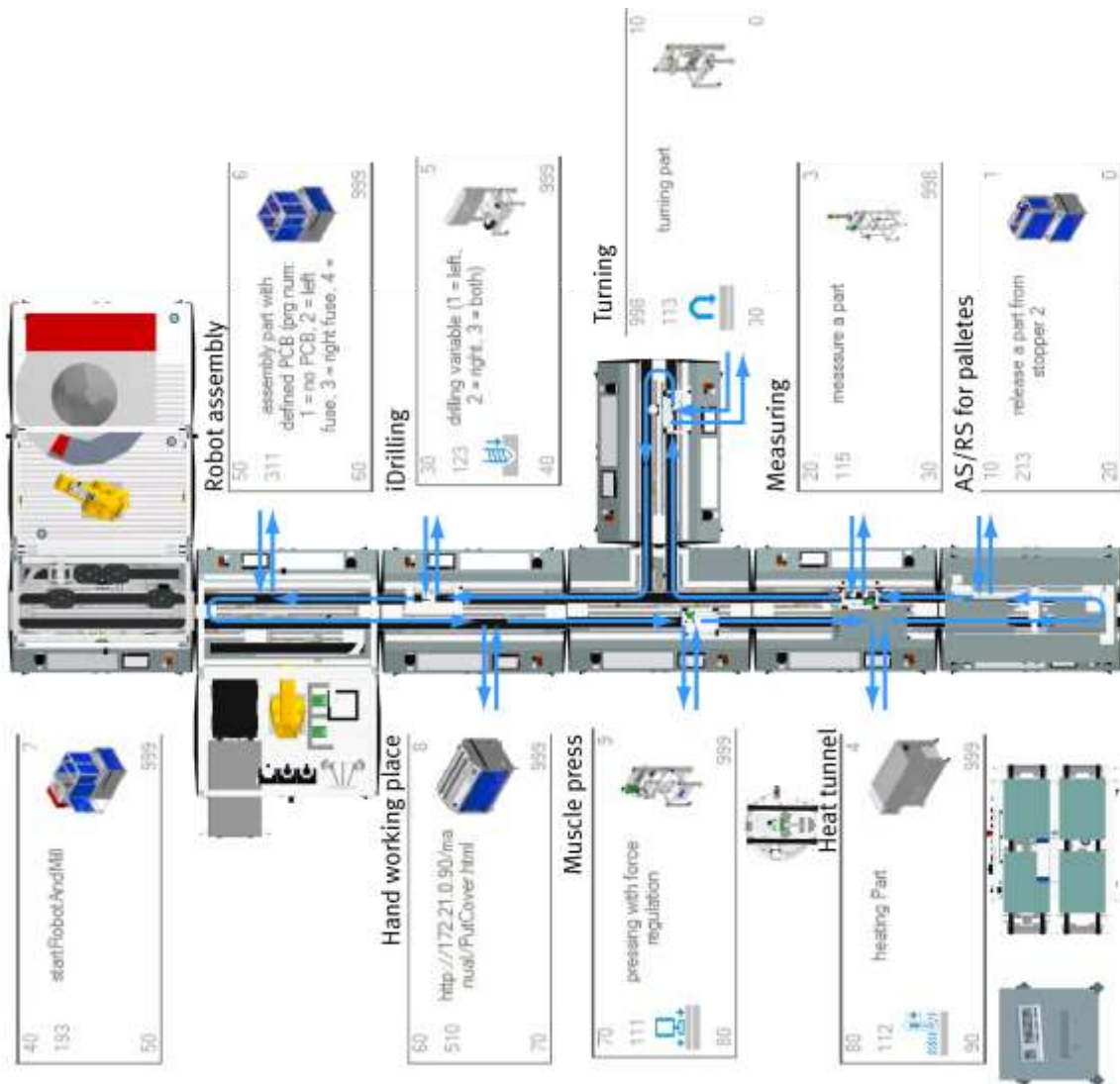
8.12 Parameters

8.12.1 Parameters general

Parameters 1 and 2 represent process values or programs to be executed by the application. The ID is used in Siemens Step 7 to provide the application-specific data, Parameters, names, and so on. Since the parameters are freely definable, these can be adapted by and for the customer. In this case, the parameters differ from the execution in the manual.

8.13 Parameter CP application module

8.13.1 Parameter (CAM)

Illustration similar

Default:

Parameter-No.	Description
1	**Program** Program number to evaluate the camera picture Standard programs: 1. Check no fuse assembled 2. Check if PCB has front fuse 3. Check if PCB has back fuse 4. Check if PCB has both fuses 5. Check if front covers right side up 6. Not used 7. Check for empty pallet

MES:

Operation		Parameter	Description
400	Camera check	1	**Camera program** Standard programs: 16. Check no fuse assembled 17. Check if PCB has front fuse 18. Check if PCB has back fuse 19. Check if PCB has both fuses 20. Check if front covers right side up 21. Not used 22. Check for empty pallet Value: 1 Type: changeable
		2	**Return value** Value: 0 Type: on runtime
401	Check: no fuse	1	**Camera program** Low Limit: 1 High Limit:-6 Value: 1 Type: constant
		2	**Return value** Value: 0 Type: on runtime
402	Check: front fuse	1	**Camera program** Low Limit: 1 High Limit:-6 Value: 2 Type: constant
		2	**Return value** Value: 0 Type: on runtime

MES:

Operation		Parameter	Description
403	Check: rear fuse	1	**Camera program** Low Limit: 1 High Limit:-6 Value: 3 Type: constant
		2	**Return value** Value: 0 Type: on runtime
404	Check: both fuses	1	**Camera program** Low Limit: 1 High Limit:-6 Value: 4 Type: constant
		2	**Return value** Value: 0 Type: on runtime
405	Check: part upside down	1	**Camera program** Low Limit: 1 High Limit:-6 Value: 5 Type: constant
		2	**Return value** Value: 0 Type: on runtime

8.13.2 Parameter (iDRILL)
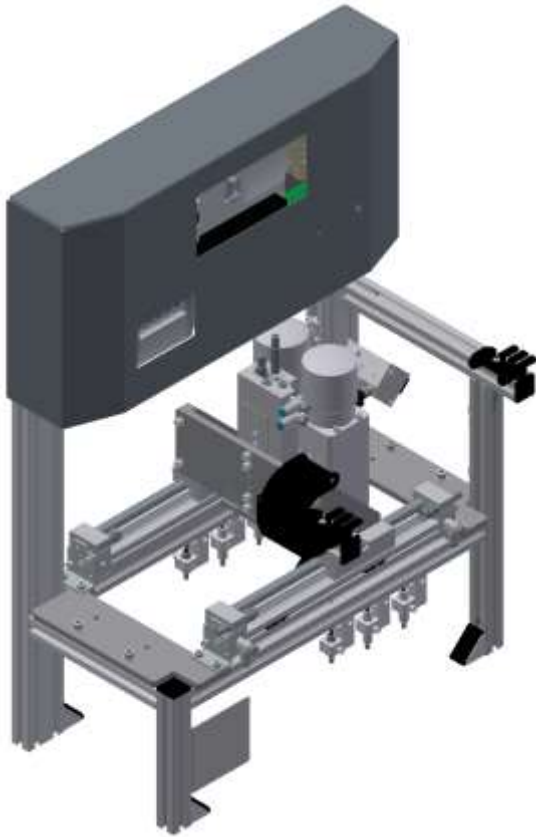
Illustration similar

Default:

Parameter-No.	Description
1	**Drill position** Possible values: 1. Left side 2. Right side 3. Both sides
2	Not used
3	Not used
4	Not used

MES:

Operation		Parameter	Description
120	Drilling right	1	**Drilling position** Low Limit: 1 High Limit:-3 Value: 2 (ride side) Type: constant
121	Drilling left	1	**Drilling position** Low Limit: 1 High Limit:-3 Value: 1 (left side) Type: constant
122	Drilling both	1	**Drilling parameter** Low Limit: 1 High Limit:-3 Value: 3 (both sides) Type: constant
123	Drilling custom	1	**Parameter (1=left; 2=right; 3=both)** Low Limit: 1 High Limit:-3 Value: 3 Type: changeable

8.13.3 Parameter (LABEL)

Illustration similar

Default:

Parameter-No.	Description
1	**File-No.** 0: Not defined (empty label is printed) 1: Frame with ONo, OPos and Festo-Logo 2: Frame with ONo, OPos without Festo-Logo 3: QR-Code Limitation: No limit to the value in the transition table **Note:** The file no. selects the desired image template for printing. The image template can be created via the printer's website.
2	**Variable 1** Value: any Limitation: No limit to the value in the transition table **Note:** The meaning of variable 1 depends on the selected image template.
3	**Variable 2** Value: any Limitation: No limit to the value in the transition table **Note:** The meaning of variable 2 depends on the selected image template.
4	Not used

MES:

Operation		Parameter	Description
114	Print label	1	**Program number** Value: 1 Type: changeable
		2	**Parameter 1 [string]** Example ^XA^XF?:**#F**.ZPL^FN11^FD**#1**^FS^FN12^FD**#2**^FS^FN13^FDQA,**#Q**^FS^XS #F: File name #1: Variable 1 #2: Variable 2 #Q: QR-String Note: #F: The filename chose the picture template fort he print #1: The meaning from variable 1 is independent from the chosen picture template. #2: The meaning from variable 2 is independent from the chosen picture template. #Q: The same QR string then the actual parameters instead the placeholders to generate an optional QR-Code
		3	**Parameter 2 [string]** Example ^XA^XF?:**#F**.ZPL^FN11^FD**#1**^FS^FN12^FD**#2**^FS^FN13^FDQA,**#Q**^FS^XS #F: File name #1: Variable 1 #2: Variable 2 #Q: QR-String Note: #F: The filename chose the picture template fort he print #1: The meaning from variable 1 is independent from the chosen picture template. #2: The meaning from variable 2 is independent from the chosen picture template. #Q: The same QR string then the actual parameters instead the placeholders to generate an optional QR-Code

8.13.4 Parameter (MAN)

Illustration similar

Default:

Parameter-No.	Description
1	Not used
2	Not used
3	Not used
4	Not used

⚠	**NOTE**
	So far only in MES mode usable. If the default mode is used, then the standard page from the MS-IIS web server is called from the MES-PC.

MES:

Operation		Parameter	Description
510	Manual html	1	**Workpiece** Value: 0 Type: changeable
		2	**Action** Value: 0 Type: changeable
		3	**Part number** Value: 0 Type: changeable Limitation: 0
		4	**Not used** Value: 0 Type: constant
		5	**Not used** Value: 0 Type: constant
		6	**Not used** Value: 0 Type: constant
		7	**Next part number [Ciros]** Value: 0 Type: constant

	NOTE
⚠	A Web page is called from the MS-IIS Web server (MES-PC). The current order is displayed on the web page. The operator must abort or confirm the order. The website is stored as a step description of the workplace.

8.13.5 Parameter (MAGFRONT)
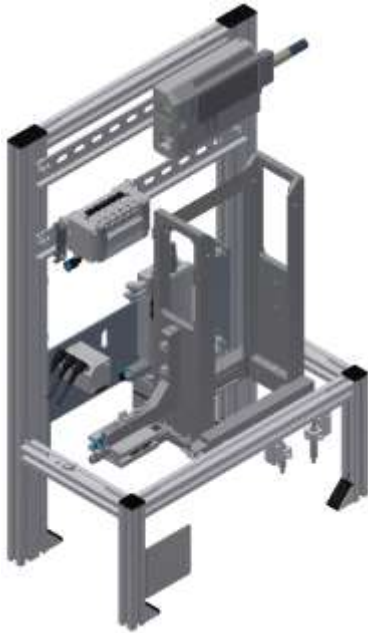
Illustration similar

Default:

Parameter-No.	Description
1	Not used
2	Not used
3	Not used
4	Not used

MES:

Operation		Parameter	Description
200	Feed front cover	1	**Part number** Value: 110 (front cover) Type: changeable

8.13.6 Parameter (MAGBACK)
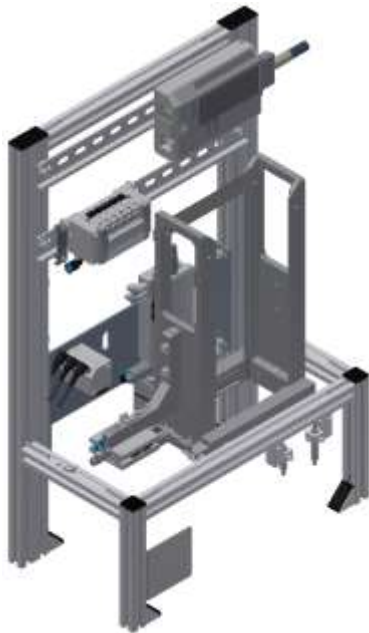
Illustration similar

Default:

Parameter-No.	Description
1	Not used
2	Not used
3	Not used
4	Not used

MES:

Operation		Parameter	Description
201	Feed back cover	1	**Part number** Value: 111 (back cober) Type: changeable

8.13.7 Parameter (MEAS)

Illustration similar

Default:

Parameter-No.	Description
1	**Program number** Setpoint Limitation: No limit to the value in the transition table
2	**Upper limit**
3	**Lower limit**
4	**Measure value**

MES:

Operation		Parameter	Description
115	Measure a part	1	**Default difference [0,1 mm]** Low Limit: 0 High Limit:-300 Value: 20 Type: changeable
		2	**Upper limit [0,1 mm]** Low Limit: 0 High Limit:-300 Value: 26 Type: changeable
		3	**Upper limit [0,1 mm]** Low Limit: 0 High Limit:-300 Value: 14 Type: changeable
		4	**Meassured [0,1mm]** Value: 0 Type: on runtime

8.13.8 Parameter (MPRESS)
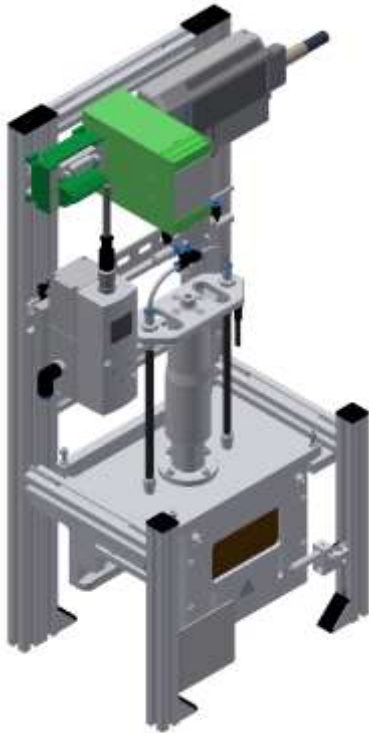
Illustration similar

Default:

Parameter-No.	Description
1	**Pressing force [N]** Limitation: No limit to the value in the transition table Limitation: Limit in controller block cntrLoop (FC300) to 200N
2	**Pressing time [s]** Limitation: No limit to the value in the transition table
3	Not used
4	Not used

MES:

Operation		Parameter	Description
111	Pressing with force regulation	1	**Pressure [N]** Low Limit: 5 High Limit:-100 Value: 50 Type: changeable
		2	**Pressing time [s]** Low Limit: 0 High Limit:-30 Value: 1 Type: changeable

8.13.9 Parameter (OUT)
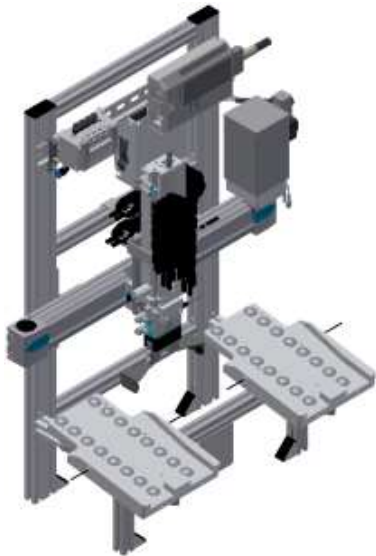
Illustration similar

Default:

Parameter-No.	Description
1	**Slide for output**
	1: slide left (line of sight to front view from CP Lab conveyor, CP Factory basic module)
	2: slide right (line of sight to front view from CP Lab conveyor, CP Factory basic module)
	Limitation: No limit to the value in the transition table
2	Not used
3	Not used
4	Not used

MES:

Operation		Parameter	Description
205	Deliver part	1	**slide (0=anywhere, 1=left, 2=right)**
			Low Limit: 0
			High Limit:-2
			Value: 0
			Type: changeable
		2	**Buffer number**
			Value: 0
			Type: constant
		3	**Resource number**
			Value: 0
			Type: constant

8.13.10 Parameter (PICK)

Illustration similar

Default:

Parameter-No.	Description
1	**Program number** The program number of Pick-by-Light-Module (e.g. 210 or 1100)
2	**Operation number** Each operation (e.g., teach-in, run, cancel, etc.) has a number. The executing program is number 1. Therefore, it must be set to 1.
3	Not used
4	Not used

MES:

Operation		Parameter	Description
116	pick by light	1	**Program number** Value: 0 Type: on runtime
		2	**Part 1 front fuse** Value: 0 Type: changeable
		3	**Part 2 rear fuse** Value: 0 Type: changeable
		4	**Part 3 PCB** Value: 0 Type :changeable
		5	**Part 4 cover** Value: 0 Type: changeable
		6	**Part number 5** Value: 0 Type: constant
		7	**Next partnumber (Ciros)** Value: 0 Type: constant

8.13.11 Parameter (TURNOVER)

Illustration similar

Default:

Parameter-No.	Description
1	Not used
2	Not used
3	Not used
4	Not used

MES:

Operation		Parameter	Description
113	Turnover workpiece	---	---

9 Message texts and interactive error messages at the HMI

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

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

9.1 Message texts

9.1.1 Message texts of the application module output

Class	Location	Alarm name	
0	ActuatorCntrApp	Z-axis	Timeout: Final position sensor GM_BG1 not reached/left! Final position / check sensor Instanz: Z-axis.
0	ActuatorCntrApp	Z-axis	Timeout: Final position sensor GM_BG2 not reached/left! Final position / check sensor. Instanz: Z-axis.
0	ActuatorCntrApp	Z-axis	Timeout: both final position sensors GM_BG1/GM_BG2 have same signal! Sensors / check final position. Instanz: Z-axis;
0	ActuatorCntrApp	Gripper	Timeout: Final position sensor GM_BG3 not reached/left! Final position / check sensor Instanz: Gripper.
0	ActuatorCntrApp	DriveSetBit0	Timeout (1000 ms) activate actor KF1_DI1! Instanz: DriveSetBit0.
0	ActuatorCntrApp	DriveSetBit1	Timeout (1000 ms) activate actor KF1_DI2! Instanz: DriveSetBit1.
0	ActuatorCntrApp	CntrEnab	Timeout (1000 ms) activate actor KF1_DI10! Instanz: CntrEnab.
0	ActuatorCntrApp	StartPos	Timeout (1000 ms) activate actor KF1_DI6! Instanz: StartPos.
0	ErrorApp	ErrCtrlRel	No "Ready" response when controller enable is issued for the X-axis; PLC: plcOut; Check releases and ensure that the Z-axis is in the upper end position!
2	ErrorApp	WarnSlide1	Slide 1 (left) occupied; Initiator GM_BG4; PLC: plcOut; Please remove workpiece!
2	ErrorApp	WarnSlide2	Slide 2 (right) occupied; Initiator GM_BG5; PLC: plcOut; Please remove workpiece!
0	Application	ErrRefRun	Referencing not possible, slide occupied; Initiator GM_BG4/GM_BG5 PLC: plcOut; Please remove workpiece!
0	Application	ErrTimeoutRef	Time monitoring for the drive movement X-axis; PLC: plcOut; Instanz: please check drive/controller!

9.1.2 Message texts of the application module idrilling

Class	Location	Alarm name	
0	ActuatorCntrApp	X-axis	Timeout: Sensor end position VN_BG1 not reached/leaved! Check sensor end position. Instanz: X-axis.
0	ActuatorCntrApp	X-axis	Timeout: Sensor end position VN_BG2 not reached/leaved! Check sensor end position. Instanz: X-axis.
0	ActuatorCntrApp	X-axis	Timeout: Both sensors end positions VN_BG1/VN_BG2 have same signal! Check sensor end position. Instanz: X-axis
0	ActuatorCntrApp	Z-axis	Timeout: Sensor end position VN_BG5 not reached/leaved! Check sensor end position. Instanz: Z-axis.
0	ActuatorCntrApp	Z-axis	Timeout: Sensor end position VN_BG6 not reached/leaved! Check sensor end position. Instanz: Z-axis.
0	ActuatorCntrApp	Z-axis	Timeout: Both sensors end positions VN_BG5/VN_BG5 have same signal! Check sensor end position. Instanz: Z-axis
0	ActuatorCntrApp	DrillDrive1	Timeout (20000 ms) activation actor VN_MA3 Instanz: DrillDrive1.
0	ActuatorCntrApp	DrillDrive2	Timeout (20000 ms) activation actor VN_MA4 Instanz: DrillDrive2.
0	ActuatorCntrApp	Clamp	Timeout (20000 ms) activation actor VN_MB7 Instanz: Clamp.

9.1.3 Message texts of the application module labeling

Report class	Location	Alarm name	
0	ActuatorCntrApp	X-axis	Timeout: PH_BG1 end position sensor not reached/left! Check end position/sensor. Instance: X-axis.
0	ActuatorCntrApp	X-axis	Timeout: PH_BG2 end position sensor not reached/left! Check end position/sensor. Instance: X-axis.
0	ActuatorCntrApp	X-axis	Timeout: Both end position sensors PH_BG1/PH_BG2 carry the same signal! Check sensors/end positions. Instance: X-axis;
0	ActuatorCntrApp	Z-axis_up	Timeout: PH_BG3 end position sensor not reached/left! Check end position/sensor. Instance: Z-axis_up.
0	ActuatorCntrApp	Z-axis_down	Timeout: PH_BG4 end position sensor not reached/left! Check end position/sensor. Instance: Z-axis_down.
0	ActuatorCntrApp	Vacuum	Timeout: Feedback from sensor (PH_BP6) without control of actuator PH_MB6! Instance: Vacuum. Check control/sensor!
0	ActuatorCntrApp	Vacuum	Timeout: No sensor feedback (PH_BP6) when actuator PH_MB6 is activated! Instance: Vacuum. Check control/sensor.
0	ActuatorCntrApp	BlowAir	Timeout (5000 ms) Activation actuator PH_MB7! Instance: BlowAir.
0	ActuatorCntrApp	CutPulse	Timeout (3000 ms) Activation actuator @1%s@! Instance: CutPulse.
0	ErrorApp	ErrPrinterJob	Timeout: No feedback of the print job; Parameter ONo: 1021 OPos: 1; PLC: plcLabel; instance: ErrPrinterJob.
0	ErrorApp	ErrLabelNotPlaced	Label was not placed / suction plate not free! (Sensor: PH_BP6); Remove label! PLC: plcLabel; Instance: ErrLabelNotPlaced.
0	LabelPrintSrv	WarnPrinterOFF	Printer is not switched on! Please check printer!
0	LabelPrintSrv	WarnPrinterPaused	The printer is in PAUSE mode: Please check printer!

9.1.4 Message texts of the application module magazine

Report class	Location	Alarm name	
0	ActuatorCntrApp	Clamp	Timeout: Sensor final position CL_MB5 not reached/left! Final position / Check sensor. Instanz: Clamp.
0	ActuatorCntrApp	Lift	Timeout: Sensor final position CL_BG1 not reached/left! Final position / Check sensor. Instanz: Lift.
0	ActuatorCntrApp	Lift	Timeout: Sensor final position CL_BG2 not reached/left! Final position / Check sensor. Instanz: Lift.
0	ActuatorCntrApp	Lift	Timeout: both sensors final positions CL_BG1/CL_BG2 have same signal! Final positions / Check sensors. Instanz: Lift.
0	ActuatorCntrApp	Seperate	Timeout: Sensor final position CL_BG3 not reached/left! Final position / Check sensor. Instanz: Seperate.
0	ActuatorCntrApp	Seperate	Timeout: Sensor final position CL_BG4 not reached/left! Final position / Check sensor. Instanz: Seperate.
0	ActuatorCntrApp	Seperate	Timeout: both sensors final positions CL_BG3/CL_BG4 have same signal! Final positions / Check sensors. Instanz: Seperate;
2	Error	WarnMagEmp	Magazine empty, please refill. Initiator: CL_BG5; PLC: Instance:

9.1.5 Message texts of the application module turn over

Class	Location	Alarm name	
0	ActuatorCntrApp	Clamp	Timeout: Sensor end position GM_MB5 not reached/leaved! Check sensor end position. Instanz: Clamp.
0	ActuatorCntrApp	Lift	Timeout: Sensor end position GM_BG1 not reached/leaved! Check sensor end position. Instanz: Lift.
0	ActuatorCntrApp	Lift	Timeout: Sensor end position GM_BG2 not reached/leaved! Check sensor end position. Instanz: Lift.
0	ActuatorCntrApp	Lift	Timeout: Both sensors end positions GM_BG1/GM_BG2 have same signal! Check sensor end position. Instanz: Lift;
0	ActuatorCntrApp	Turn	Timeout: Sensor end position GM_BG3 not reached/leaved! Check sensor end position. Instanz: Turn.
0	ActuatorCntrApp	Turn	Timeout: Sensor end position GM_BG4 not reached/leaved! Check sensor end position. Instanz: Turn.
0	ActuatorCntrApp	Turn	Timeout: Both sensors end positions GM_BG3/GM_BG4 have same signal! Check sensor end position. Instanz: Turn;
0	ActuatorCntrApp	Grip	Timeout: Sensor end position GM_BG5 not reached/leaved! Check sensor end position. Instanz: Grip.
0	ActuatorCntrApp	Grip	Timeout: Sensor end position GM_BG6 not reached/leaved! Check sensor end position. Instanz: Grip.
0	ActuatorCntrApp	Grip	Timeout: Both sensors end positions GM_BG5/GM_BG6 have same signal! Check sensor end position. Instanz: Grip;
2	ErrorApp	WarnApp1	Waring: Jam in front of module turn over. Initiator.: @1%s@; Application start after removing the jam

9.2 Interactive error messages

9.2.1 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.

9.2.2 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.

9.2.3 General

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

9.2.4 Application module output

Value	Text	Fix error
1070	Referencing did not finish!	Start referencing again
1071	Positioning did not finish!	Start positioning again
1072	No part on deposit slide detected after output!	Check sensors BG4/BG5.
1073	Wrong parameter for deposit position!	Check parameter
1074	Start not possible, deposit position is occupied!	Remove part from slide

9.2.5 Application module Drilling/iDrilling

Value	Text	Fix error
1010	Wrong parameter for drilling program	Use correct drilling program
5013	Back cover already available	Remove back cover / check sensor BG8
5014	Front cover not available	Insert front cover / check sensor BG4
5015	Orientation of front cover is wrong	Turn / insert front cover the correct way / check sensor BG3

9.2.6 Application module Labeling

Value	Text	Fix error
1060	Suction plate is occupied!	Please remove label and check sensor BP6.
1061	Label was not placed!	Check suction plate and sensor BP6.
1062	Printer not ready.	Switch on printer and check printer.
1063	Printing label failed.	Check printer.
1064	Build up vacuum failed	Check vacuum unit.
5067	No workpiece on palet detected!	Check palet / sensor BG1.

9.2.7 Application module camera inspection

Value	Text	Fix error
1050	Camera is not in online mode.	Bring camera in online mode.
1051	Camera is not ready.	Check camera / Check Networkconnection camera
5050	Quality check failed!	Check workpiece and camera program
5051	No code found!	

9.2.8 Application module magazine

Value	Text	Fix error
1001	No pallet on workpiece carrier	
1002	Front cover already available	
1003	Back cover already available	
1004	Front cover not available	
1005	Back cover not available	
1006	Front cover not correct inserted	
1007	No workpiece available	
1008	Orientation from workpiece not correct	
1020	Magazine is empty	refill or check sensor BG5
5000	order canceled incorrectly	
5001	No pallet present	Check pallet / sensor BG7
5002	Front cover is already present	Check workpiece / sensor BG8.
5003	Back cover already present	Check workpiece / sensor BG8.
5004	No front cover present	Check pallet / sensor BG7.
5005	Wrong parameter	
5007	No workpiece available	Check pallet sensor
5009	No workpiece detected on the pallet!	Check sensor BG1

9.2.9 Application module measuring

Value	Text	Fix error
5040	Measured value is out of defined range!	Check workpiece and measuring device / check parameters for limit values

9.2.10 Application module muscle press

Value	Text	Fix error
5000	Job canceled incorrectly	
5001	No pallet available	Pallet / check sensor BG7
5002	The front cover is already present	Workpiece / check sensor BG8
5003	The back cover is already present	Workpiece / check sensor BG8
5004	No front cover available	Pallet / check sensor BG7
5005	Wrong parameter!	
5007	No workpiece available	Pallet / check sensor BG1
5009	No workpiece on pallet detected	Check pallet / sensor BG1

9.2.11 Application module turn over

Value	Text	Fix error
1001	No pallet on workpiece carrier	
1002	The front cover is already present	
1003	The back cover is already present	
1004	Front cover is not available	
1005	Back cover is not available	
1006	Front cover is not inserted correctly!	
1007	No workpiece available!	
1008	Workpiece orientation incorrect!	
5000	Job canceled incorrectly	
5001	No pallet available	Pallet / check sensor BG7
5002	The front cover is already present	Workpiece / check sensor BG8
5003	The back cover is already present	Workpiece / check sensor BG8
5004	No front cover available	Pallet / check sensor BG7
5005	Wrong parameter!	
5007	No workpiece available	Pallet / check sensor BG1
5009	No workpiece on pallet detected	Check pallet / sensor BG1

10 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.

11 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

12 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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