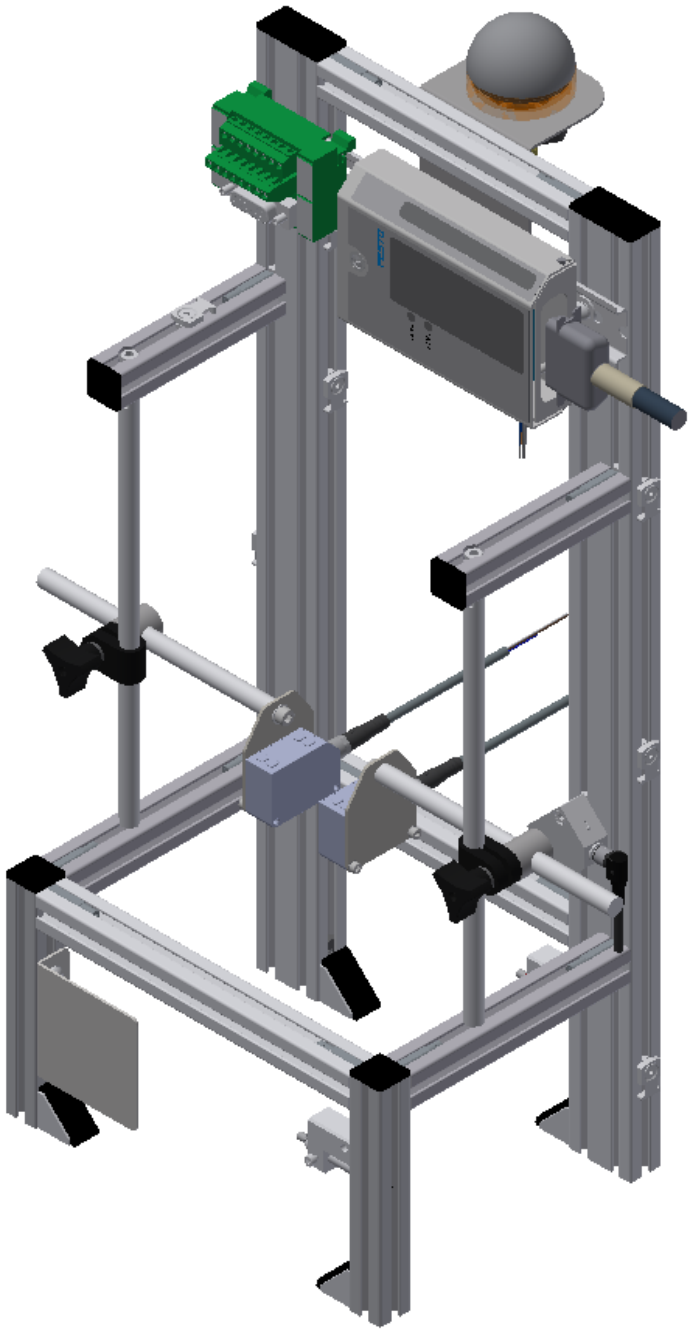
# 8154245

## Measuring

FESTO

**CP Factory/CP Lab**

Original operating instructions



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Original operating instructions



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

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**CAUTION**

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

**Main document**
Associated documents attached:

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

# Contents

# 1 Safety instructions

## 1.1 Warning notice system

These operating instructions contain notes that must be observed for your personal safety and in order to prevent property damage. The notes concerning your personal safety are indicated by a safety symbol. Notes that only concern property damage are not indicated by a safety symbol.
The notes below are listed in order of hazard level.

**DANGER**

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

**WARNING**

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

**CAUTION**

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

***NOTE***

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

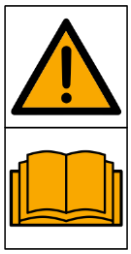
In cases where more than one hazard level applies, the safety note with the highest hazard level will be shown. A safety note may concern both personal injury and property damage.
Hazards that will only result in property damage are indicated with the word "Note".

### 1.2 Pictograms

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

Hazard warning

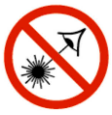
Warning - dangerous electric voltage



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

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

**Laser 2**



Warning of laser beam

Warning – optical radiation

Warning – lifting heavy loads

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 components

**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 Cyber security

Festo Didactic offers products with 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 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, defense-in-depth) are in place. Failure to ensure adequate security measures when connecting the product to the network can result in vulnerabilities which allow unauthorized, remote access to the network – even beyond the product's boundaries. This access could be abused to incur a loss of data or manipulate or sabotage systems. Typical forms of attack include but are not limited to: Denial-of-Service (rendering the system temporarily non-functional), remote execution of malicious code, privilege escalation (executing malicious code with higher system privileges than expected), ransomware (encryption of data and demanding payment for decryption). In the context of industrial systems and machines this can also lead to unsafe states, posing a danger to people and equipment.
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.

Support Festo in ensuring your continued safety. Please report any security findings to the Festo Product Security Incidence Response Team (PSIRT) in German or English language, by email to psirt@festo.com or online contact form at https://www.festo.com/psirt.

**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.

## 4.5 Safety instructions for laser class 2

**WARNING**

- **Read the Sick Quickstart before starting any work.**
- **Caution - If operating or adjusting devices other than those specified here are used or other procedures are carried out, this can lead to dangerous exposure to radiation.**
- **Temporary irritating optical effects cannot be completely ruled out, especially in the case of low ambient brightness. Irritating optical effects are e.g. B. glare, flash blindness, afterimages, photoepilepsy or impaired color vision.**
- **Optical radiation laser class 2**
  The human eye is not endangered with short-term irradiation of up to 0.25 seconds. If you look into the laser beam for a long time, damage to the retina is possible. The laser radiation is harmless to human skin.
  - - Do not intentionally stare into the laser beam.
  - - Do not point the laser beam at people's eyes.
  - - A direct look into the laser beam cannot be ruled out e.g. Use suitable eye protection, e.g. for commissioning and maintenance work.
  - - Avoid reflections of the laser beam on reflective surfaces. Pay particular attention to this during assembly and alignment work.
  - - Do not open the housing. Opening the housing can increase the risk.
  - - Observe the valid national regulations for laser protection

### 4.6 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.**

### 4.7 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.

### 4.8 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.

### 4.9 Transport

**WARNING**

- **Danger due to tipping over**
  - Suitable packaging and transport equipment must be used when transporting the station. The station can be lifted from underneath using a forklift truck. Please note that eccentric centers of gravity can cause the station to tip over.
  - Stations with attachments at height will have a high center of gravity.
  - Take care to avoid tipping over during transportation.

***NOTE***

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

### 4.10 Name plates


Name plate example

| Position | Description |
|---|---|
| 1 | Maximum pressure pneumatic (if available) |
| 2 | current consumption |
| 3 | Operating voltage |
| 4 | Serial number |
| 5 | Type number (Ordernumber) aaaaa-aa (canadian nomenclature) bbbbbbbb (german nomenclature) |
| 6 | CE idenification |
| 7 | WEEE identification |
| 8 | Country of origin |
| 9 | Production year |
| 10 | Weight |
| 11 | Data Matrix Code (Type-and serial number) |

## 4.11 CE Declaration of Conformity

FESTO

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

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

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

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

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

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

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

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

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

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

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

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

(LT) 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 desbetreffende 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 ζσμμόρθωζης 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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FESTO

2022-03-02

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

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

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Philippe Drolet, ing.
Product Compliance

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

SIEMENS

## Anhang RED & RoHS / *Annex RED & RoHS*
## zur EU–Konformitätserklärung / *to EU-Declaration of Conformity*

Nr./*No.* A5E50679864A; REV.: 001

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

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

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

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

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

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

| Referenznummer *Reference number* | Ausgabedatum *Date of issue* | Referenznummer *Reference number* | Ausgabedatum *Date of issue* |
|---|---|---|---|
| ETSI EN 301 489-1 | V2.2.3 | EN IEC 61000-6-1 | 2019 |
| ETSI EN 301 489-3 | V2.1.1 | EN IEC 61000-6-2 | 2019 |
| EN 55011 + A1 + A11 | 2016/2017/2020 | EN 61000-6-3 + A1 | 2007/2011 |
| EN 55032 + A11 Class A/B | 2015/2020 | EN IEC 61000-6-4 | 2019 |
| EN 55035 + A11 | 2017/2020 | EN IEC 61000-6-8 | 2020 |

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

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

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

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

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### 4.12 General product safety

**WARNING**

- **General product safety, CE conformity**
  - The product fulfills the requirements of all applicable EU directives. We confirm this with the CE mark.
  - As a consequence of
    Changes (hardware / software)
    Additions
    or improper use
  - Product safety can no longer be guaranteed by the operator.
  - In this case, the manufacturer's CE declaration of conformity expires. The operator must re-evaluate the safety and determine the CE conformity.

### 4.13 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.

#### 4.13.1 Emergency stop

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

#### 4.13.2 Additional protective devices

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

# 5 Technical data

| Parameter | Value |
|---|---|
| **Electrics** | |
| Power supply | 24 V DC, 4.5 A; safe low voltage (PELV) |
| Digital inputs | 1 |
| Digital outputs | 2 |
| **Ambient conditions** | |
| Operating environment | Use inside building only |
| Ambient temperature | 5°C ... 40°C |
| Rel. air humidity | 80% up to 31°C |
| Pollution degree | 2, Dry, non-conductive contamination |
| Operating height | Up to 2000 m above NN (sea level) |
| Noise emission level | $L_{pA}$ < 70 dB |
| **Certification** | |
| CE marking in accordance with: | Machinery Directive<br>EMC Directive<br>RoHS Directive |
| EMC environment | Industrial environment, Class A (in acc. with EN 55011) |
| **Measurements** | |
| Length | 273 mm |
| Width | 240 mm |
| Height | 558 mm |
| Weight | Approx 4,0 kg |
| **Subject to change** | |

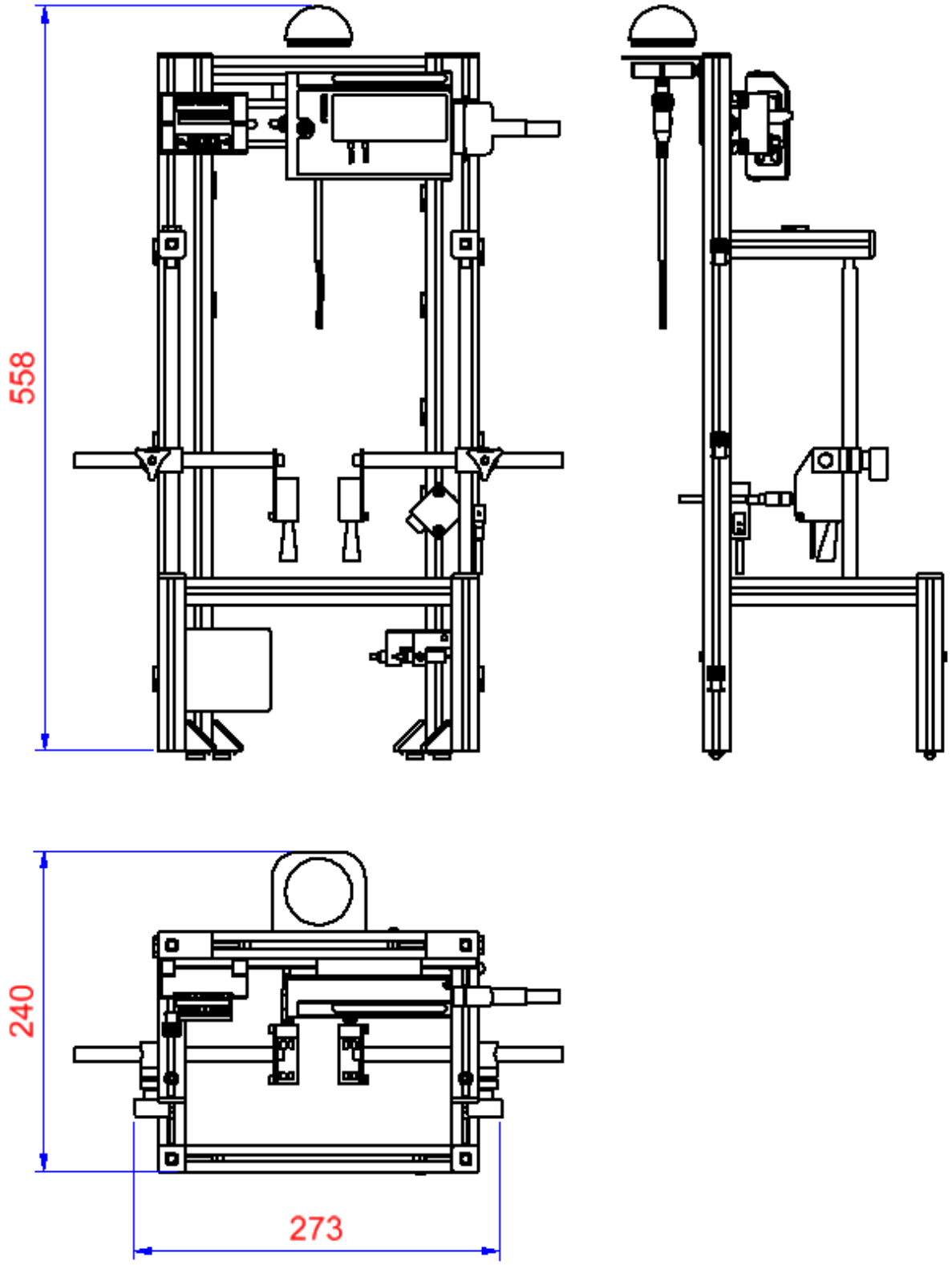



Illustration similar

# 6 Design and Function

## 6.1 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.

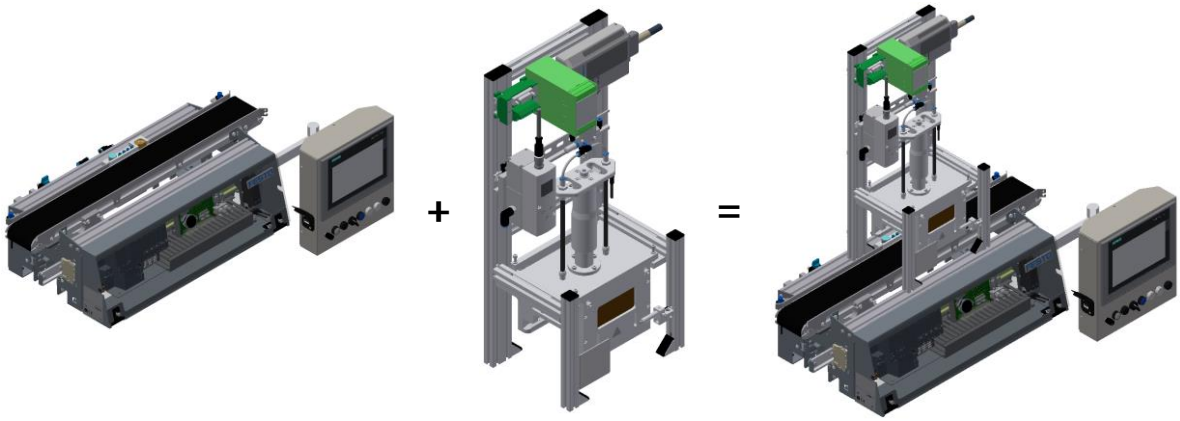
**NOTE**

- 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.

### 6.2 Overview of the System

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

**Example**



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.

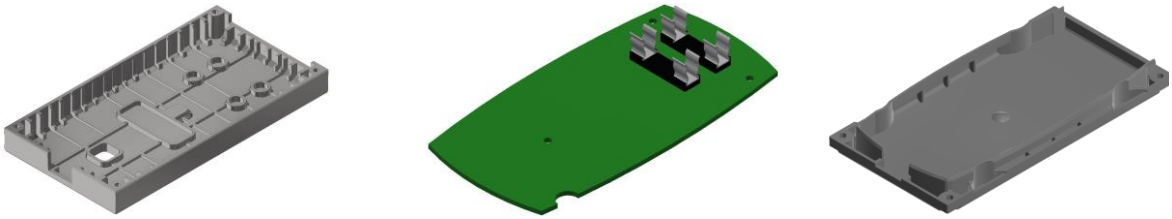
carrier

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.

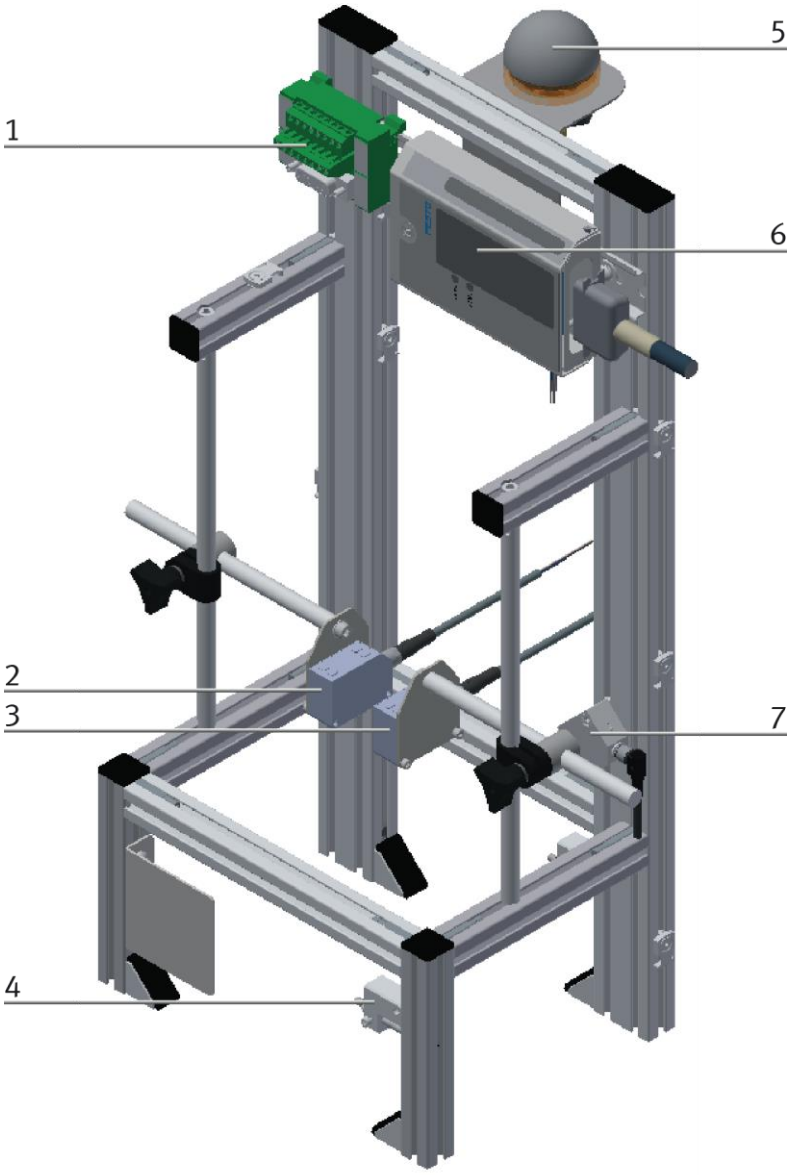


front cover

board

back cover

### 6.3 Components of the CP application module measuring




CP application module Measuring / illustration similar

| Position | Description |
|---|---|
| 1 | analogue terminal |
| 2 | height measurement 1 / distance sensor |
| 3 | height measurement 2 / distance sensor |
| 4 | workpiece request / light guide |
| 5 | signal lamp |
| 6 | I/O module |
| 7 | workpiece request / lightguide |

## 6.4 Terminal allocation of the digital and analogue interfaces
## I/O module (XD1)


I/O module (XD1) / illustration similar

With the help of the I/O module, the signal status of the sensors and actuators can be read:
IN0 to IN7 resp. OUT0 to OUT7 indicates here the range of values of a byte from Bit 0 to 7. The sensors and actuators of the CP application module Measuring are set on the inner terminals.
IN0 to IN7 visualizes the sensor status with a green LED. If one of the LEDs is flashing green, then the sensor connected with the input will have a logical 1-signal (TRUE).
OUT0 to OUT7 visualizes the actuator status with an orange LED. If one of the LEDs is flashing orange, the actuator connected with the output will be energized.

**Digital Inputs (PLC):**

| Digital Inputs | Reference Identifier | Description |
|---|---|---|
| IN0 | BG1 | True = workpiece available |
| IN1 | | Reserve |
| IN2 | | Reserve |
| IN3 | | Reserve |
| IN4 | | Reserve |
| IN5 | | Reserve |
| IN6 | | Reserve |
| IN7 | | Reserve |

**Digital Outputs (PLC):**

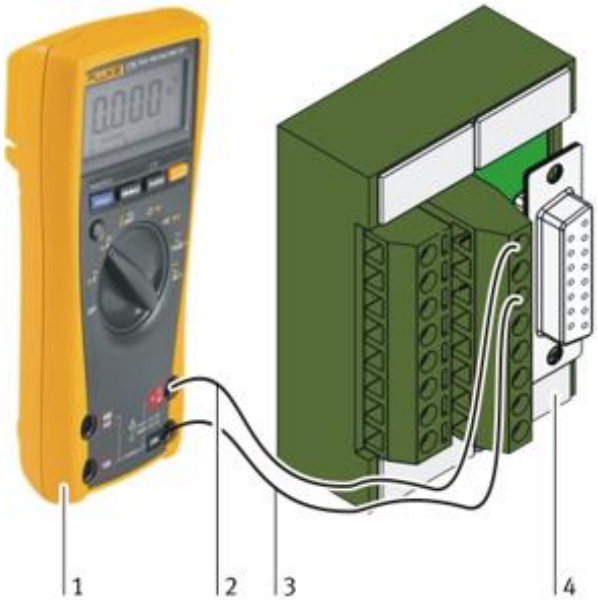
| Digital Outputs | Reference Identifier | Description |
|---|---|---|
| OUT0 | PF1 | Basic color red |
| OUT1 | PF2 | Basic color green |
| OUT2 | PF3 | Basic color blue |
| OUT3 | FL | Reserve |
| OUT4 | BG2-MF | BG2 Multi function |
| OUT5 | BG3-MF | BG3 Multi function |
| OUT6 | | reserve |
| OUT7 | | reserve |

Display LED lamp

| Color | Display color | | | | | | |
|---|---|---|---|---|---|---|---|
| | RD | YE | GN | CY | BU | MA | WH |
| PF1: red | ● | ● | | | | ● | ● |
| PF2: green | | ● | ● | ● | | | ● |
| PF3: blue | | | | ● | ● | ● | ● |

## Analogue-Terminal (XD2A)


Analogue-Terminal (XD2A)




Multimeter and Analogue-Terminal

| Position | Description |
|---|---|
| 1 | Multimeter |
| 2 | Measuring line with probe ($U_{E1}$) |
| 3 | Measuring line with probe (GND) |
| 4 | Analogue-Terminal |

The analogue output signals of the two distance sensors (= analogue input signals of the PLC) are set on the following terminals of the analogue terminal:

| Terminal | Reference Identifier | Description |
|---|---|---|
| 1 | | reserve |
| 2 | | reserve |
| 3 | | reserve |
| 4 | | reserve |
| 5 | | reserve |
| 6 | XD2A: AGNDE | reference potential of the sensors |
| 7 | XD2A: UE2 | height measurement BG3A (0 V = 50 mm, 10 V = 150 mm) |
| 8 | XD2A: UE1 | height measurement BG2A (0 V = 0 mm, 10 V = 150 mm) |
| 9 | | reserve |
| 10 | | reserve |
| 11 | | reserve |
| 12 | | reserve |
| 13 | | reserve |
| 14 | | reserve |
| 15 | | reserve |

Therefore, the measurement and testing of the input voltage for the A/D converter can be performed at these pairs of terminals.

- pair of terminals 6/8: distance sensor BG2
- pair of terminals 6/7: distance sensor BG3

### 6.5 Assignment

The CP application module Measuring is designed for recording and rating a quantitative characteristic value. In this connection, the difference in length measured by differential measurement represents the metrically scaled continuous feature. Besides, the value of the difference in length corresponds to the quantitative characteristic value, in the following referred to as the measured value of difference.
By determining a quality requirement such as, for instance, the production tolerances of the workpiece, its position on the carrier etc., a rating can be performed by means of the recorded characteristic value and the limit value range defined for the quality requirement.
The result of the rating can be shown with a signal lamp, thus influencing the further value-added process of the workpiece, for example:

- result without the defined limit value range
  reaction: identifying the workpiece as a bad part and sorting it out, or forwarding it for further processing
- result within the defined limit value range:
  reaction: identifying the workpiece as a good part and forwarding it to the next processing station

**NOTE**

– Due to local views, the differential measurement will also be referred to as height measurement in what follows.

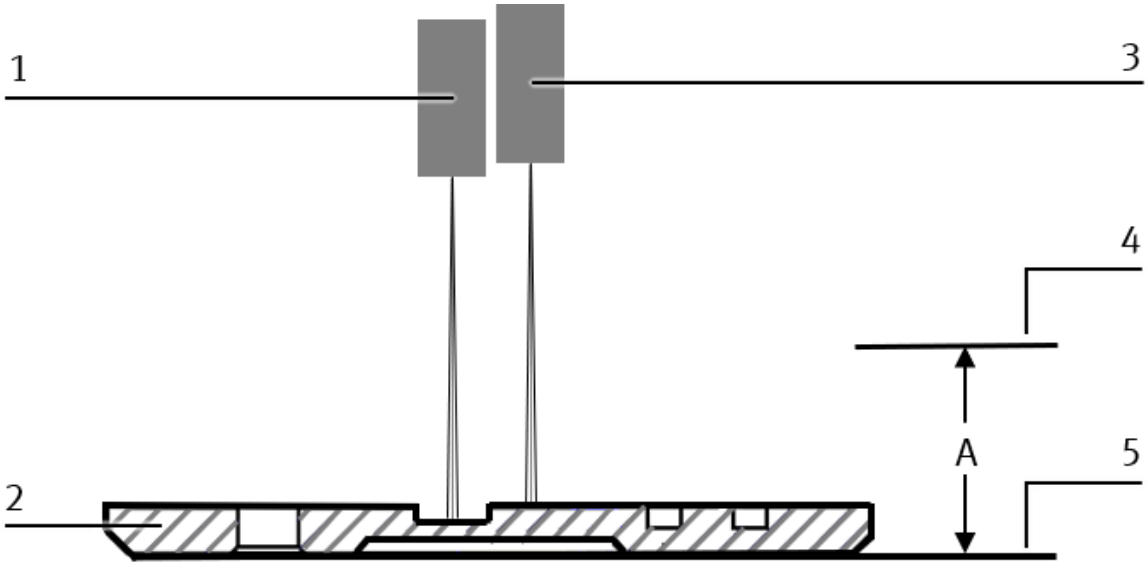
### 6.6 Function

**NOTE**

– The CP application module measuring has exclusively been constructed for differential measurements.

The CP application module Measuring has been constructed for controlling the quality of housing parts. It has got two distance sensors working with the triangulation method. Triangulation method means that the laser (light source) and the optical position sensor (detector) are positioned in a certain defined distance to each other. The beam path of the laser meets an object and is reflected by this object into the direction of the optical position sensor. The distance between the laser and the object is automatically calculated on the basis of the light spot's position on the optical position sensor.
Teaching the distance sensors according to the relevant measuring area is required. They emit the corresponding distance to an object in their measuring area as an analogue signal. The scan points of the distance sensors BG2 (1) and BG3 (3) are directed to two different measuring zones on the workpiece (2). Teaching the measuring areas of the distance sensors during commissioning to an area from the topside of the workpiece reception (5) up to 40 mm above it (4) has to be done. Thus the difference (A) is 40 mm. Therefore, the distance sensors emit their minimum analogue signal with an idle pallet, and they emit their maximum analogue signal with an object on a pallet that with a height of 40 mm. The station Measuring reads the two analogue signals and calculates the actual measured value of difference (characteristic value) from that.

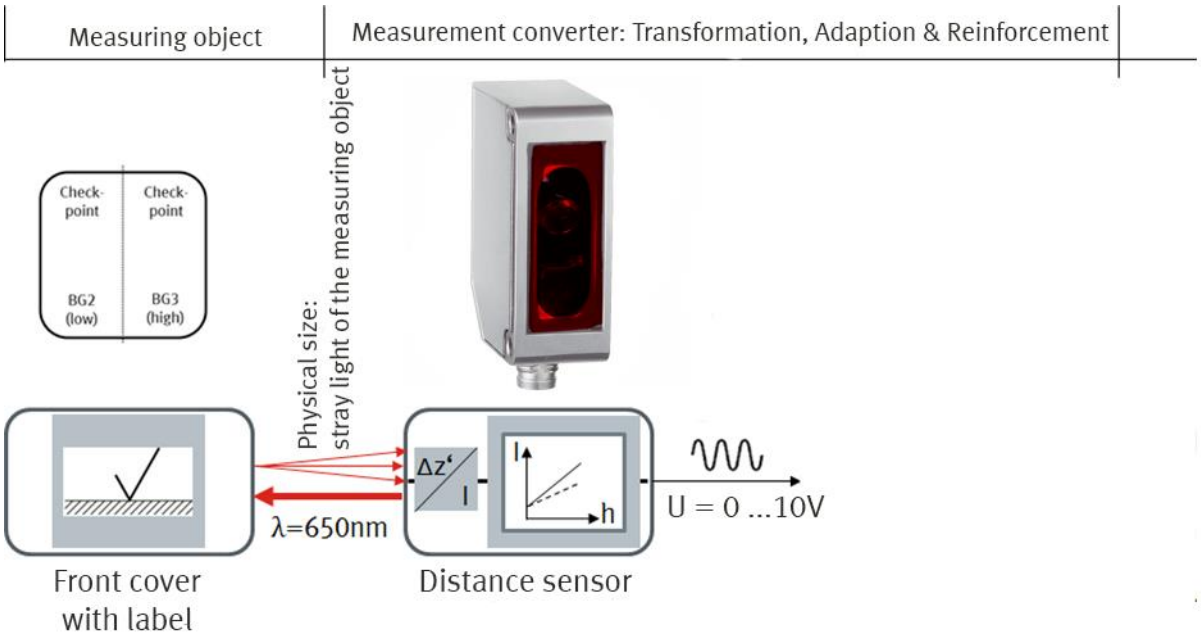
The actual measured value of difference must be within a fixed range of limit values of the quality standard, otherwise the workpiece will be defined as faulty (bad part). Thus the compliance with the defined quality standard(s) of the workpiece within the discrete production is controlled and guaranteed with the station Measuring. In addition, the currently calculated actual measured value of difference is transferred to the MES system.

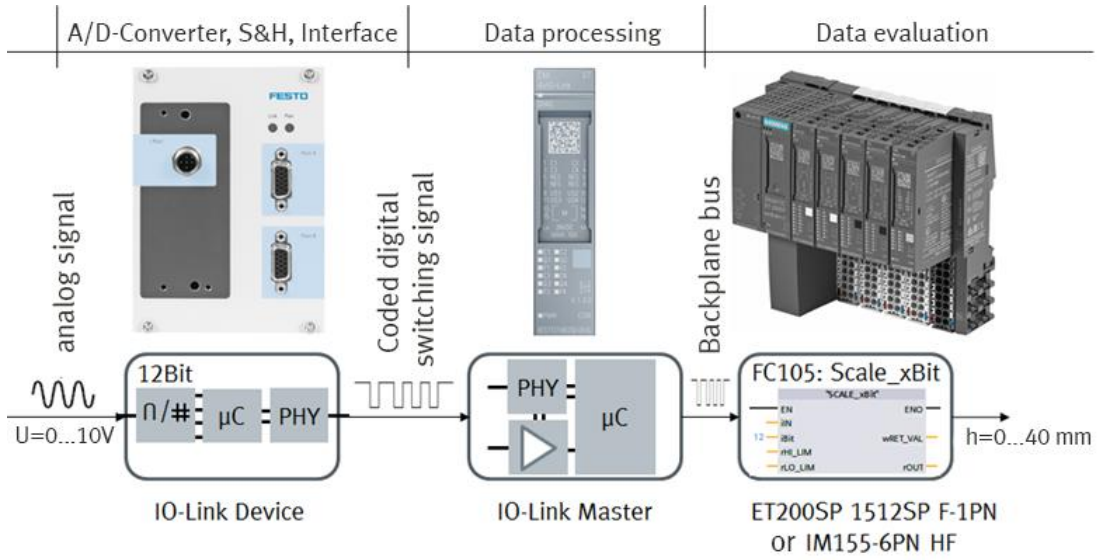



Differential measurement / illustration similar

| Position | Description |
|---|---|
| 1 | distance sensor (BG2) |
| 2 | workpiece |
| 3 | distance sensor (BG3) |
| 4 | maximum height of object h = 40 mm |
| 5 | reference area: topside of the workpiece reception h = 0 mm |
| A | difference Δh = 40 mm |

### 6.6.1 Measuring chain CP Lab

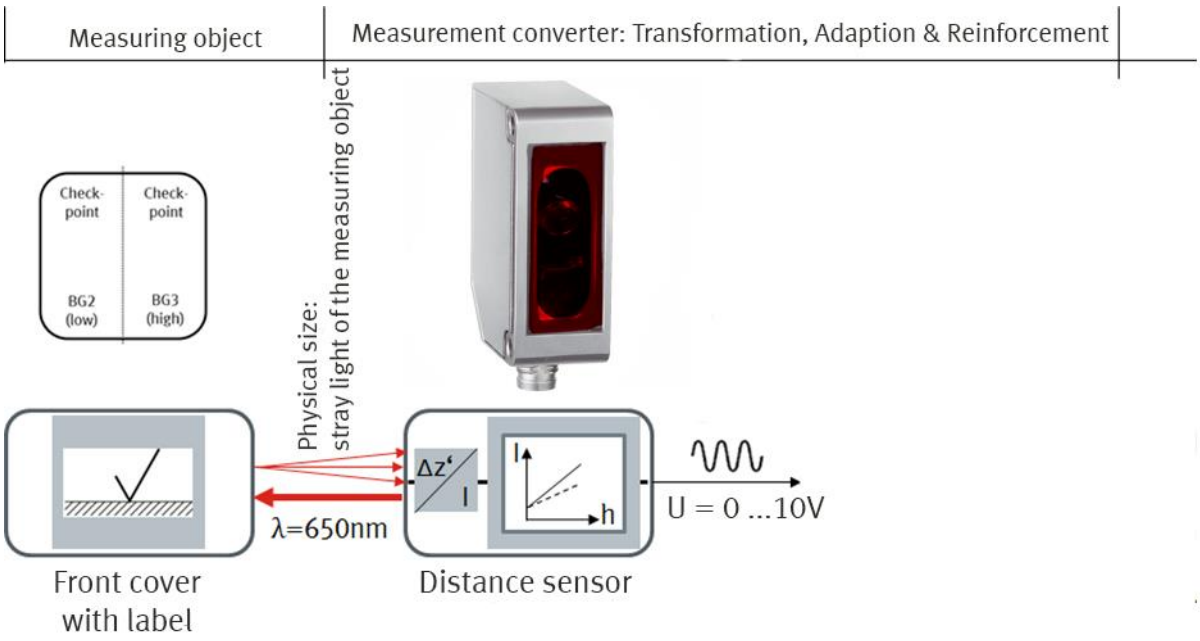


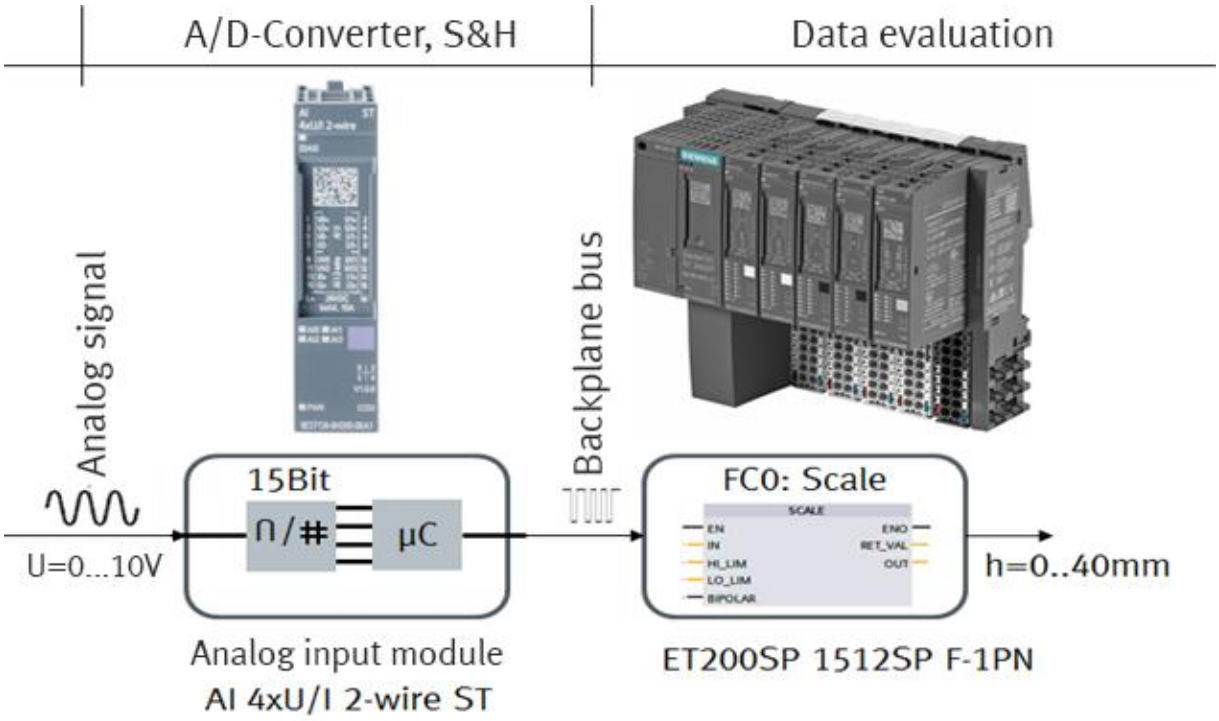



| distance sensor | IO-Link Device | ET200SP 1512SP F-1PN or IM155-6PN HF |
|---|---|---|
| U = 0 V<br>h = 0 mm | A/D-converter = 12 Bit,<br>voltage measuring range U = 0...10 V:<br>10 V ➔ 4096 units (idealized)<br>0 V ➔ 0 units (idealized) | standardization to the range h=0...40 mm with module Scale_xBit (FC105):<br>iBit = 12; rHI_LIM = 40.0; rLO_LIM = **-10.0** ➔ rOUT = 0.0 |
| U = 10 V<br>h = 40 mm | A/D-converter = 12 Bit,<br>voltage measuring range U = 0...10 V:<br>10 V ➔ 4096 units (idealized) | standardization to the range h=0...40 mm with module Scale_xBit (FC105):<br>iBit = 12; rHI_LIM = 40.0; rLO_LIM = **-10.0** ➔ rOUT = 40.0 |

The distance sensor emits a red laser beam with the wavelength λ = 650 nm which meets the measuring zone, where it is scattered. The distance sensor recognizes the change of position Δz‘ of the reflected light spot on its detector. On the basis of the taught-in measuring area and the therefore defined linear characteristic curve, it emits a voltage value U = 0...10 V.
After tapping, the voltage is supplied to the IO link device which converts the voltage to a basic value represented in the nominal range 0...4095 by means of a 12-Bit A/D-converter. The now digitalized basic value is transferred to the IO link master by means of a IO-Link point-to-point connection and afterwards forwarded to the CPU. In the CPU, the basic value is scaled to the height h = 0...40 mm with the function Scale_xBit_1_10V (FC105).

### 6.6.2 Measuring chain CP Factory



| Distance sensor | Analogue input module AI 4xU/ I 2-wire ST | ET200SP 1512SP F-1PN |
|---|---|---|
| U = 0 V<br>h = 0 mm | A/D-converter = **15** Bit, voltage measuring range U = 0..10 V:<br>10 V ➔ 27648 units (idealized)<br>2 V ➔ 5529 units (idealized) | standardization to the range h=0...40 mm with module Scale (FC0):<br>„Scale_xBit_0-10V“ (FC105):<br>iBit = 16; rHI_LIM = 40.0; rLO_LIM = **-10.0** ➔ rOUT = 0.0 |
| U = 10 V<br>h = 40 mm | A/D-converter = **15** Bit, voltage measuring range U = 0...10 V:<br>10 V ➔ 27648 items (idealized) | standardization to the range h=0...40 mm with module<br>„Scale_xBit_0-10V“ (FC105):<br>Scale_xBit_0-10V“ (FC105):<br>iBit = 16; rHI_LIM = 40.0; rLO_LIM = **-10.0** ➔ rOUT = 40.0 |

The distance sensor emits a red laser beam with the wavelength λ = 650 nm which meets the measuring zone, where it is scattered. The distance sensor recognizes the change of position Δz‘ of the reflected light spot on its detector. On the basis of the taught-in measuring area and the therefore defined linear characteristic curve, it emits a voltage value U = 0...10 V.
After tapping, it is supplied to the analogue input module. The module converts the voltage level to a basic value, represented in the Siemens-specifically nominal range 0...27648. The now digitalized basic value is transferred to the CPU for further data processing and scaled to the height h = 0...40 mm by the function Scale (FC0).

Representation of the analogue value in the unipolar voltage measuring range 0...10 V:

| units | measured value in % | voltage measuring range 0...10 V | |
|---|---|---|---|
| 32767 | › 117,589 % | ›11,759 V | overflow |
| 32511 | 117,589 % | 11,759 V | overamplify range |
| 27649 | 100,004 % | 10 V + 400 µV | |
| 27648 | 100,000 % | 10 V | nominal range |
| 20736 | 75 % | 7,5 V | |
| 1 | 0,003617 % | 0 V + 361,7 µV | |
| 0 | 0,000 % | 0 V | |
| -1* | -0,003617 %* | 0 V - 361,7 µV* | underamplify range* |
| -4864* | -17,593 %* | -1,759 V* | |
| -32768* | ‹-17,593 %* | ‹-1,759 V* | underflow* |

*negative values are only possible if the module (6ES7134-6GD**01**-0BA1) is projected with firmware status from V2.0.0 on.

# 7 Commissioning

**NOTE**

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

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

**NOTE**

– You can read the general installation instructions in the manual of your basic module. The following instructions apply particularly to the CP Application Module.

### 7.1 Workplace

The commissioning of the CP Application Module requires:

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

### 7.2 Visual Inspection

**WARNING**

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

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

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

### 7.3 Safety Regulations

**WARNING**

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

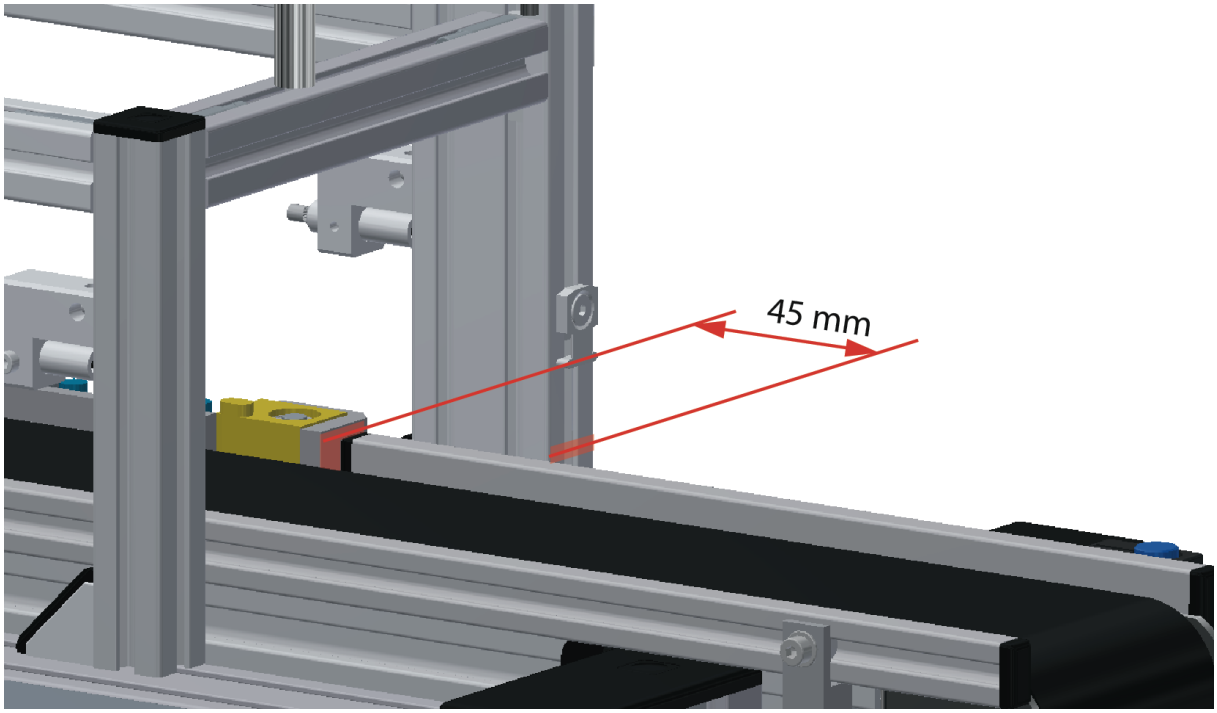
The CP Application Module may only be operated on the following conditions:

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

### 7.4 Assembly

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

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




Example distance between application module and stopper / illustration similar

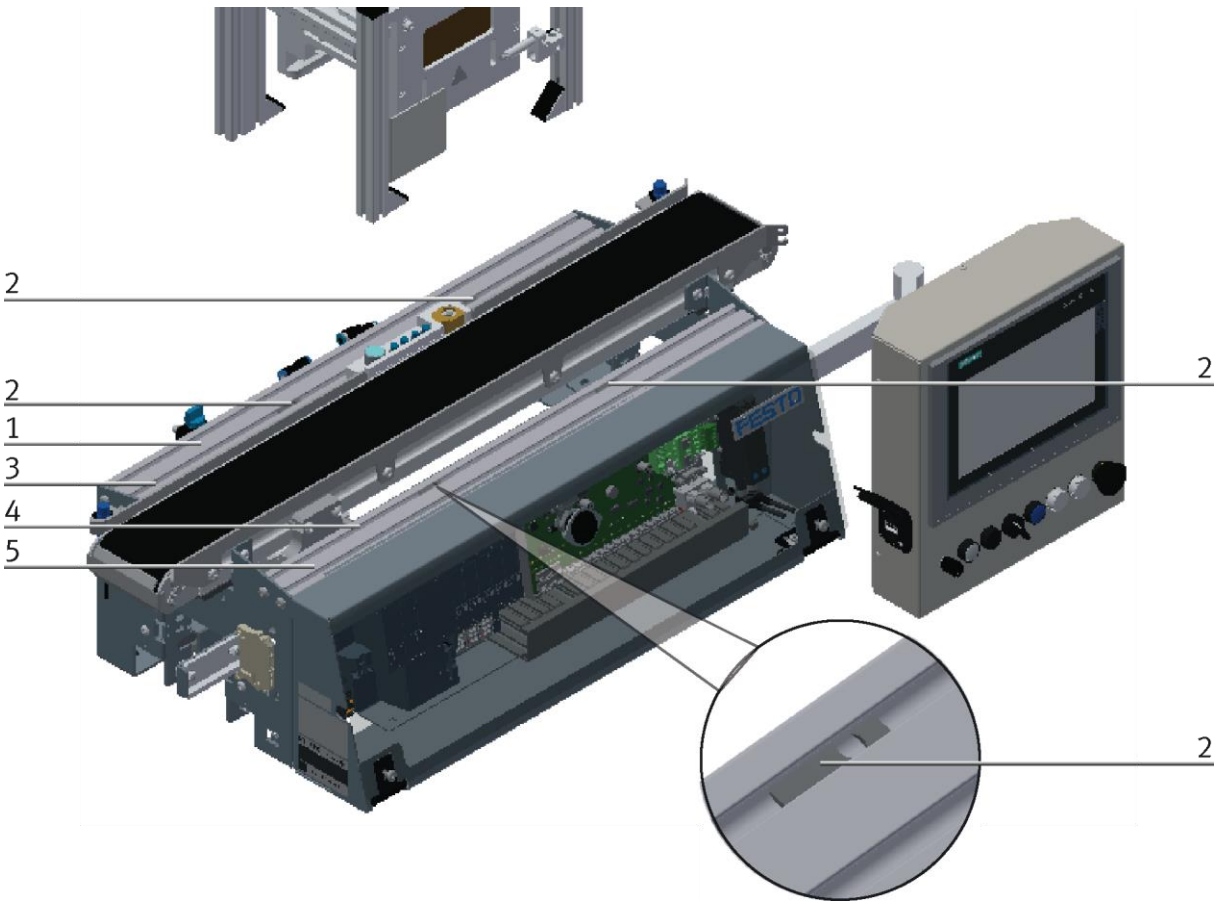
#### 7.4.1 Assembly of an CP application module

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

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

Mounting the CP application module is very easy:

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



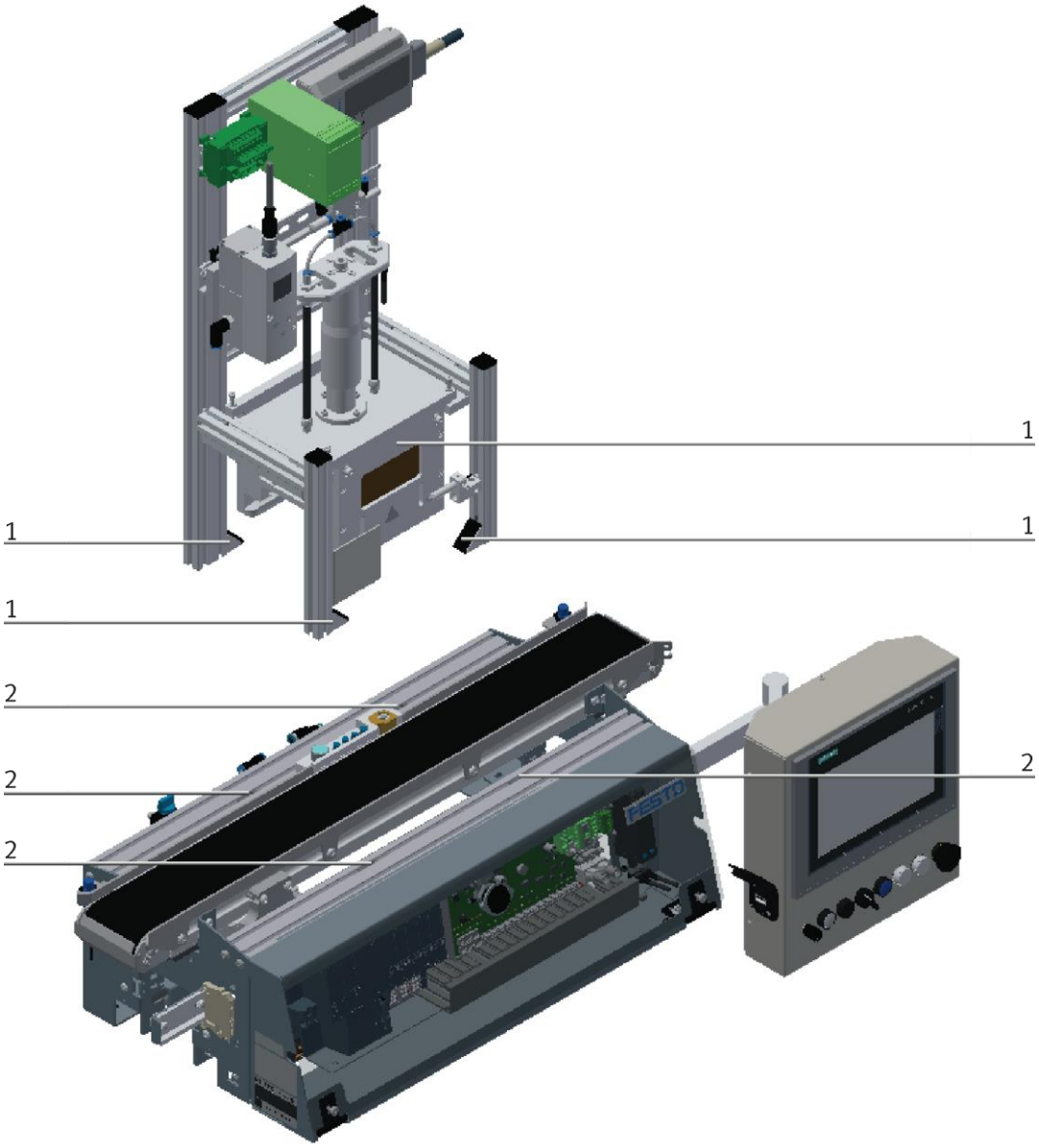

Positioning slot nuts / illustration similar

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

**Attaching the application module to the basic module CP Lab Conveyor**

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

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

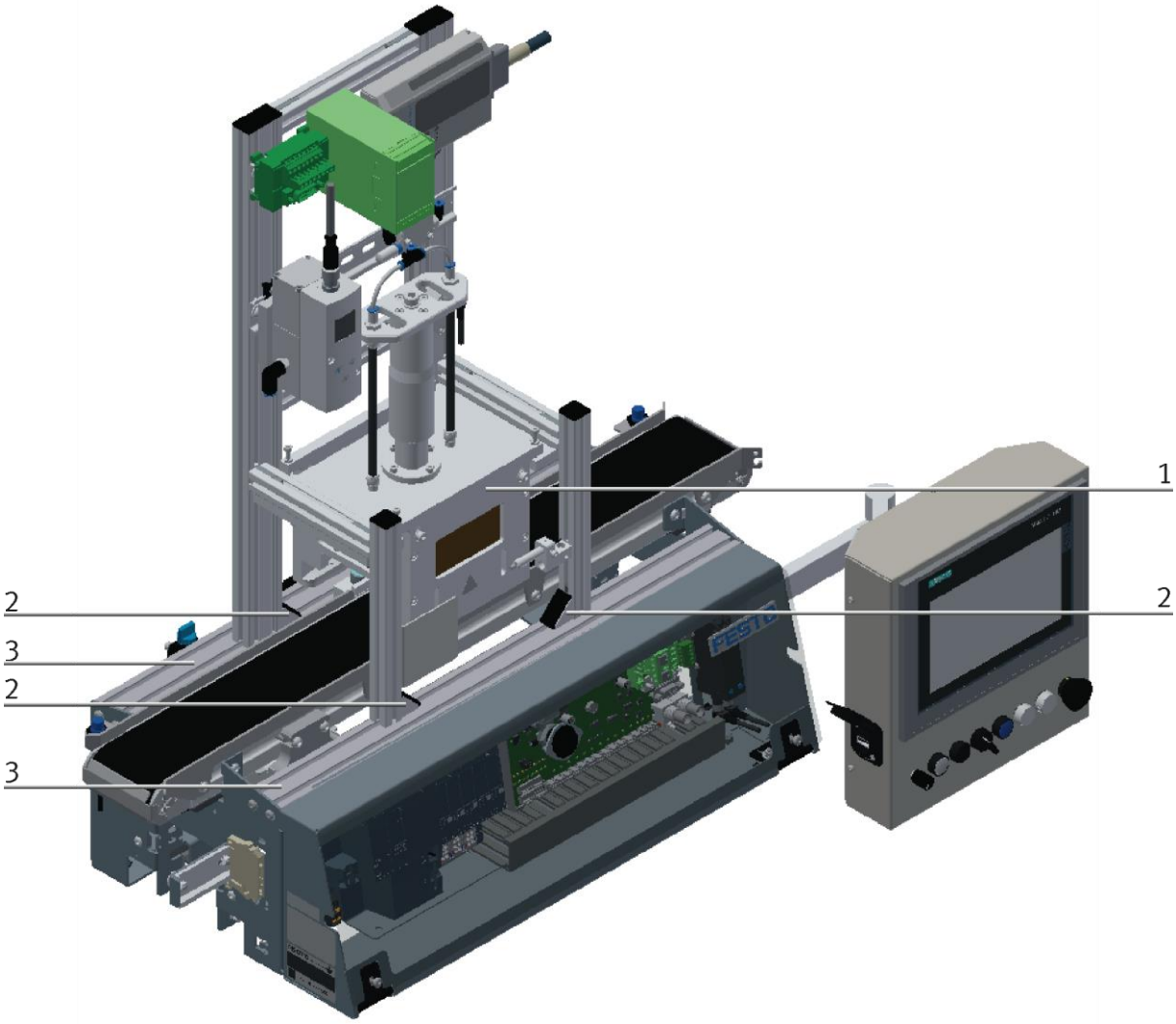



How to put on the CP application module / illustration similar

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

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

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




Tightening the CP application module / illustration similar

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

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

**NOTE**

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

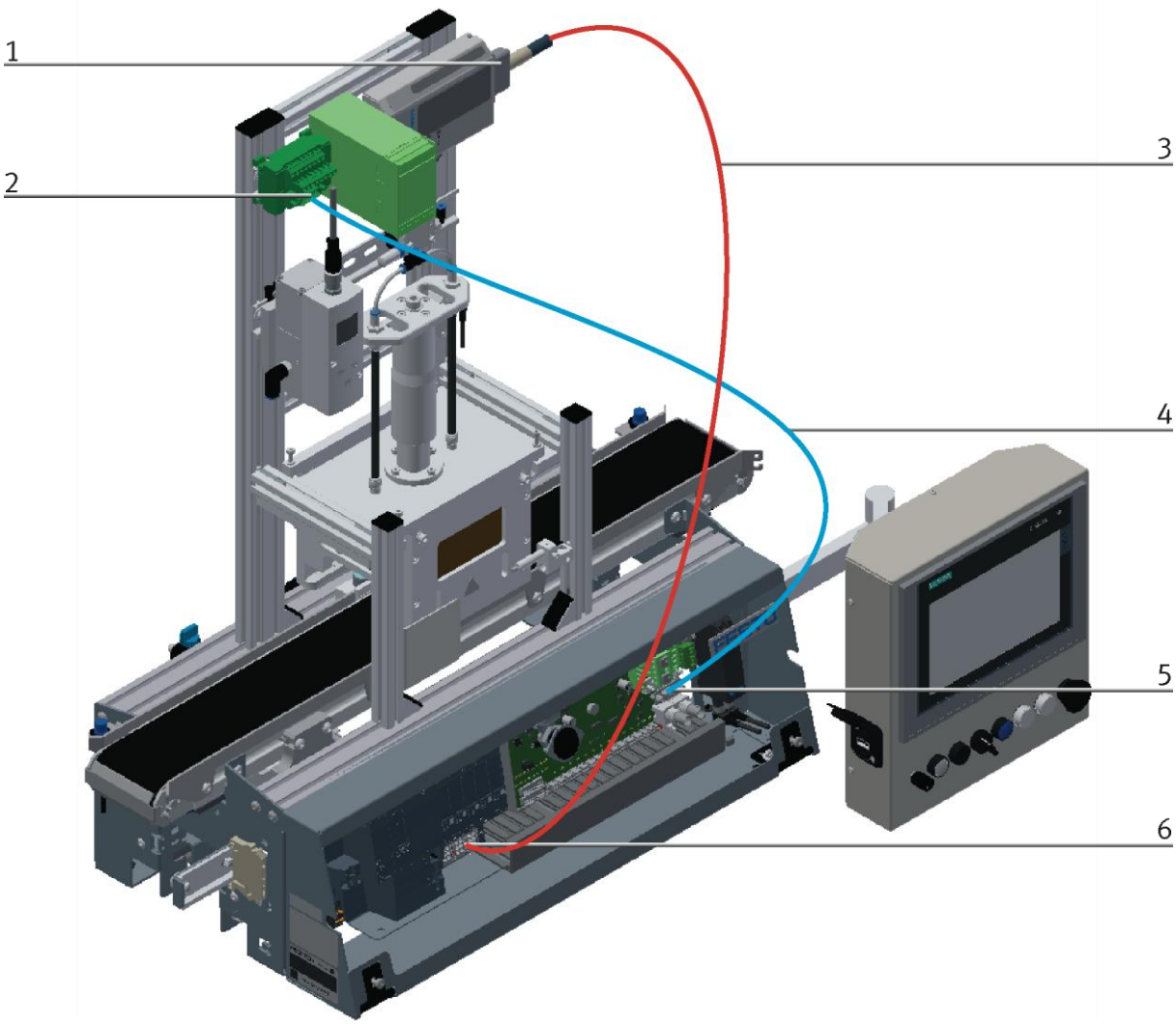
The CP application module exchanges digital input and output signals with the basic module via the SysLink interface:

- Connect the I/O terminal (1) of the CP application module with the control (6) of the basic module CP Lab Conveyor. Therefore use the connecting cable with SysLink plugs (3) which has already been attached to the control and is led out on the back side of the basic module CP Lab Conveyor.

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

The CP application module muscle press provides an analog output signal. This must be applied to the analog terminal (2) and connected to the analog inputs of the basic module:

- Connect the analog terminal (2) of the CP application module to the D-Sub interface for analog signals (5) on the XZ1 board of the CP Lab Band basic module. For this purpose, use the supplied connection cable (4) with standard D-Sub connectors: 15-pin, double row.

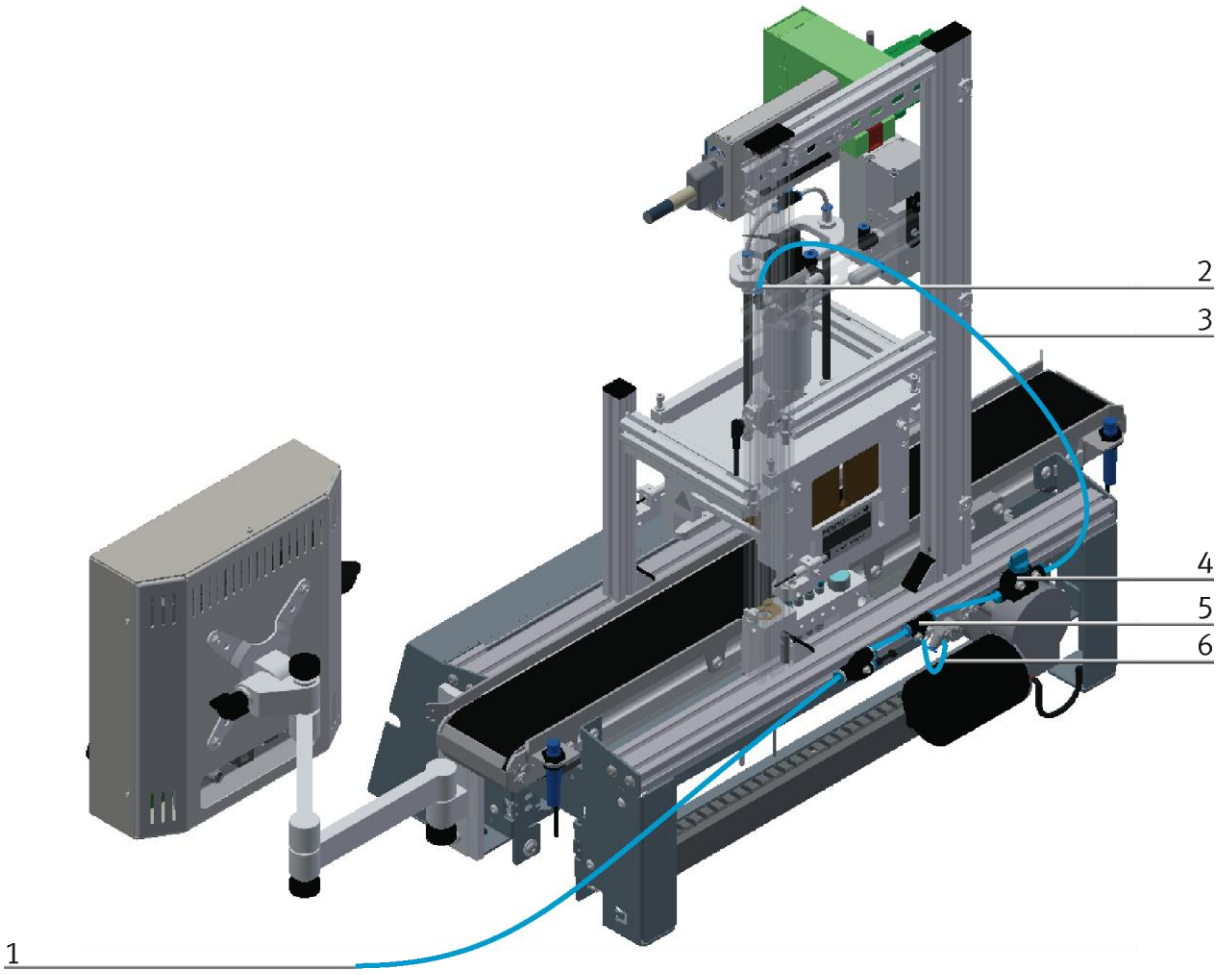



Electrical connections / illustration similar

| Position | Description |
|---|---|
| 1 | CP application module: I/O terminal (+BG-XD1) |
| 2 | CP application module: analogue terminal (+BG-XD2A) |
| 3 | connecting cable with a SysLink-plug (SysLink-cable) |
| 4 | connecting cable with15-pin standard D-Sub-plugs |
| 5 | basic module CP Lab Conveyor: board (XZ1 / X5) |
| 6 | Basic module CP Lab Band: PLC (-inputs / KF2; outputs / KF4) |

### 7.4.3 Pneumatic connection from application modules (option – not available at all application modules)

The pneumatic connection is made according to the principle of the following sketch. The application module is connected from the valve terminal/valve (2) to the shut-off valve (4) on the conveyor belt. The hose (3) (nominal diameter 4) is simply plugged into the QS connector. The supply line (1) is plugged into the T-connector (5); the CP Lab conveyor is also supplied from this T-connector (6).




Pneumatically connect application module / illustration similar

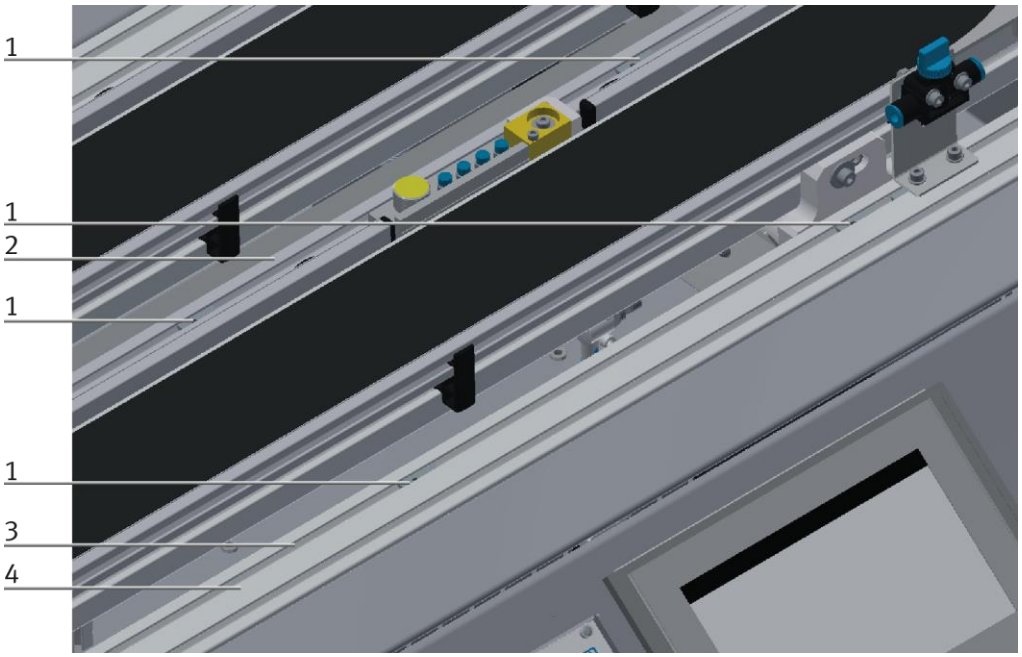
### 7.4.4 Assembly of an CP application module to a CP Factory basic module

| | |
|---|---|
|  | **NOTE**<br>The procedure for installing a CP application module on a basic module is identical for all basic modules. The following example is an example for all basic modules and applications. |

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

Mounting the CP application module is very easy:

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



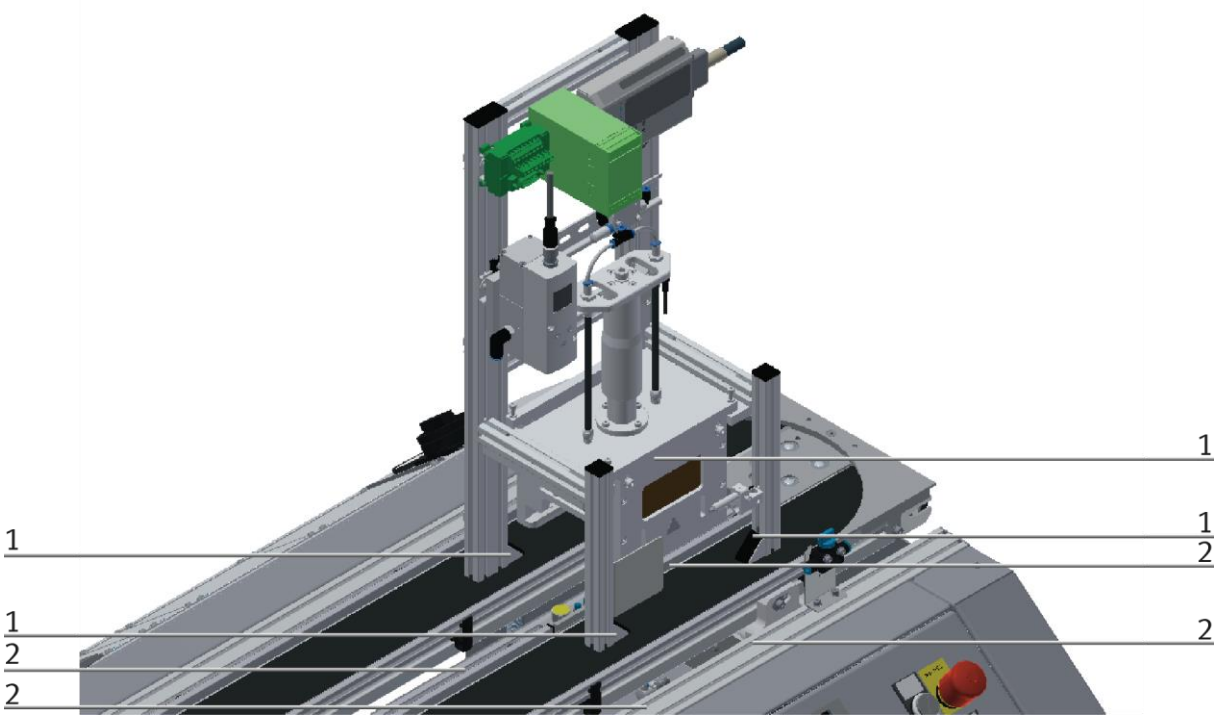

Positioning slot nuts / illustration similar

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

**Attaching the application module to the CP Factory basic module**

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

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

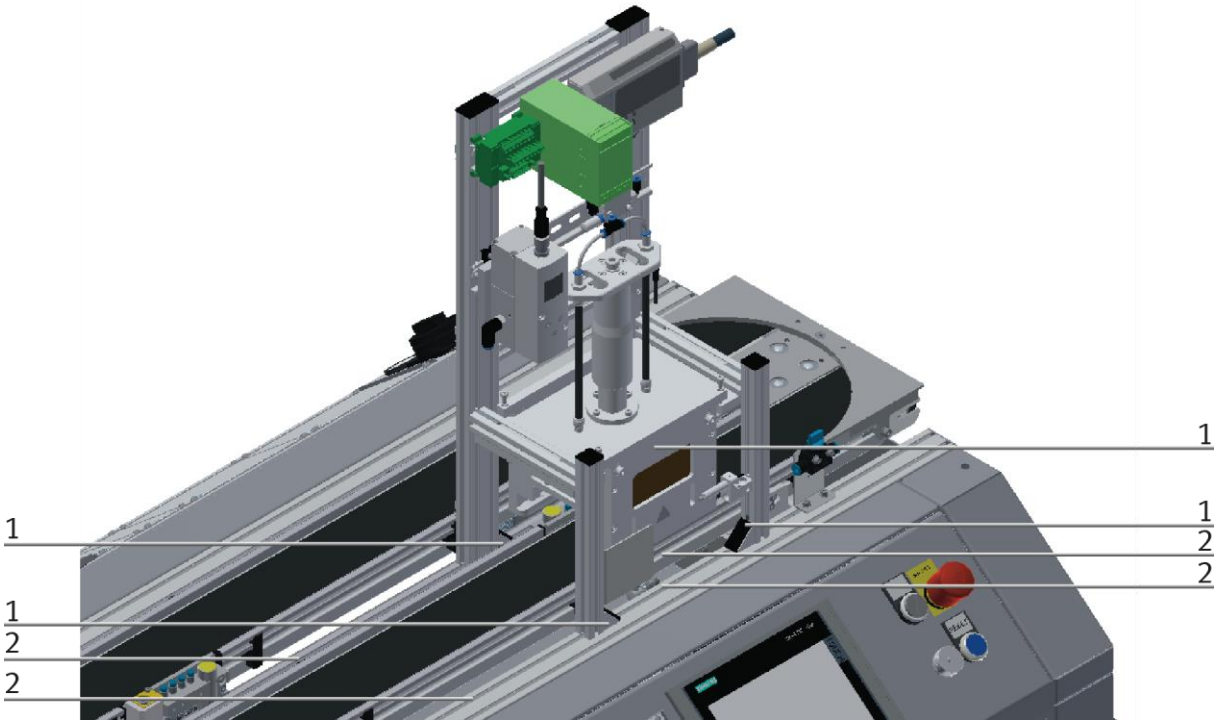



How to put on the CP application module / illustration similar

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

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

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




Tightening the CP application module / illustration similar

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

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

**SysLink-interface for digital signals**

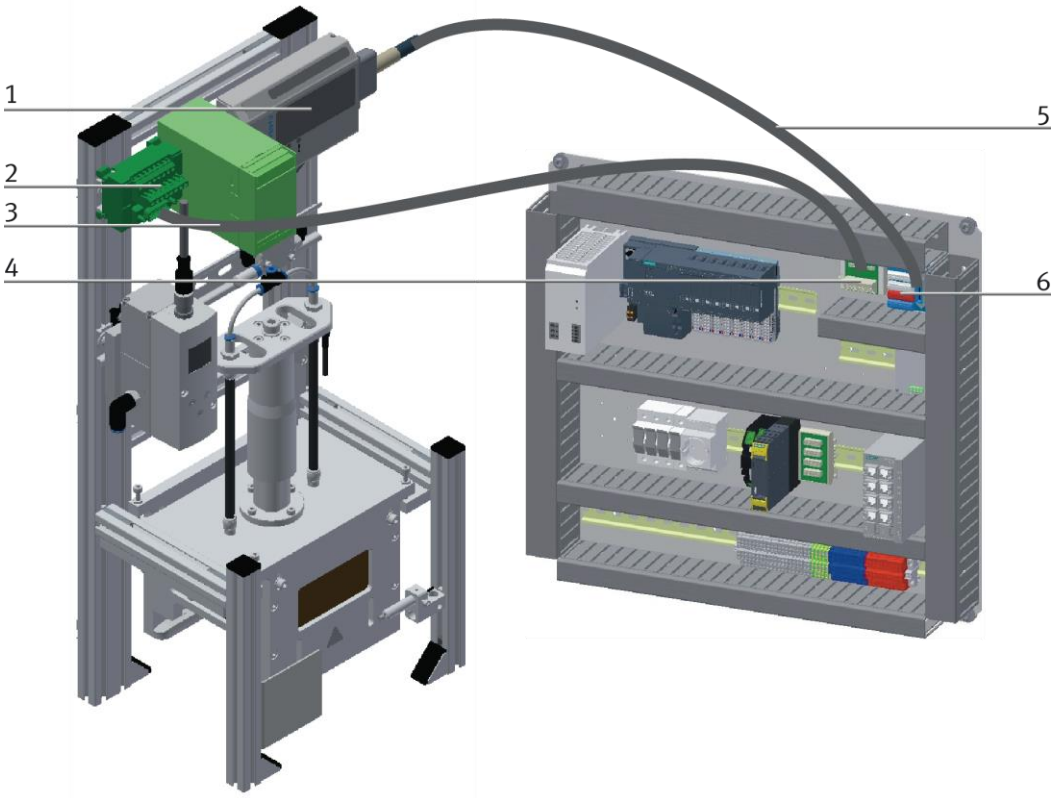
The CP application module exchanges digital input and output signals with the basic module via the SysLink interface:

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

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

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

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




Electrical connections / illustration similar

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

### 7.5 Hardware configuration of sensor SICK OD1-B100H50U14

#### 7.5.1 Enable the multifunction inputs of the sensors:

- Press “Set” on the sensor, display changes to “MENU”.


- Press “Set” on the sensor, display changes to “0V”.


- Press “+” 3 times, display changes to “MF”


- Press “Set”, display shows initial setting “off”
- Press “+”, several times until display shows “teach”


- Press “Set”
- Press “+”, several times until display shows “n_P”


- Press “Set”
- Press “+”, once until display shows “PnP”

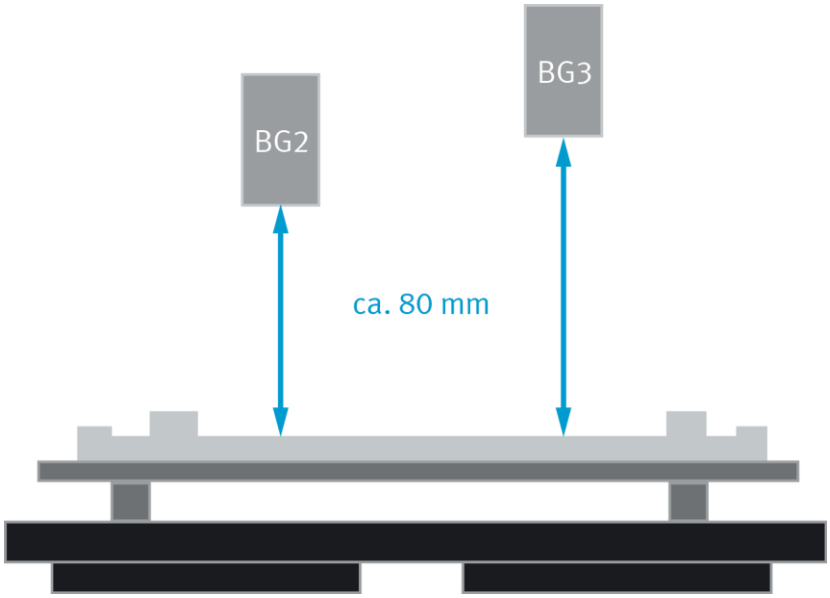

- Press “Set”
- Press “Zero Run” to go back to the main display and leave the settings.

### 7.5.2 Mechanical adjustment of sensors

**Distance to pallet**

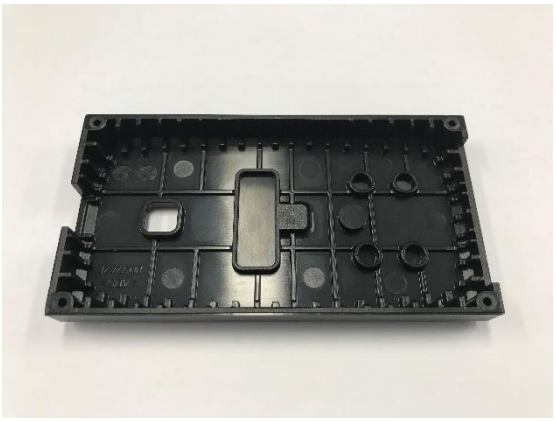
Adjust the sensors so that the distance from the sensor to the workpiece carrier with empty pallet is approximately 80mm.

| | |
|---|---|
|  | **NOTE**<br>The value on the sensor shows the distance between the object and the sensor in relation to the measuring range (100 mm) in mm.<br>If the distance between the sensor and the surface of the measurement object is 110 mm, it therefore shows 10 mm. This display cannot be changed and is also not influenced by the scaling. |



### 7.6 Workpiece variants

Milled plastic workpiece

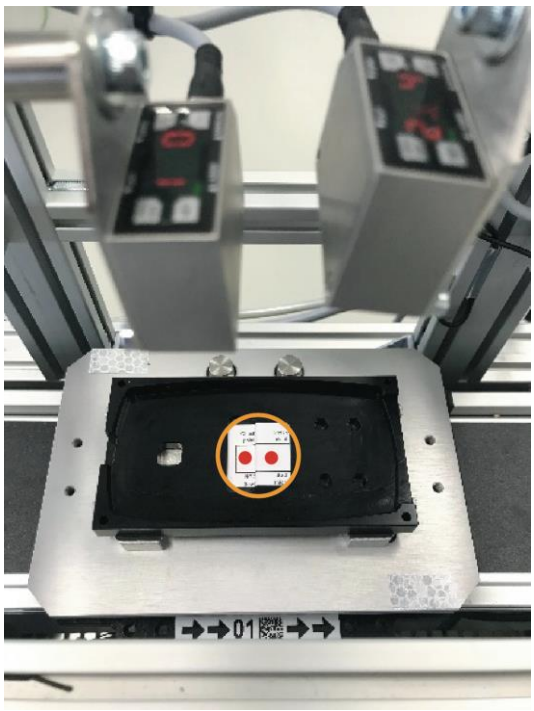


Injection molding workpiece (ABS)

### 7.7 Alignment of the sensors to the workpiece

#### 7.7.1 Alignment to the milled plastic workpiece

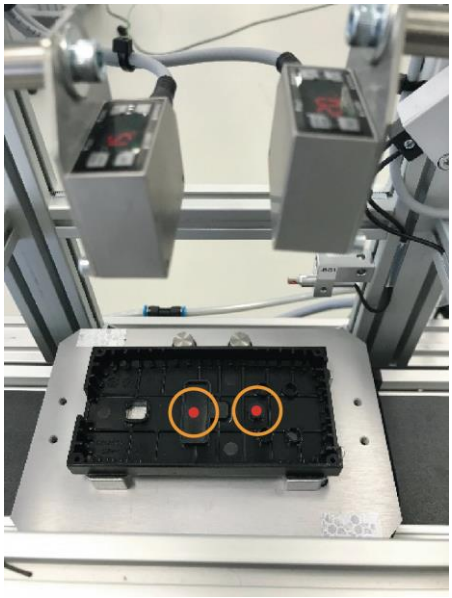
- Leave the stopper in the upper position.
- Push the workpiece carrier in transport direction with pallet and inserted workpiece (pay attention to orientation) up to the stopper.
- Align the sensors so that the laser beams hit the workpiece as follows:



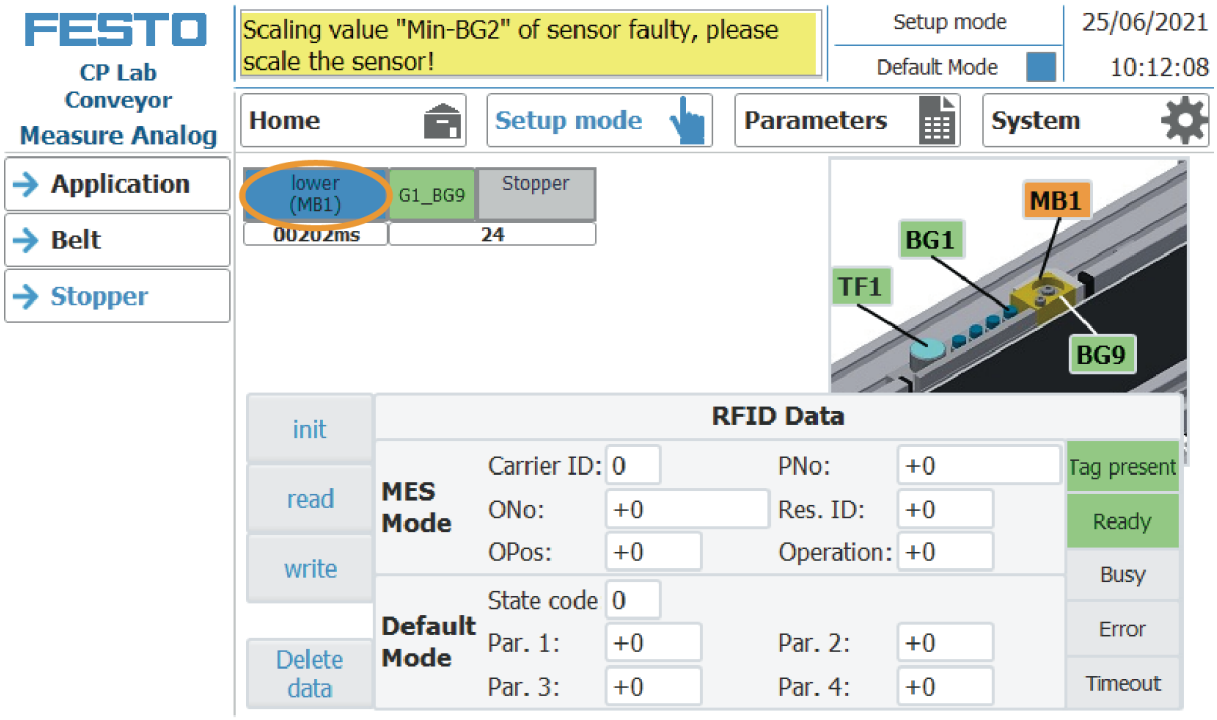

- When you have adjusted the sensors using the lab stands as above, remove the workpiece.
- Place the measuring body in the round cutout of the pallet.
- Adjust the limit values as described in the next section "Adjustment of limit values".

### 7.7.2 Alignment of the sensors to the injection molded workpiece (ABS).

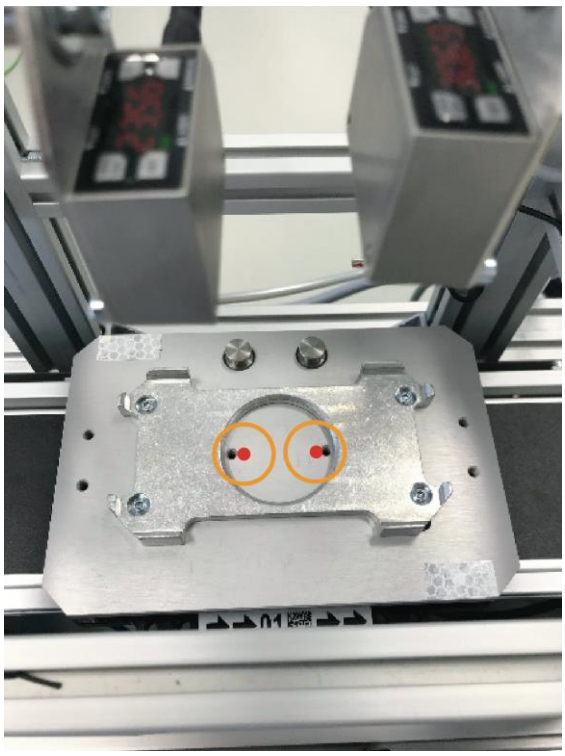
- Leave the stopper in the upper position.
- Push the workpiece carrier in transport direction with pallet and inserted workpiece (pay attention to orientation) up to the stopper.
- Align the sensors so that the laser beams hit the workpiece as follows:



- When you have adjusted the sensors using the lab stands as above, remove the workpiece.
- Go to the menu item "Setup" › "Stopper" on the HMI and switch the stopper down via the "Lower" button, select the Setup operating mode for this.



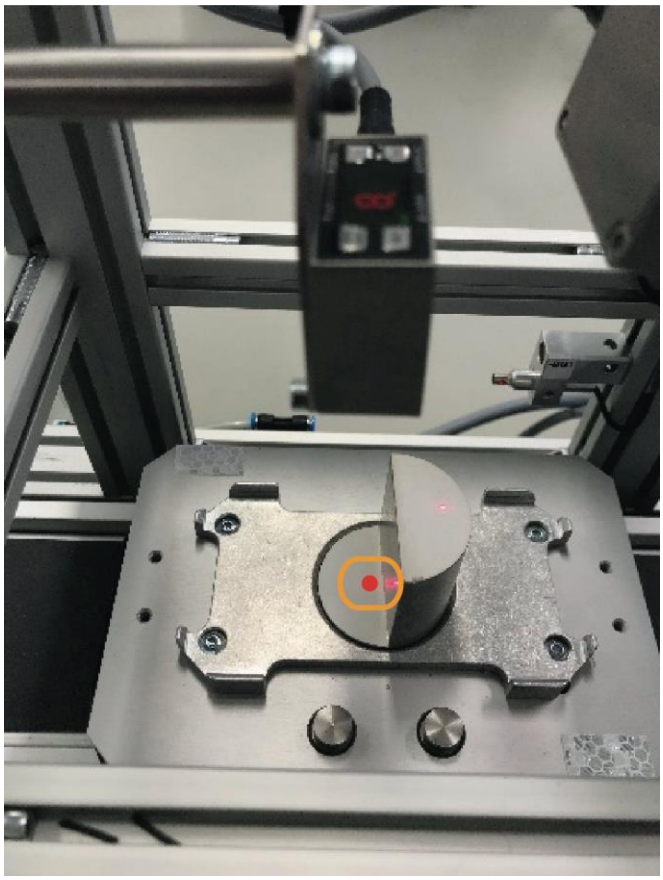
- Push the workpiece carrier with the pallet further in the transport direction until both laser beams hit the round cutout of the pallet as follows:



- Place the measuring body in the round cutout of the pallet.
- Adjust the limit values as described in the next section "Adjustment of limit values".

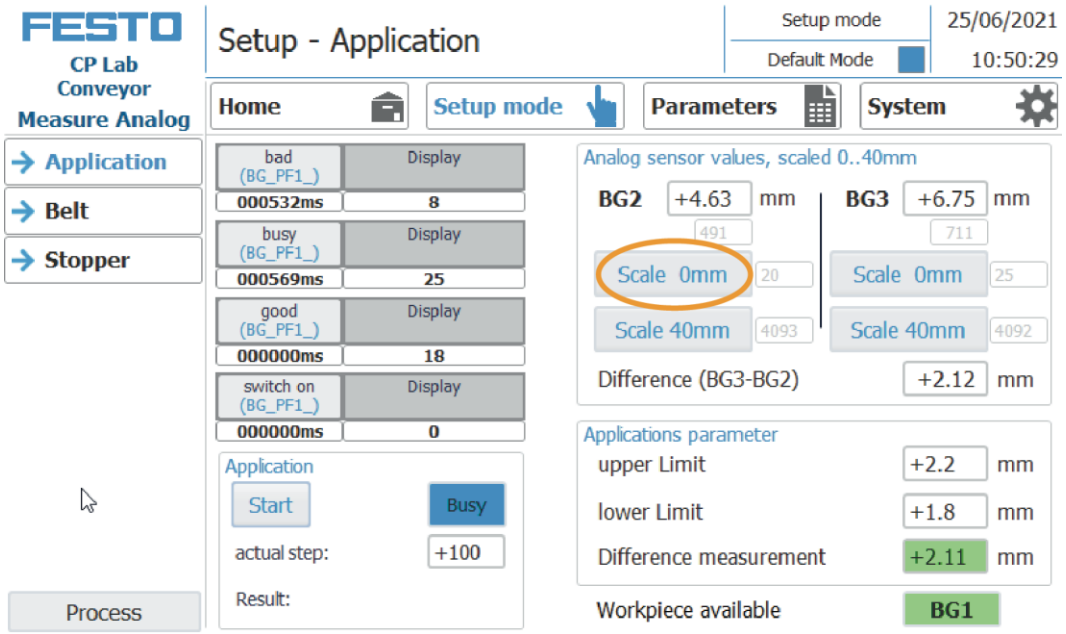
### 7.8 Adjustment of limit values

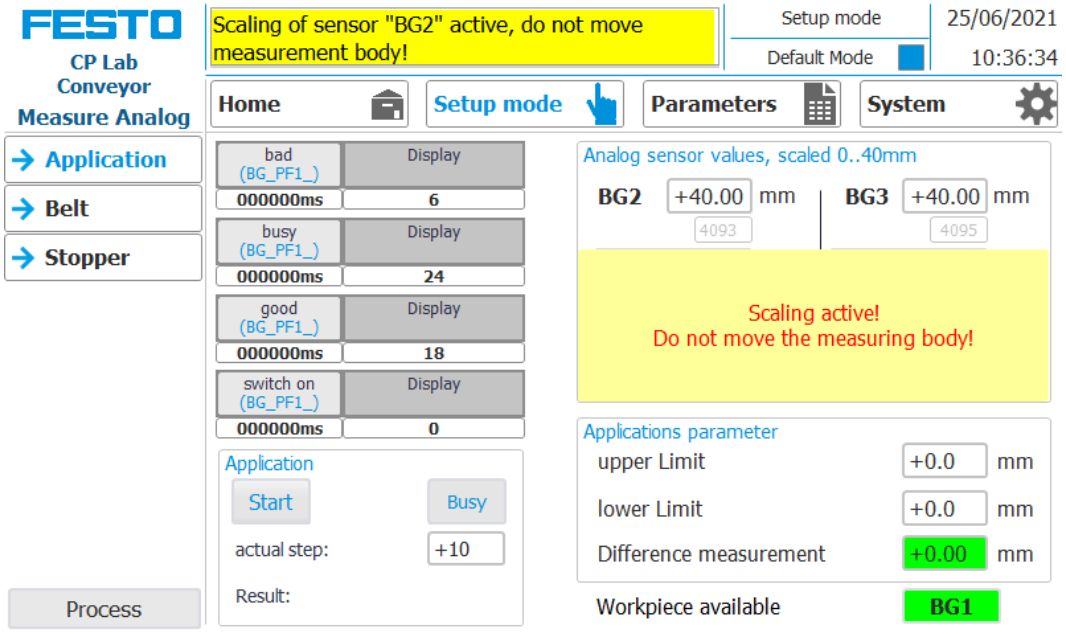
1. On the HMI, go to the menu item "Setup" › "Application”
2. Place the measuring body in the circular cutout of the pallet so that the light beam of the BG 2 sensor hits the deep spot of the measuring body.



3. Press the "Scale 0mm" button on the HMI and wait a few seconds until the yellow warning disappears.

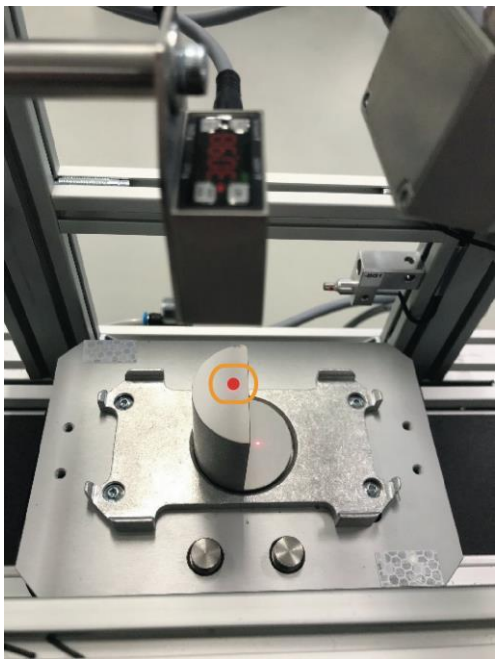
| | NOTE |
|---|---|
| ⚠ | The buttons are password protected.<br>User: festo<br>Password: festo |



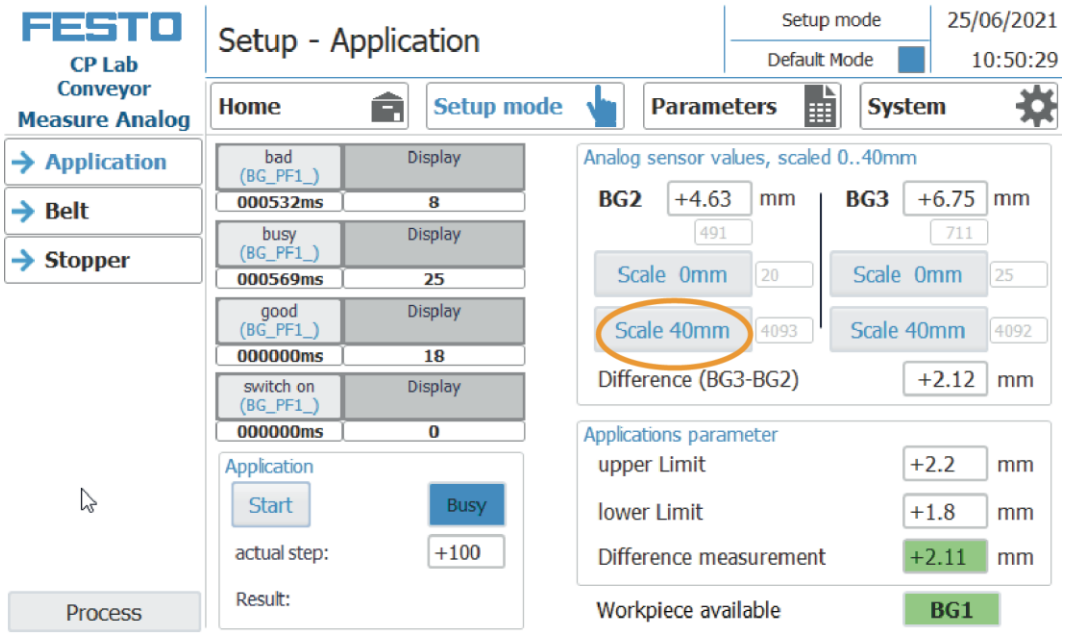




(First the analog output of the sensor is calibrated to 0V and then the converted analog value is taken over in the PLC as minimum value).

4. Turn the measuring body so that the light beam of the BG 2 sensor hits the high point of the measuring body.

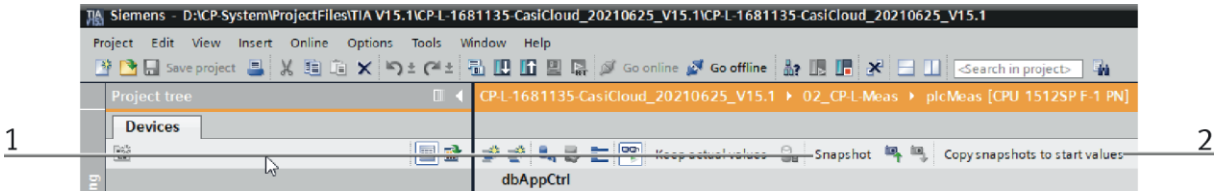


5. Press the "Scale 40mm" button on the HMI and wait a few seconds until the yellow warning disappears.

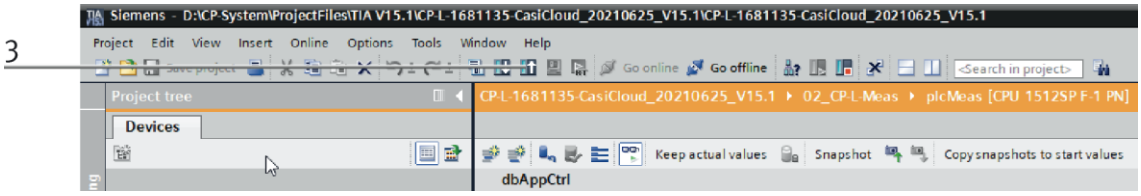



(First the analog output of the sensor is calibrated to 10V and then the converted analog value is taken over in the PLC as maximum value).

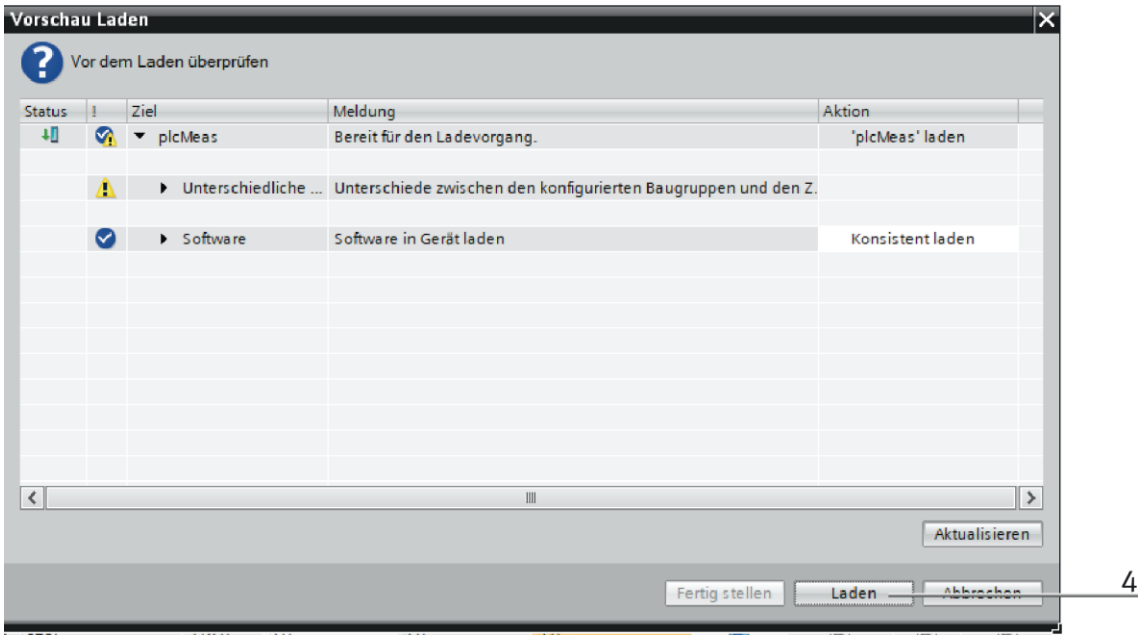
6. Proceed in the same way for the sensor BG3.
7. Take over the actual values as start values in the data block "dbAppCtrl" of the PLC.
   You can do this by going online to the PLC in the TIA Portal and calling up the data block.
   There you find the button (1) "Snapshot", which you have to press. Then press the "Copy snapshots to start values" button (2) and load the data block into the PLC.




Press Button (3) Upload.




Confirm the loading into the data block of the PLC with the button (4) Load.




| | **NOTE** |
|---|---|
| | This step 7 is not mandatory |

# 8 Operation

**NOTE**

– The distance between interface (C) and distance sensor (A/B) has been set ex works to 200...250 mm.

**NOTE**

– All application-specific information is described in this user manual. The general operation of a station, however, is described in the manuals of the basic modules. The information is essential when you intend to operate the CP application module Measuring as a station together with a basic module CP Factory or a basic module CP Lab Conveyor.

An application module has no control elements. Operation of the application module is only possible when it is mounted on a basic module of the CP-Lab or CP-Factory system.
The operation of the application module can be realized by every customer according to his wishes, the supplied programs are only an operating suggestion with which the application module is on CP-Lab or CP-Factory System can be operated. Own operating concepts or external controls are also possible.
If the application module is mounted on a CP Lab or a CP Factory basic module, the general operation for this is described in the manuals of the CP Lab or CP Factory system. All application-specific information is described in this manual for the application module.

## 8.1 Function signal lamp

Red – current test result is incorrect, the recorded measured value is beyond the defined limits.
Yellow – application is busy, measurement is being taken.
Green – measurement was successful, test result is within the defined limits.

## 8.2 Process description

### 8.2.1 MES-Mode

**Start conditions**

- The station has been mounted and adjusted correctly.
- The distance sensors are set correctly towards the workpiece to be tested.
- All required connections have been established in conformity with the safety regulations.
- The power supply of the station is switched on.
- The system programs of the PLCs and of the HMI of the station are loaded.
- The PLCs are in the Run mode and the run time of the HMI has been started.
- The automatic mode is activated.
- The MES-system has been started and is connected with the PLC of the station.
- A work schedule has been set up in the MES-system where the station Measuring is contained and parametrized.
- There is an order in the MES-system containing the execution of the work schedule.
- The MES-mode of the station Measuring is activated.

**Process description**

1. The prepared order is started in the MES-system.
2. A free carrier is assigned to the order.
3. The carrier runs through all stations defined in the work schedule until it will reach the station Measuring. The transponder of the carrier contains now the current order data for the station Measuring where the differential measurement shall be taken.
4. There is now a pallet and a front cover on the carrier. The front cover points with its inside upwards. The drill hole of the front cover is on the left (view to control cabinet).
5. At the stopper position, the carrier is recognized by the PLC of the station Measuring via an inductive proximity switch.
6. The transponder of the carrier is read out by the PLC of the station with the RFID-read-write head. If the reading was not successful, the carrier is released by the stopper and transferred to the next station. Furthermore, an error message is displayed at the HMI of the station.
7. If the reading was successful and the CP application module Measuring is ready to start, the PLC of the station sends an enquiry to the MES system on the basis of the read RFID data for a station-specific order for the carrier. If the CP application module Measuring is not ready to start, the carrier is released by the stopper.
8. In case there are order data existing, the MES-system transfers them to the PLC of the station.
   If not, the carrier is released by the stopper and transferred to the next station.
9. The order data record of the MES-mode contains order number, order position, part number, resource number and operation number as well as the parameters of the operation to be executed.
   The parameters of the CP application module Measuring are: setpoint measured value of difference, upper limit value and lower limit value. The setpoint measured value of difference is only used for the display on the HMI.
10. Then the PLC of the station sends an enquiry to the MES system for the URL, a station-specific website, on the basis of order number and order position. On this website, any order-specific operating instructions can be displayed at the HMI by the MES system, e.g. for the worker guidance at the manual workplace.

11. The PLC of the station starts the function sequence of the CP application module Measuring and communicates it to the MES system:
12. The status line of the station Measuring is highlighted in yellow in the work schedule of the MES-system (=station busy).
13. The signal lamp of the station is flashing orange as long as the function sequence has not been finished yet.
14. The station records the measured values of the two distance sensors, calculates the actual measured value of difference and emits it at the HMI.
15. It checks if the actual measured value of difference is in the parametrized limit range between upper and lower limit.
16. It outputs the result of the evaluation as binary information at the HMI and via the signal lamp.
    Bad:
    If the actual measured value of difference is below the lower limit value or above the upper limit value, then the front cover does not meet the quality standard. The signal lamp is flashing red and the front cover will be treated as bad part in further order processing.
    Good:
    If the actual measured value of difference is within the defined limit range, the front cover meets the quality standard. The signal lamp is flashing green and the front cover will be treated as good part in further order processing.
17. The function sequence of the CP application module Measuring is finished.
    Special case: The function sequence has been finished with an error:
    A window opens up at the HMI. The error text is displayed in this window, and the system operator can restart the function sequence of the CP application module, ignore or cancel it or reset the order in the MES (further information is provided in the operating instructions of the basic module) by pressing the buttons “Repeat”, ”Ignore”, ”Cancel” or “Reject Order”.
18. The parameters – especially the currently recorded actual measured value of difference – are then transferred by the PLC of the station to the MES system.
19. The MES system acknowledges the receipt of the parameters from the PLC of the station.
20. The PLC of the station reports the completed function sequence to the MES system.
21. The MES system acknowledges the message of the PLC of the station and transfers the subsequent order data to the PLC of the station.
22. The PLC of the station writes them on the transponder of the carrier with the RFID read-write head. In the meantime, the status line of the station Measuring is highlighted in color in the work schedule of the MES system as follows
    red: function sequence finished with error
    green: function sequence finished without error
23. If no carrier blockade has been recognized in front of the station and if there is no other order for the station, the carrier will be released by the stopper and transferred to the next station.

### 8.2.2 Default-Mode

**Start conditions**

- The station has been mounted and adjusted correctly.
- The distance sensors are set correctly towards the workpiece to be tested.
- All required connections have been established in conformity with the safety regulations.
- The power supply of the station is switched on.
- The system programs of the PLCs and of the HMI of the station are loaded.
- The PLCs are in the Run mode and the run time of the HMI has been started.
- The automatic mode is activated.
- A carrier with pallet and front cover has been prepared. The front cover's inside points upwards, its drill hole is on the left side.
- There is no carrier in the station
- The transition table of the station is set up in the HMI.
- A valid status code from the transition table is stored on the transponder of the prepared carrier.
- The default mode of the station Measuring is activated.

**Sequence description**

1. You put the prepared carrier on the conveyor of the station.
2. The carrier is recognized by the PLC of the station Measuring at the stopper position via an inductive proximity switch.
3. The transponder of the carrier is read out by the station's PLC with the RFID read-write head. If the reading was not successful, the carrier is released by the stopper and transferred to the next station. Furthermore, an error message is displayed at the station's HMI. If the reading was successful, however, the carrier remains at the stopper position.

   The read-out RFID data contain, among others, an order data record for the default mode, which contains the status code and the parameters 1...4.

***NOTE***

– The sequence will only start if the CP application module Measuring has been released for the function sequence via the HMI. If it has not been released, the CP application module Measuring will not start, and the carrier will be released by the stopper (you will find further information on that in the operating instructions of the basic module).

4. If the option for initializing the carrier with a status code has been selected at the HMI, this is executed now.
5. If the status code from the order data record corresponds to a „start condition“ from the transition table of the HMI, the station’s PLC will start the function sequence of the CP application module Measuring. If not, the carrier will be released by the stopper and transferred to the next station.
6. If the status code from the order data record corresponds to a “start condition” from the transition table of the HMI, the PLC of the station will take the parameters assigned to the “start condition” from the transition table. The parameters of the CP application module Measuring are: upper limit value and lower limit value.
7. The station’s PLC starts the function sequence of the CP application module Measuring:
   - The signal lamp of the station is flashing orange as long as the function sequence has not been finished yet.
   - The station records the measured values of the two distance sensors, calculates the actual measured value of difference and emits it at the HMI device.
   - It checks if the actual measured value of difference is in the parametrized limit range between upper and lower limit value.

     It outputs the result of the evaluation as binary information at the HMI device and at the signal lamp:

     Bad:

     If the actual measured value of difference is below the lower limit value or above the upper limit value, then the front cover does not meet the quality standard. The signal lamp is flashing red and the front cover will be treated as bad part in further order processing. The new status code corresponds to the status code “final state NOK” in the transition table of the HMI.

     Good:

     If the actual measured value of difference is within the defined limit range, the front cover meets the quality standard. The signal lamp is flashing green and the front cover will be treated as good part in further order processing. The new status code corresponds to the status code “final state OK” in the transition table of the HMI.
8. The function sequence of the CP application module Measuring is finished.
   Special case: The function sequence has been finished with an error. :
   At the HMI, a window opens up. The error text is displayed in the window, and the system operator can restart the function sequence of the CP application module Measuring, ignore or cancel it (further information is provided in the operating instructions of the basic module) by pressing the buttons “Repeat”, ”Ignore”, ”Cancel”.
9. Then the station’s PLC takes the status code “final state NOK resp. OK“ from the HMI’s transition table and writes it with the RFID read-write head as the new status code on the transponder of the carrier.
10. If no carrier blockade has been recognized in front of the station, the carrier will be released by the stopper and transferred to the next station.

### 8.2.3 Setup Mode

**Start conditions**

- The station has been mounted and adjusted correctly.
- The distance sensors are set correctly towards the workpiece to be tested.
- All required connections have been established in conformity with the safety regulations.
- The power supply of the station is switched on.
- The system programs of the PLCs and of the HMI of the station are loaded.
- The PLCs are in the Run mode and the run time of the HMI has been started.
- The Setup Mode is activated.
- A carrier with pallet and front cover is at the stopper position. The front cover's inside points upwards, its drill hole is on the left side.

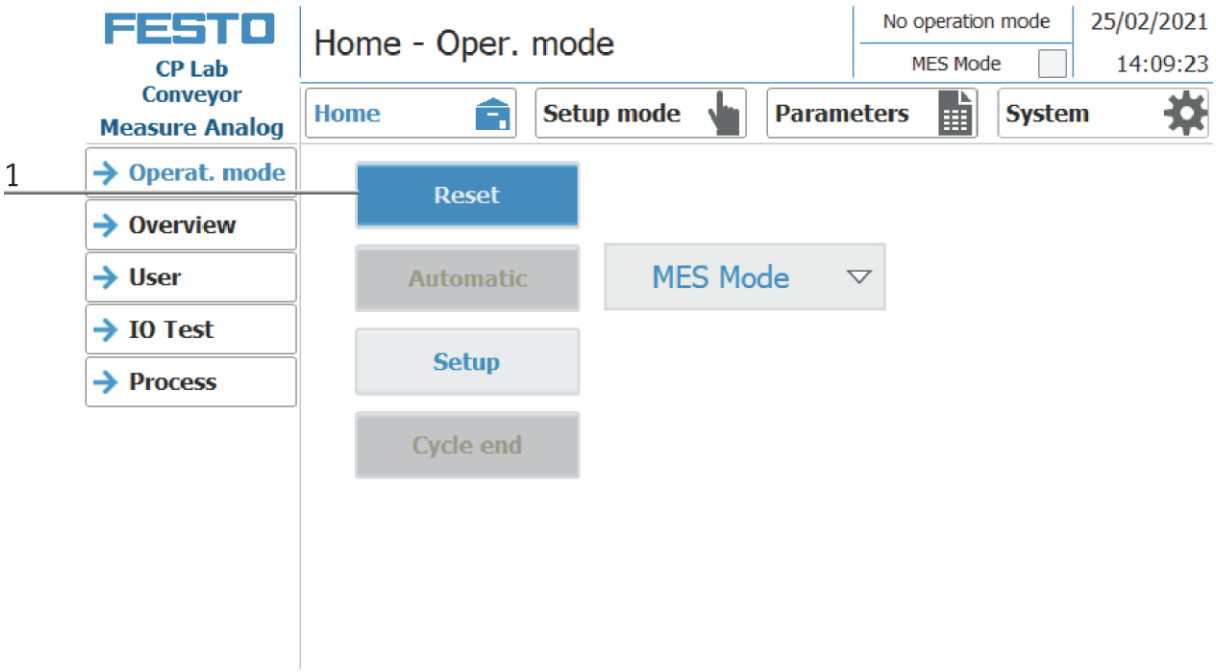
**Sequence description**

You will find a detailed sequence description in the chapter "Measurement taken in Setup Mode".

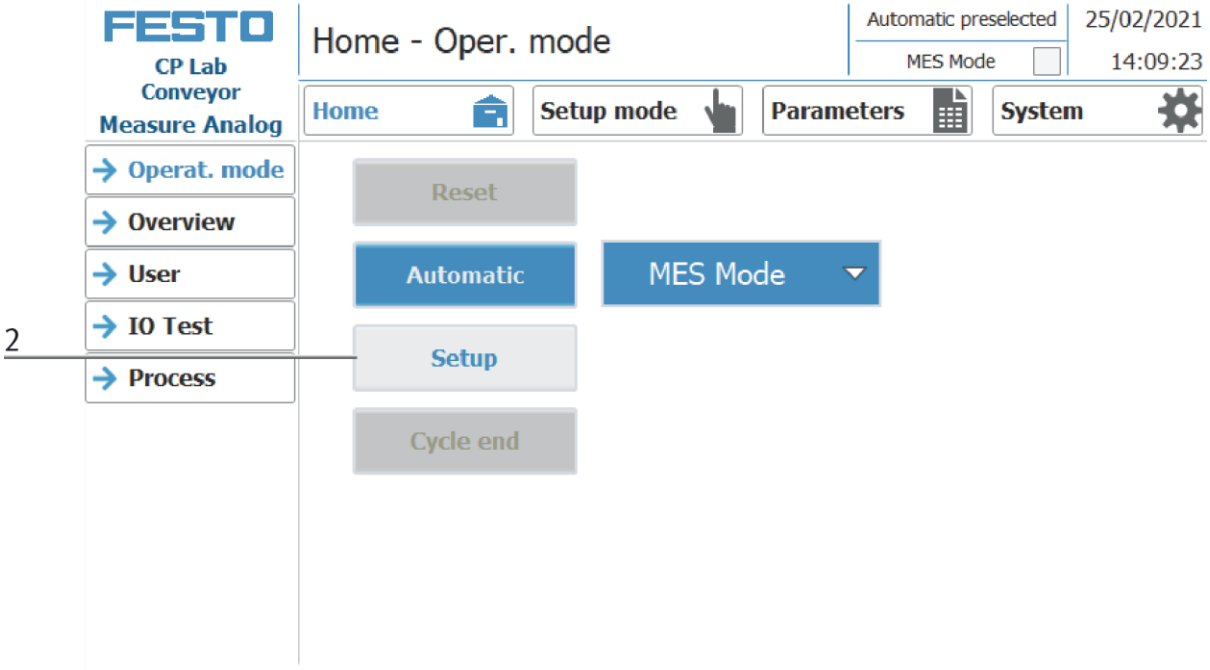
### 8.3 Setting the application module measuring at HMI

To set the application module, the application module must be set to setup mode.

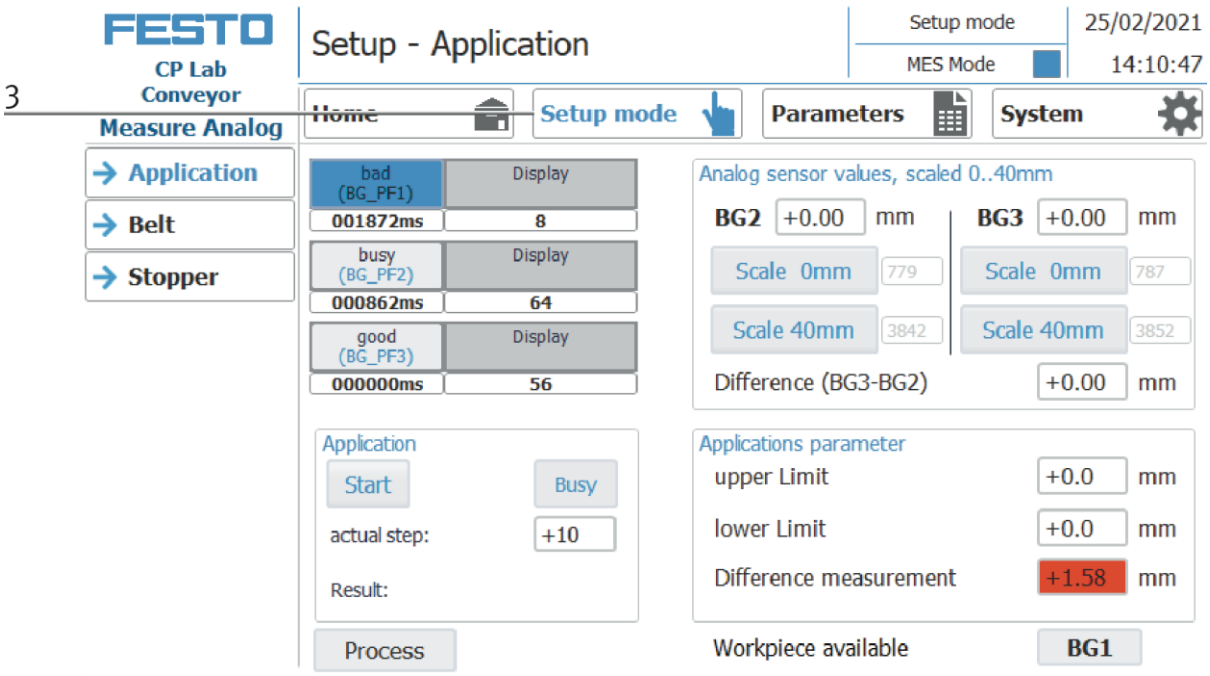
1. If the application module has not yet started, click on the Setup button under Operating mode on the home screen. The application module moves into its basic position



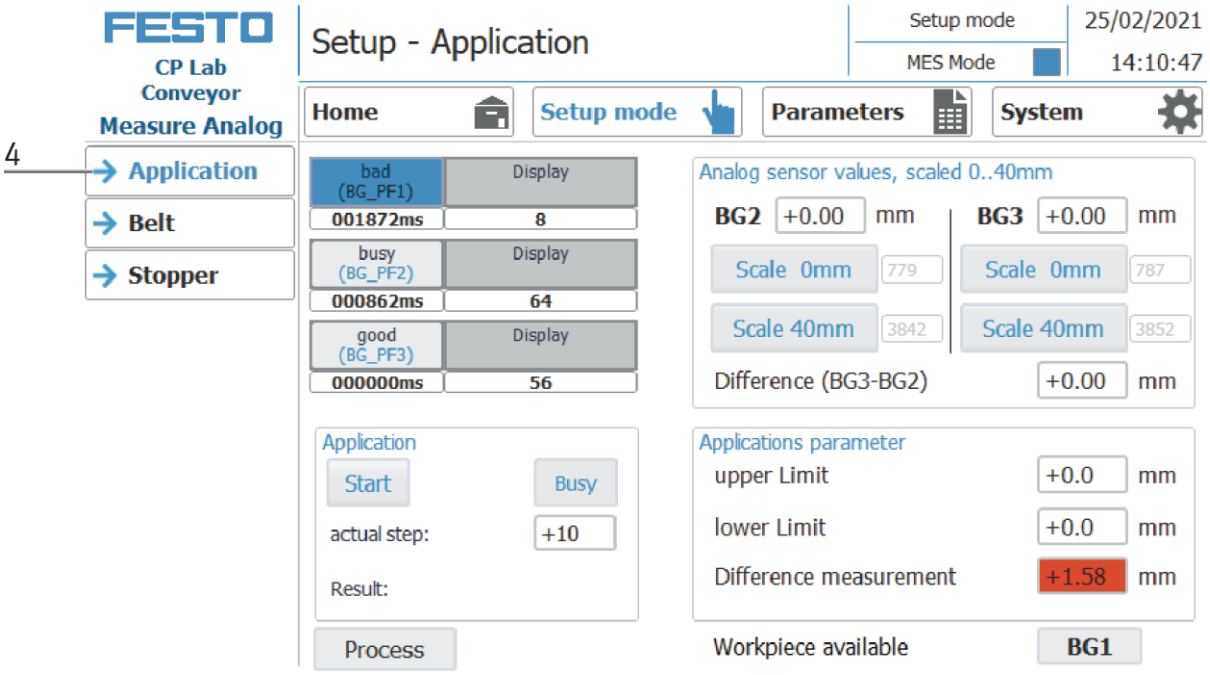

2. Then click on Setup, setup mode is active.



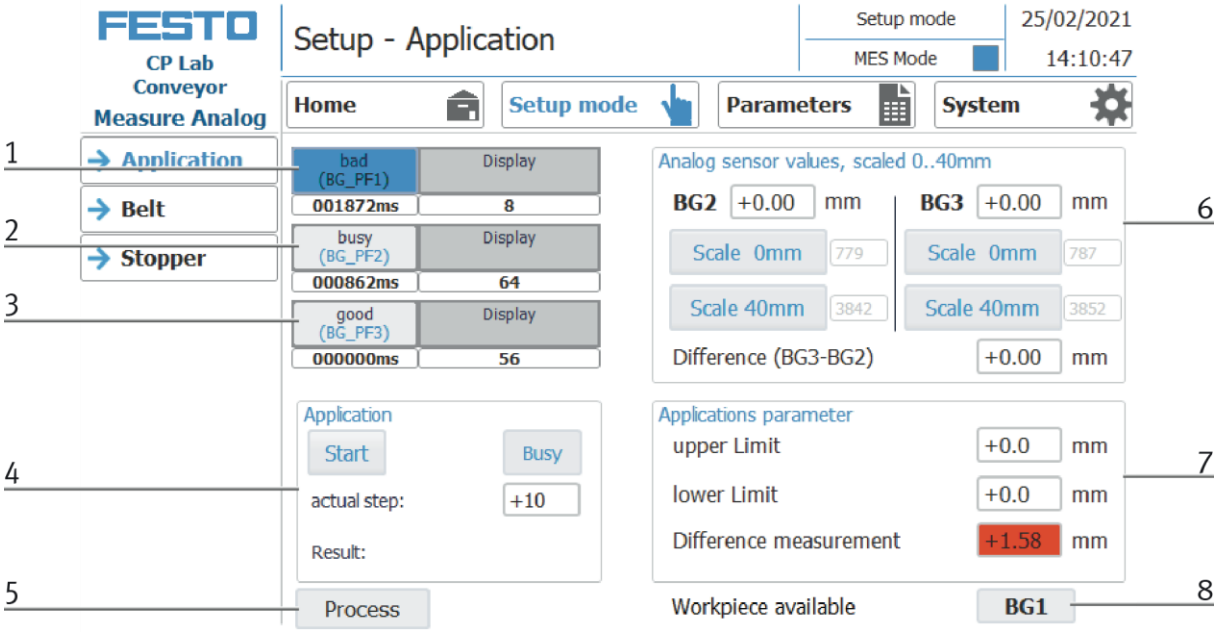
3. Change to Setup mode page.




4. Choose application



**Overview of the submenu page „application“ in the menu page „Setup - application“**

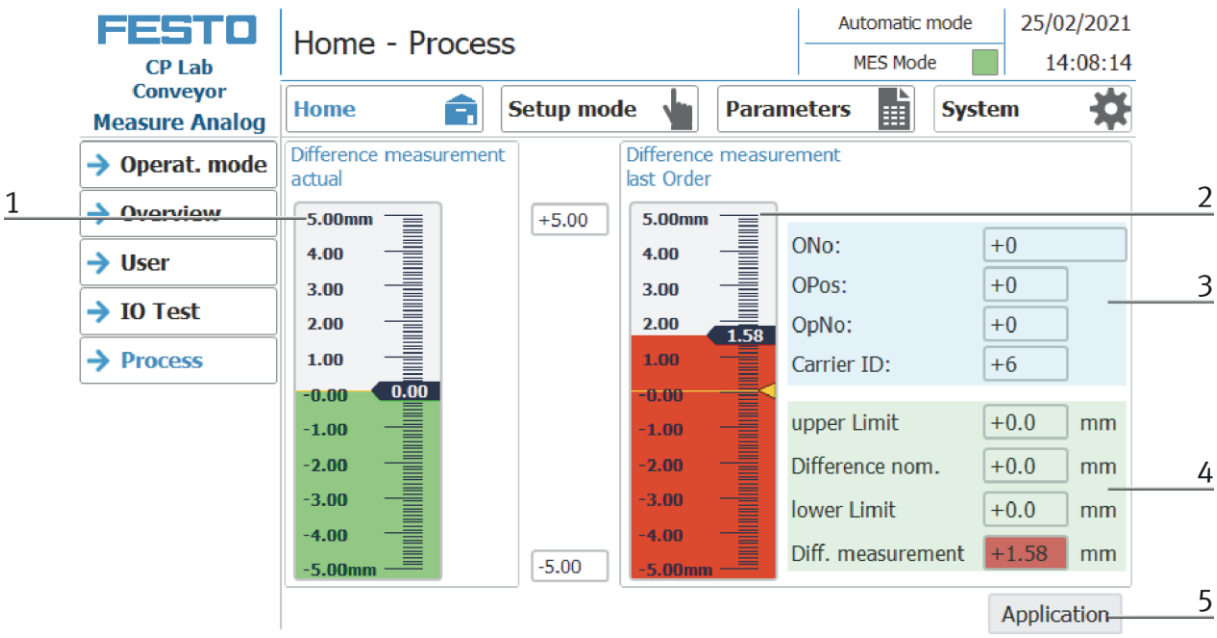



| | ***NOTE*** |
|---|---|
| | – You can only operate the buttons of this menu page if you have already activated the Setup mode! |

| Position | Description |
|---|---|
| 1 | screen block „Visu_Actuator_1Q“ consisting of:<br>output field „ActModLED1“:<br>indicates the name of the actuator:. „ActMonLED1“ corresponds to the red lamp of the signal lamp.<br>button„BadPart (BG_PF1)“:<br>action: pressing the button<br>result: TRUE = switch on red lamp (bad part: workpiece is not OK)<br>The background of the button is blue when the button is active.<br><br>output field „0s“:<br>indicates the time how long the actuator has been activated .<br>output field „7“:<br>indicates how often the actuator has been activated. |
| 2 | screen block „Visu_Actuator_1Q“ consisting of:<br>output field„ActModLED2“:<br>indicates the name of the actuator. „ActMonLED2“ corresponds to the yellow lamp of the signal lamp.<br>button „Busy (BG_PF2)“:<br>action :pressing the button<br>result: TRUE = switch on yellow lamp (measurement is performed)<br>The background of the button is blue, if the button is active.<br><br>output field „0s“:<br>indicates the time how long the actuator has been activated..<br>output field „26“:<br>indicates how often the actuator has been activated.. |

| Position | Description |
|---|---|
| 3 | Screen block „Visu_Actuator_1Q“ consisting of:<br>output field „ActModLED3“:<br>indicates the name of the actuator.:„ActMonLED3“ corresponds to the green lamp of the signal lamp.<br>button: „GoodPart (BG_PF3)“:<br>action: pressing the button<br>result: TRUE = switch on the green lamp (good part)<br>the background of the button is blue when the button is active.<br><br>output field „0s“:<br>indicates the time how long the actuator has been active.<br>output field „20“:<br>indicates how often an actuator has been activated. |
| 4 | area „application“:<br>button „Start“:<br>action: pressing the button<br>result: TRUE = application is started in the setup mode<br>the background of the button is blue when the button is active<br>text field „active“:<br>The background of the text field is blue while the CP application module Measuring is performing the measurement<br>input/output field „current step“:<br>The current step of the CP application module Measuring during the measurement is displayed here .<br>text field „result“:<br>Behind this text field, the text field “bad” or “good” is superimposed corresponding to the actual measured value of difference. |
| 5 | button: „Process“:<br>action: releasing the button<br>result: The HMI switches to the menu page “home-process”. You can have the measured result graphically displayed here. |
| 6 | area „analogue sensor values, scaled 0...40 mm“<br>output fields BG2, BG3 and difference(BG3-BG2):<br>The current measured values of the distance sensors are displayed here. |
| 7 | text field „BG1“:<br>The background of the text field is green if there is a workpiece in the CP application module Measuring (BG1 active). |
| 8 | area „application-parameters“:<br>input/output fields “upper limit“ and „lower limit“:.<br>Here you can enter the parameters „upper limit“ and „lower limit“ for the Setup Mode<br>output field „measured value of difference“:<br>Here the actual measured value of difference is emitted.<br>If this value is within the .limit values, it is highlighted in green<br>If it goes below the lower limit value, it is highlighted in orange .<br>If it exceeds the upper limit value, it is highlighted in red. |

**Overview of the sub menu page „Process“ in the menu page „Home - Process“ (graphical display)**

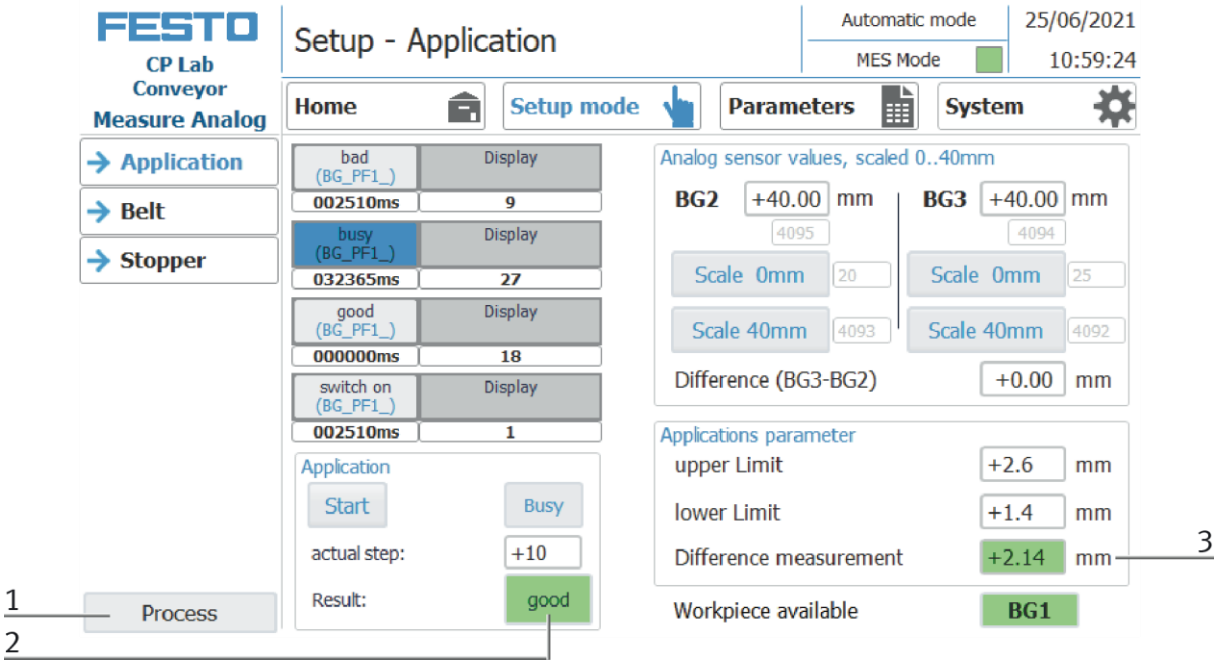



| Position | Description |
|---|---|
| 1 | area „measured value of difference actual“, bar:<br>Here the current actual measured value of difference is displayed graphically. The lower limit value is represented with an orange line and marking, the upper limit value with a red line and marking. |
| 2 | area „measured value of difference last order”, bar:<br>Here the actual measured value of difference of the last order is displayed graphically. The lower limit value is represented with an orange line and marking, the upper limit with a red line and marking. |
| 3 | area:„measured value of difference last order“, order data<br>All fields represented here are output fields, therefore serving as a display. The represented order data always refer to the last order.<br>Carrier ID = number of carrier<br>MES-Mode: ONo = order number, OPos = order position, OpNo = operation number of the last order |
| 4 | area „measured value of difference last order“, parameters und measured result:<br>All fields represented here are output fields, therefore serving as a display. The represented measurement data always refer to the last measurement.<br>Parameters:<br>upper limit value<br>Here the limit value is displayed which is above the setpoint measured value of difference.<br>Difference setpoint:<br>Here the given setpoint measured value of difference is displayed.<br>lower limit<br>Here the limit value is displayed which is below the setpoint measured value of difference.<br>Measurement result = measured value of difference:<br>Here the last measured actual measured value of difference is displayed. |
| 5 | button „Application“:<br>action: releasing the button<br>result: The HMI switches to the menu page „Setup - Application“. |

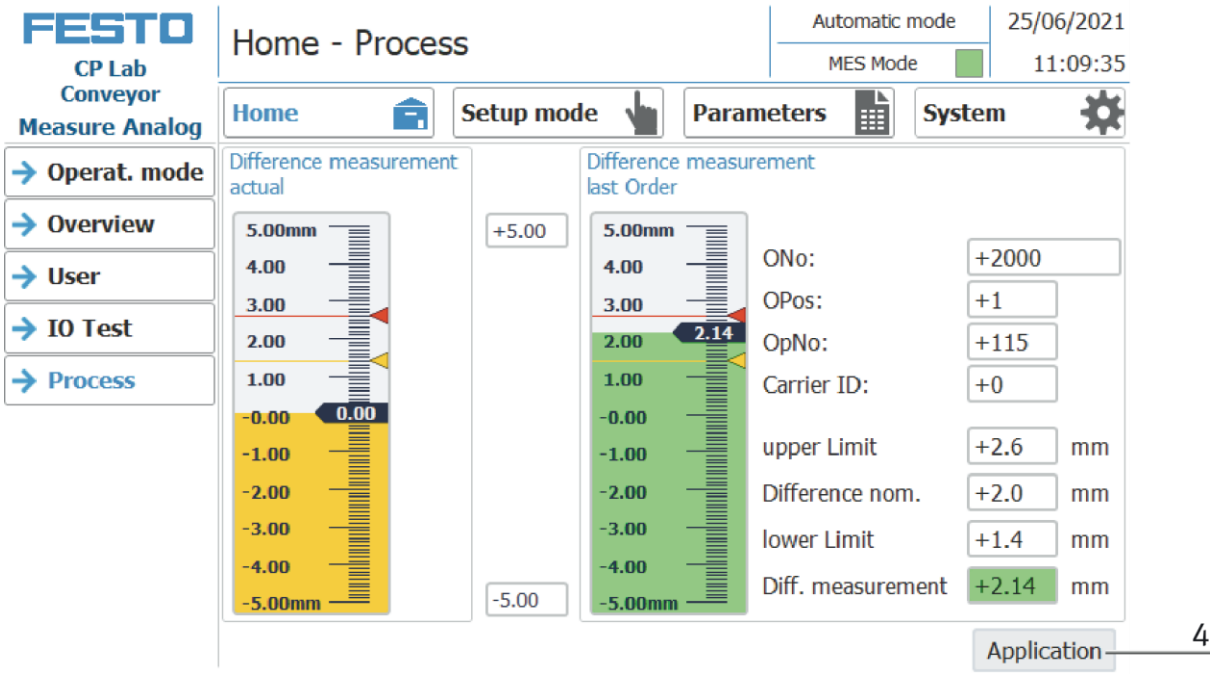
### 8.3.1 Measurement is performed via the MES-Mode

**An example for a measurement in MES mode within the limit values**

The carrier is transported into the CP application module Measuring. It runs through different working procedures (see sequence description for the MES-Mode and sequence of steps). Afterwards the current actual measured value of difference (3) is displayed. In our example, the measurement lies within the upper and lower limit value, therefore the actual measured value of difference (3) is displayed in green color, and the result (2) is also displayed in green color as “good”. The signal lamp on the CP application module Measuring is flashing green.



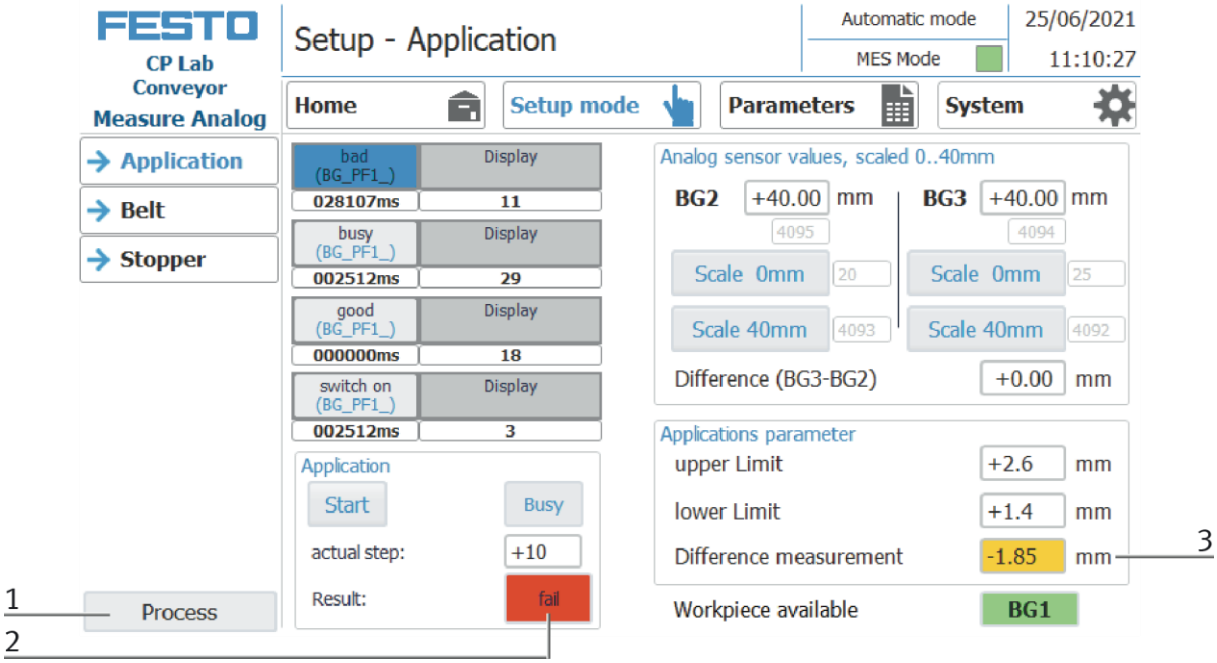
1. If you press the button „Process“ (1), you will switch to the menu page „Home - Process“ where you can have the measurement result displayed graphically. Since another measurement has already been performed, the example explained here is displayed in the area „Differential Measurement last order“.



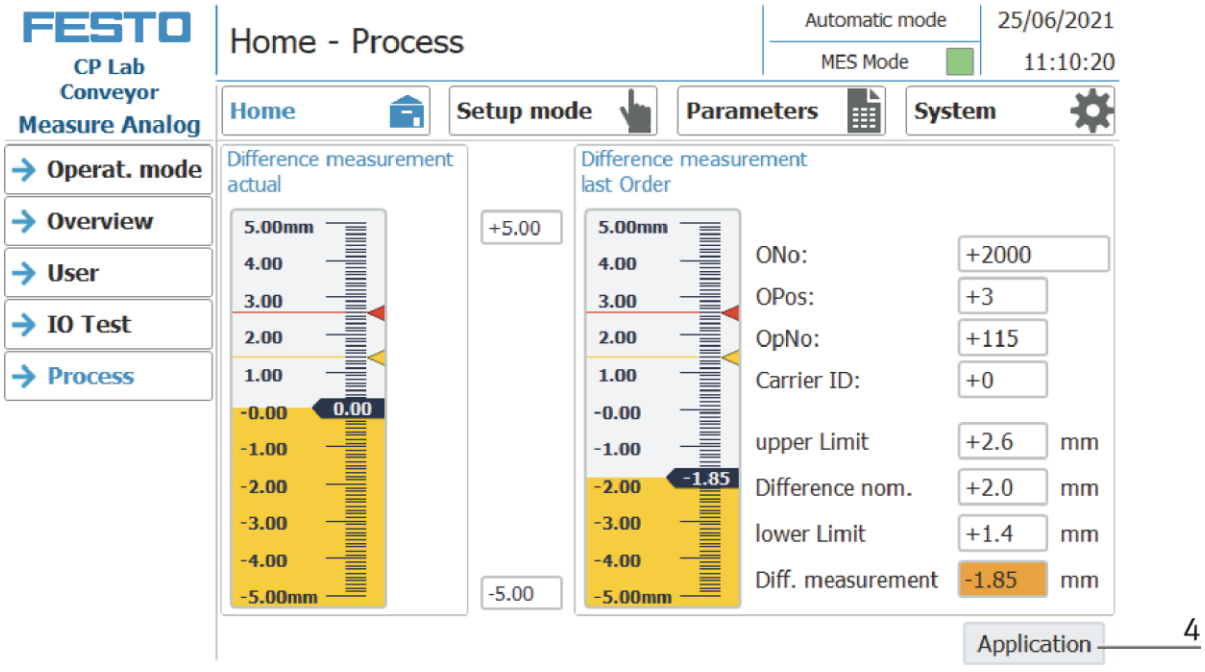

2. If you click the button „Application“ (4), you will return to the menu page “Setup - Application”.

**Example for a measurement in MES-Mode which falls below the lower limit value**

The carrier is transported into the CP application module Measuring. It runs through different working procedures (see sequence description for the MES-Mode and sequence of steps). Afterwards the current actual measured value of difference (3) is displayed. In our example, the result falls below the lower limit value, therefore the actual measured value of difference (3) is displayed in orange colour, and the result (2) as „bad“ in red colour. The signal lamp on the CP application module Measuring is flashing red.



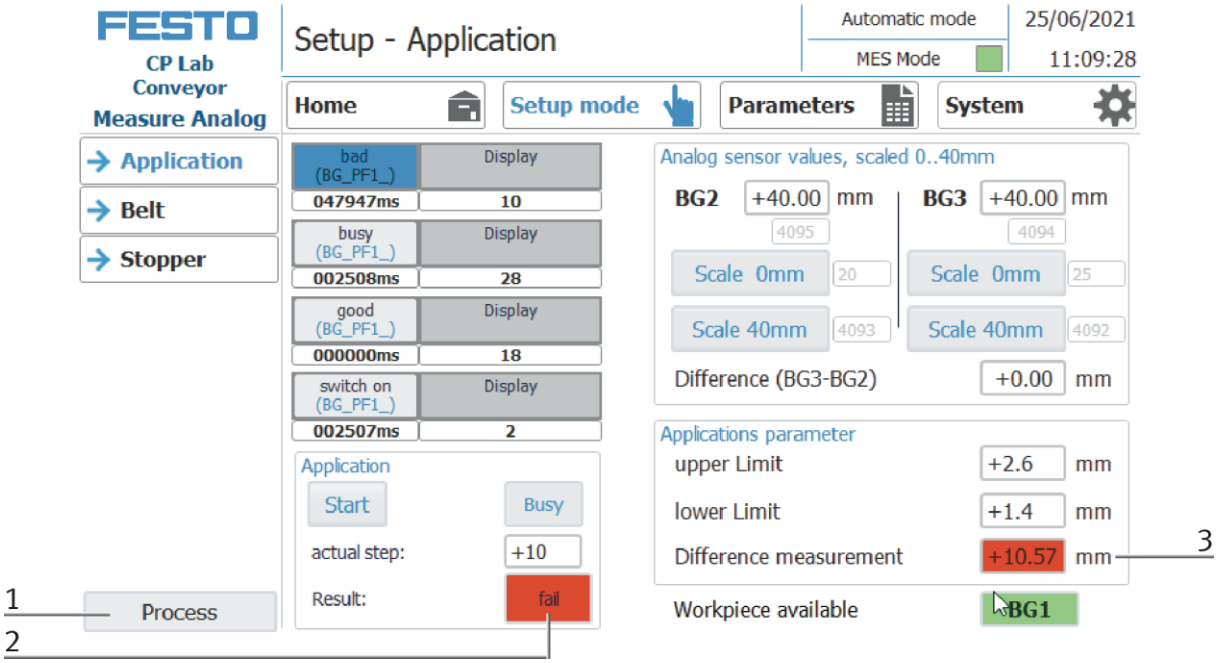

3. If you press the button „Process“ (1), you will switch to the menu page „Home - Process“ where you can have the measurement result displayed graphically. Since another measurement has already been performed, the example explained here is displayed in the area „Differential Measurement last order“.



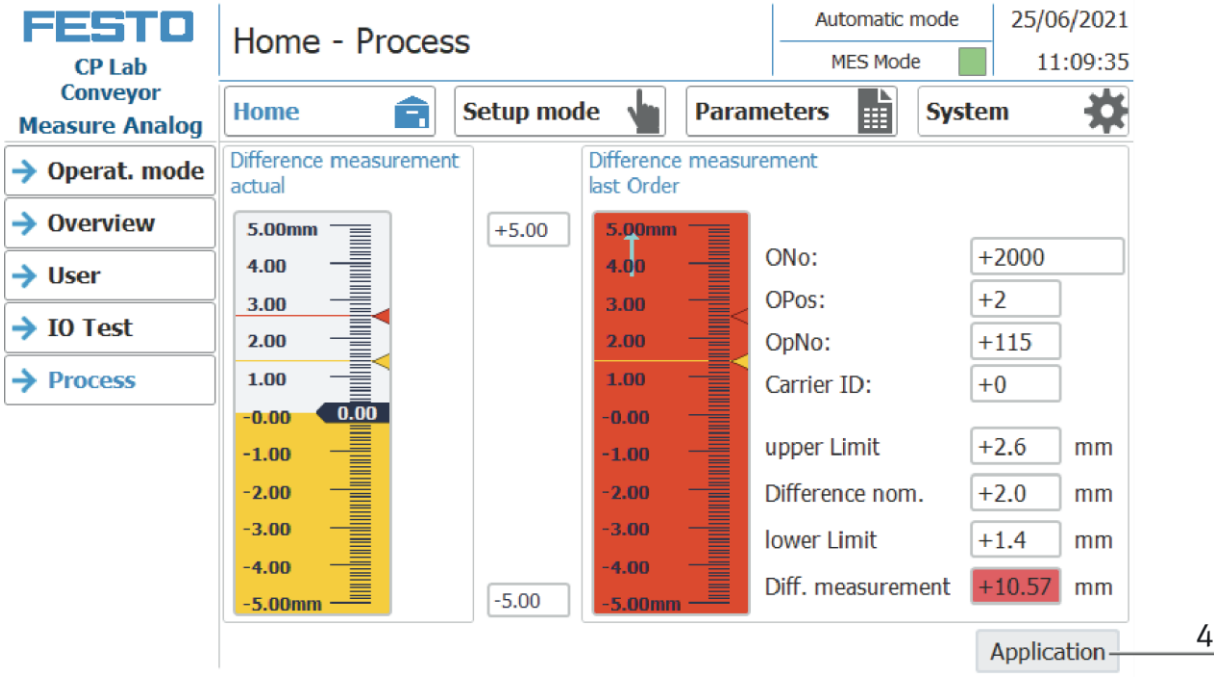

4. If you click the button „Application“ (4), you will return to the menu page “Setup – Application”.

**An example for the measurement in MES Mode which exceeds the upper limit value**

The carrier is transported into the CP application module Measuring. It runs through different working procedures (see sequence description for the MES-Mode and sequence of steps). Afterwards the current actual measured value of difference (3) is displayed. In our example, the upper limit value is exceeded, therefore the actual measured value of difference (3) is displayed in red colour, and the result (2) is also displayed in red colour as “bad”. The signal lamp on the CP application module Measuring is flashing red.




1. If you press the button „Process“ (1), you will switch to the menu page „Home - Process“ where you can have the measurement result displayed graphically. Since another measurement has already been performed, the example explained here is displayed in the area „Differential Measurement last order“.




2. If you click the button „Application“ (4), you will return to the menu page “Setup - Application”.

### 8.3.2 Measurement performed with Default-Mode

The carrier is transported into the CP application module Measuring. It runs through different working procedures (see sequence description for the Default-Mode and sequence of steps). Afterwards the current actual measured value of difference is displayed.

The representation on the HMI for the default mode corresponds in the widest sense to the representation in the MES mode, therefore there is no need to go into that here.

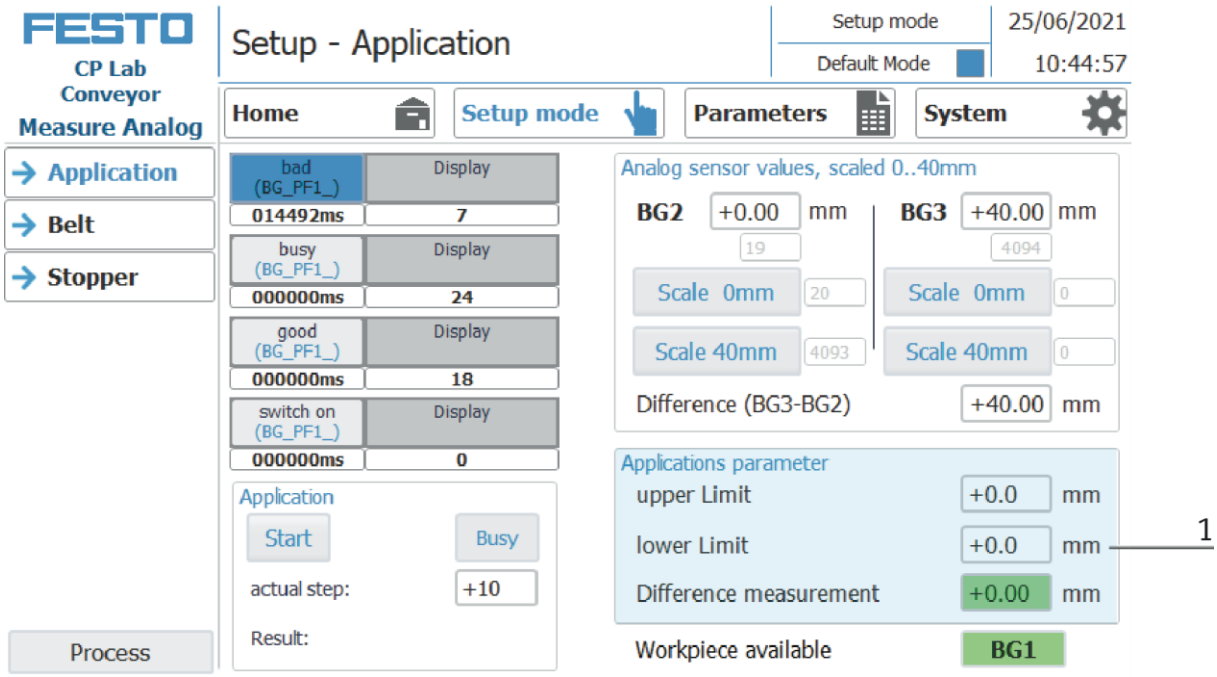
The only difference is:

The MES-order data ONo, OPos and OpNo have no further meaning in the default mode, since the CP application module Measuring receives the parameter values from the transition table in the default mode.

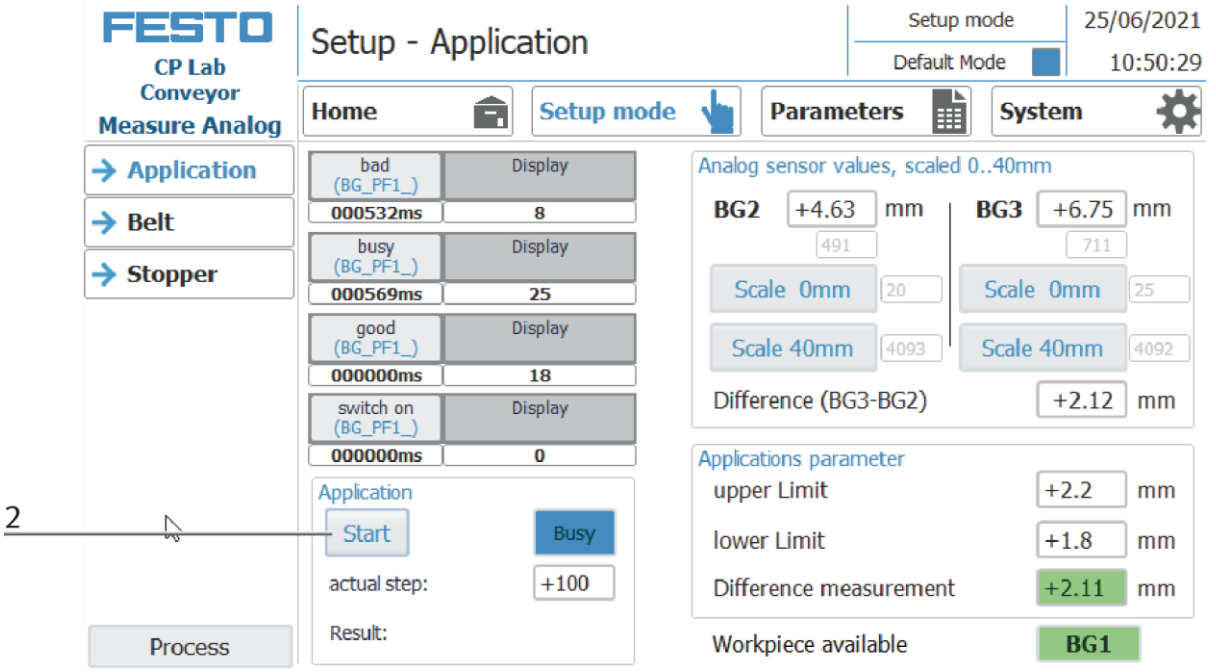
### 8.3.3 Measurement performed in Setup Mode

**An example for a measurement in the Setup Mode which is within the limit values**

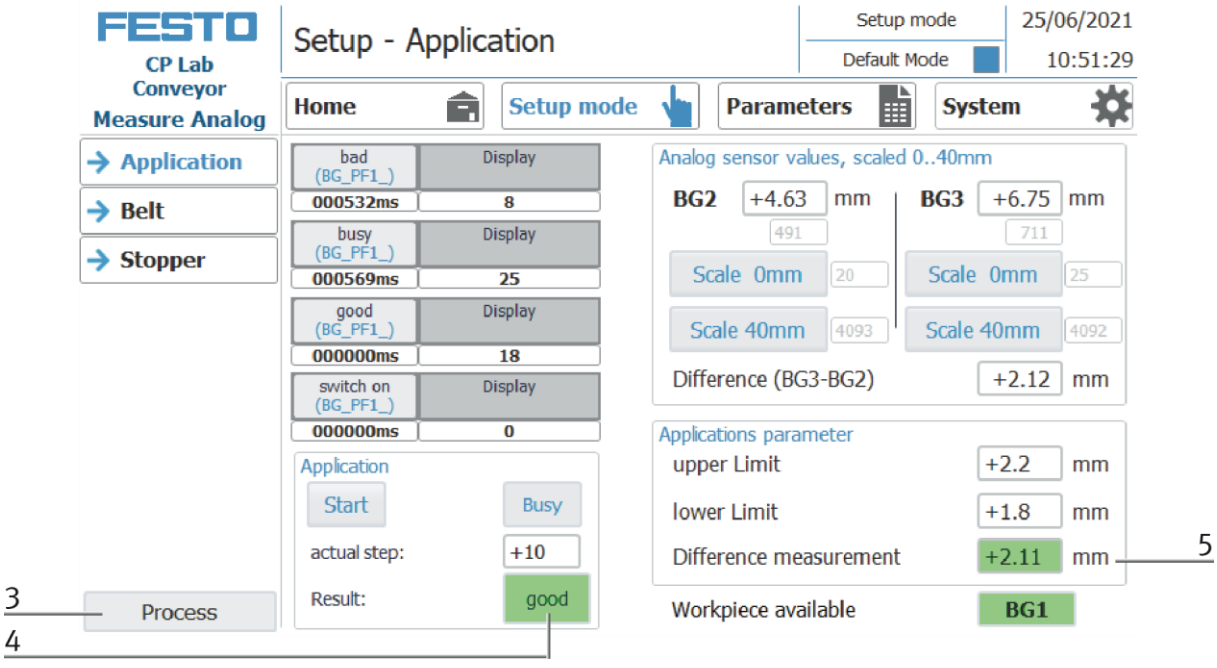
1. Place a carrier with pallet and front cover at the stopper position. The inside of the front cover points upwards. The drill hole of the front cover is on the left side.



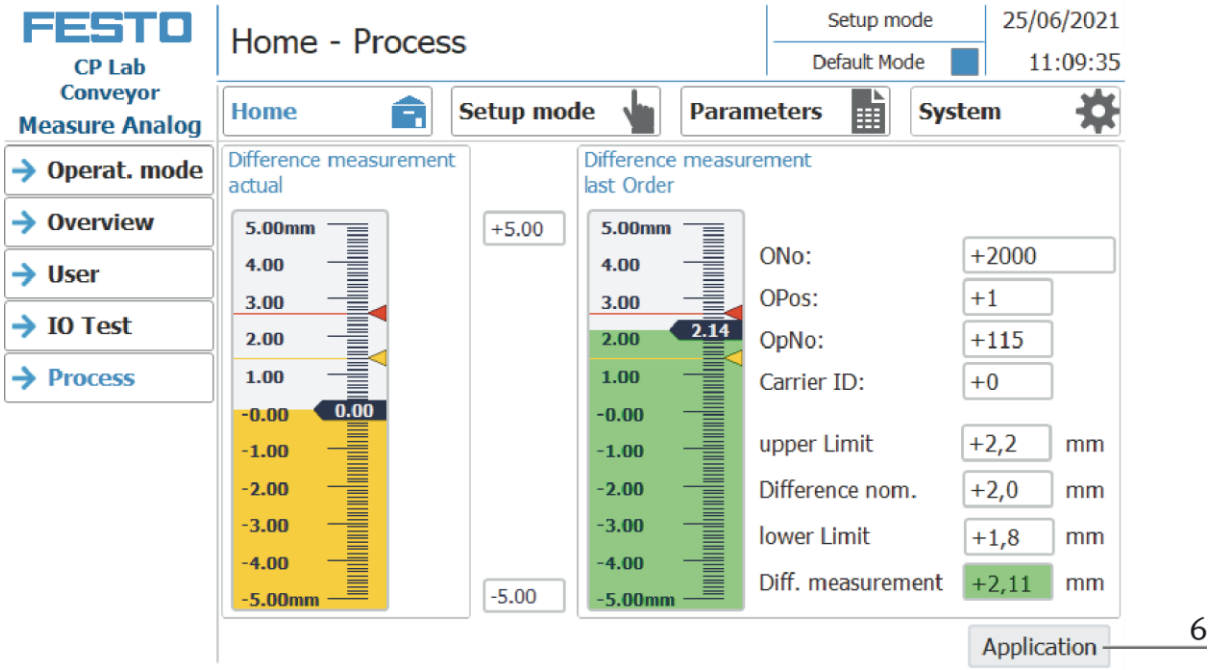

2. Define the parameters of the limit values for the actual measured value of difference by clicking on the input/output field “upper limit value” in the area „Application Parameters“ (1). Now a screen keyboard will appear. Enter the upper limit value on the screen keyboard and confirm. Repeat this procedure for the lower limit value. Now all parameters required for the measurement have been entered.




3. Start the measurement by pressing the „Start“ button (2) and then releasing it.



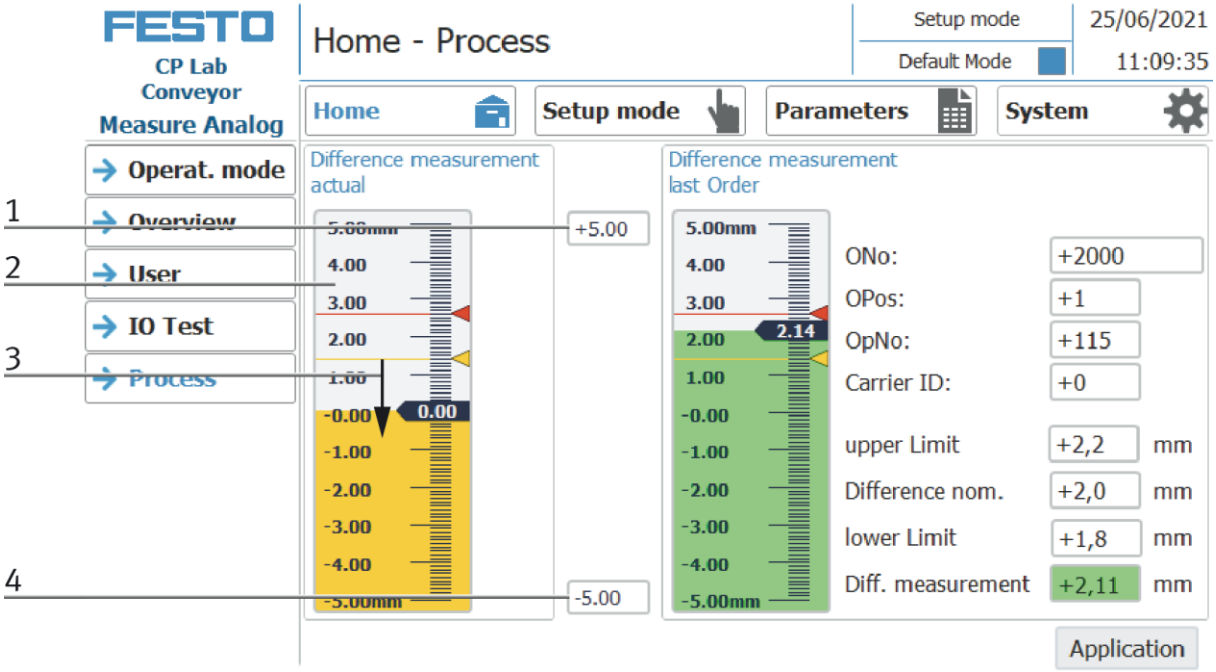

4. The measurement is within the upper and lower limit value, therefore the actual measured value of difference (5) and the result (4) „good“ are displayed in green colour.
   After a measurement in the Setup Mode, the signal lamp is not actuated automatically, and therefore it is not flashing. You can operate it manually, however, with the buttons “BadPart”,”Busy” and “GoodPart”.
5. By pressing the „Process button (3), you will switch to the menu page „Home - Process“. There you can have the measuring result displayed graphically.




6. By pressing the „Application“ button (6), you return to the menu page „Setup - Application“.

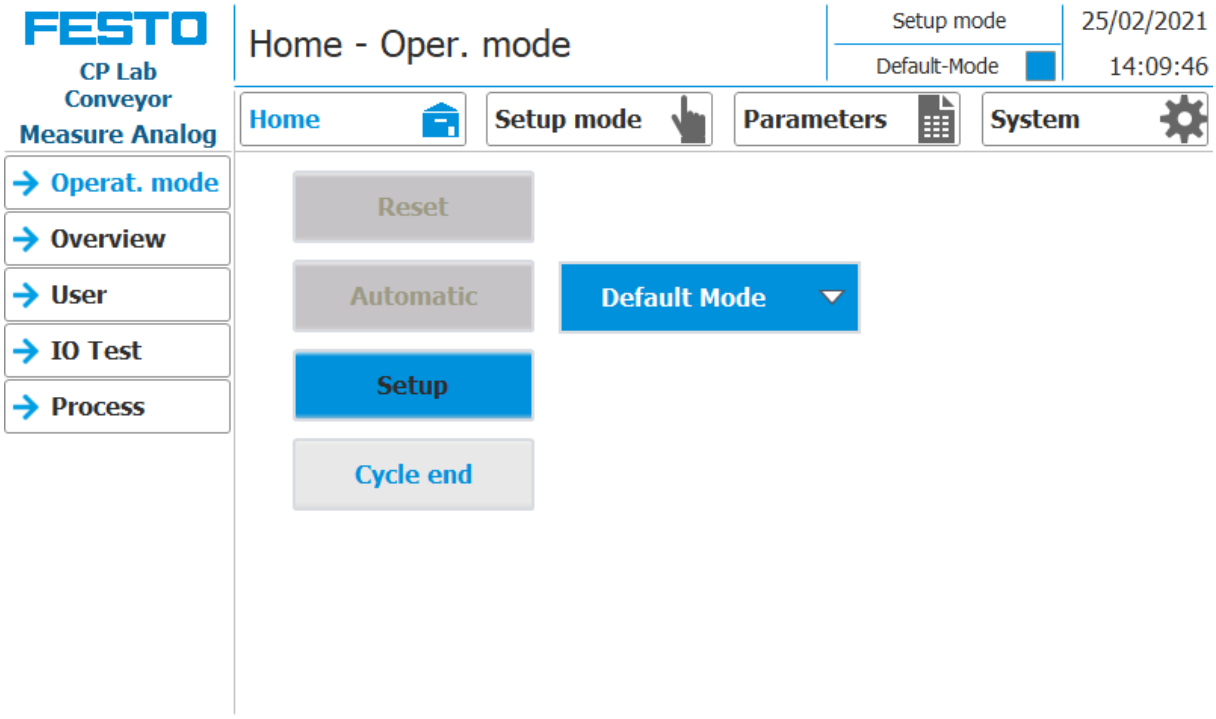
**Adjusting the measuring scale manually**

If the measured value of difference is below or above the measuring scale (2), you can enlarge or diminish it manually. In the following example, the arrow (3) points downwards. In this case, a measured value is below the displayed area of the measuring scale. Therefore click on the lower value (4) next to the measuring scale. A screen keyboard will appear. You only have to enter the suitable value for the measuring scale, so that the measured value of difference can be displayed correspondingly. You can also modify the measuring scale upwards. Therefore you have to change the upper value (1).



### 8.4 Default-Mode: Transitions of the CP Application module Measuring

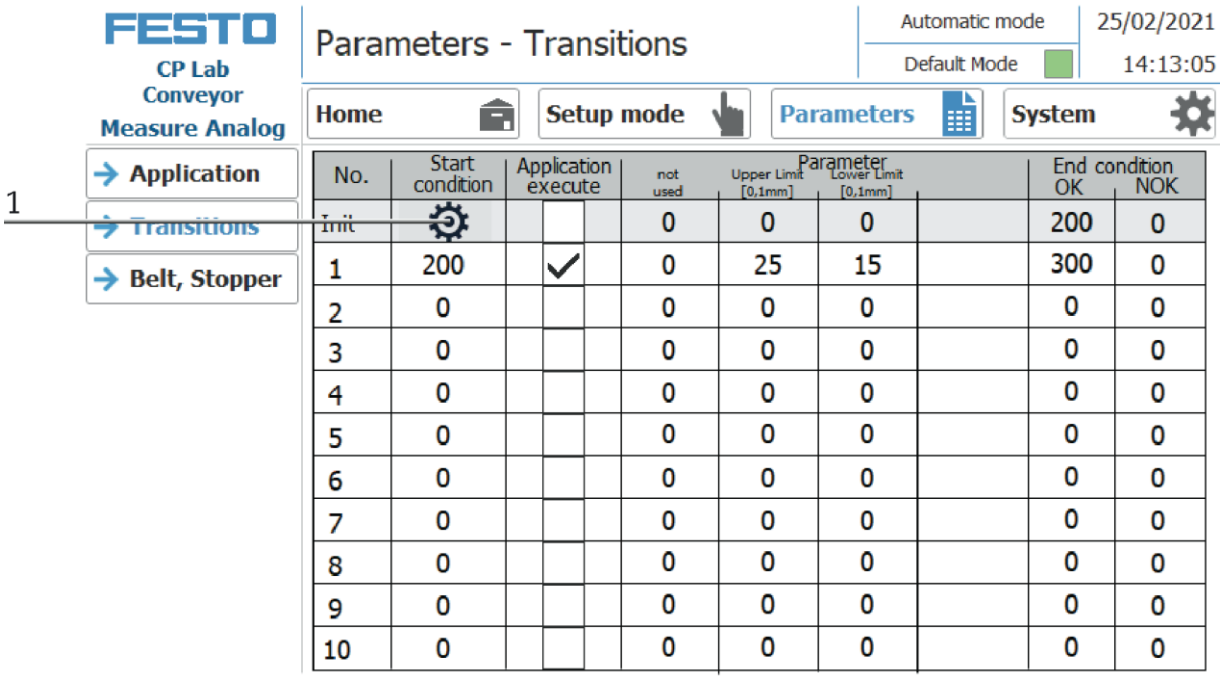
With the table of transitions, it is defined at CP Factory/Lab-Stations in Default Mode whether an operation shall take place at this station, and if so, with which parameters. In order to switch to the sub menu “Parameters - Transitions“, you have to set the HMI to the Setup Mode.



1. Press the „Parameter“ button (1) in order to switch to the menu page „Parameters - Transitions“.
2. Press now the „Transitions1“ button (2) to get into the corresponding sub menu.

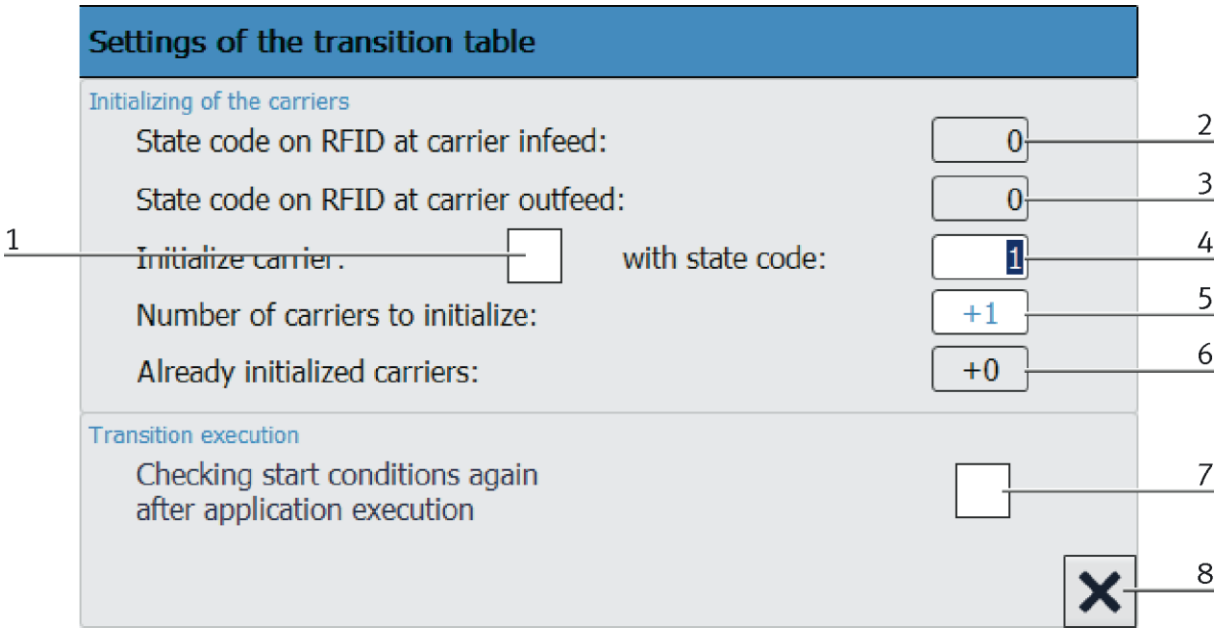
### 8.5 Transitions of the application module

The transitions are located in the Parameters submenu

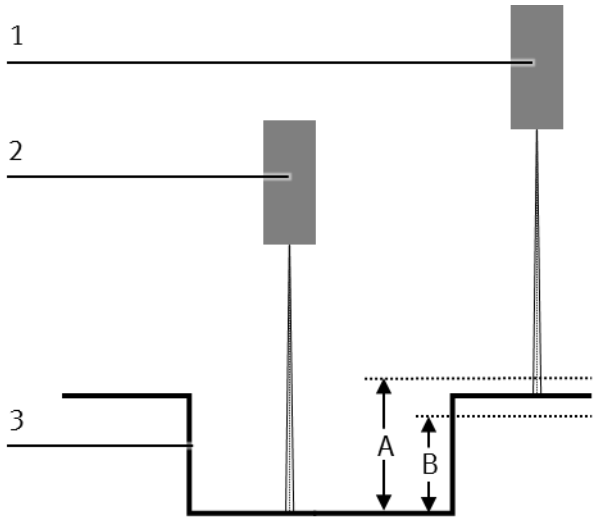



If the transitions submenu is selected, the transitions of the mounted application module are displayed. The transitions of all other application modules can be found in the corresponding manuals of the application modules.

3. Click on the gear wheel to access the settings for the transitions. (see the following picture)



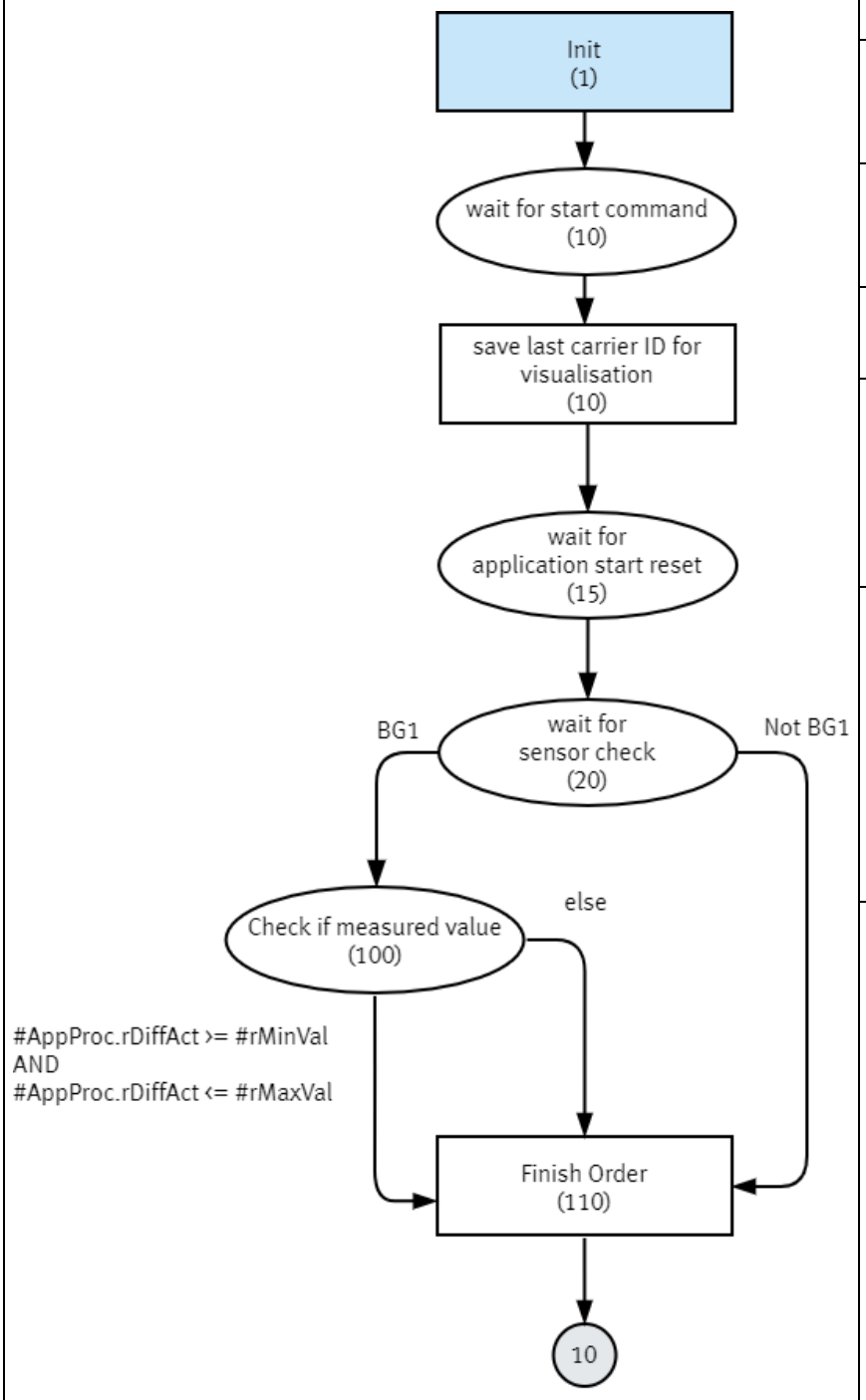

| Position number | Description |
|---|---|
| 1 | Initialize workpiece carrier:<br>The next carrier arriving at the stopper position is initialized with the end state (state code can be entered under item 4) of the first line of the transition table. |
| 2 | Status code on the RFID at carrier infeed:<br>Display of the start condition for application processing |
| 3 | Status code on the RFID at carrier outfeed:<br>Display of the start condition after application processing |
| 4 | With state code:<br>During initialization (Pos. 1 / Initialize carrier), the carrier is initialized with the state code entered here. |
| 5 | Number of carriers to be initialized:<br>Editable, the number of workpiece carriers to be initialized can be entered here. |
| 6 | Already initialized carriers:<br>Display of the already initialized workpiece carriers |
| 7 | Checking start conditions again after application execution:<br>If this function is activated, the start conditions are checked again after a transition condition has been processed. In this way it is possible to execute an application several times without the carrier leaving the working position. |
| 8 | Exit settings |




workpiece (limit values)

| Position | Description |
|---|---|
| 1 | distance sensor BG3 |
| 2 | distance sensor BG2 |
| 3 | workpiece |
| A | upper limit for distance sensor BG3 |
| B | lower limit for distance sensor BG3 |

## 8.6 Flow chart

| CP-AM-MEAS | 1 |
|---|---|
|  | **1: Init**<br>Initialization start conditions |
| | **10: wait for start command**<br>wait for xStart bit from Application Interface |
| | **10: save last carrier ID**<br>#AppProc.iLastCarrierID := #iCarrierID; |
| | **15: wait for application start reset**<br>wait for not xStart bit |
| | **20: Sensor Check**<br>If not BG1, then ISTB Error Message: "No Workpiece available!"<br>go to step 110<br>If BG1, then go to step 100 |
| | **100: Check if measured value is in hysteresis area**<br>start wait time for 150ms<br>If #AppProc.rDiffAct >= #rMinVal AND #AppProc.rDiffAct <= #rMaxVal,<br>then Good Part = true Ret code = 0<br>else Bad Part = true,Ret code = ISTB Message "Actual value outside limits" |
| | **110: Finish Order**<br>go back to step 10 |

### 8.6.1 MES Parameter (MEAS)

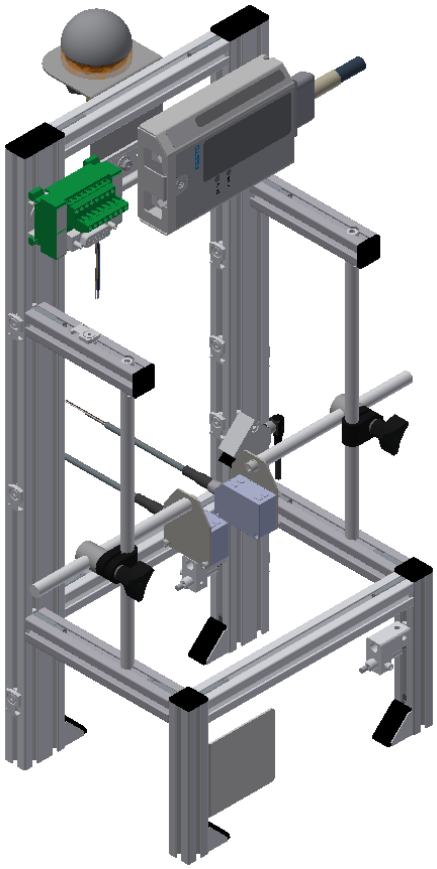
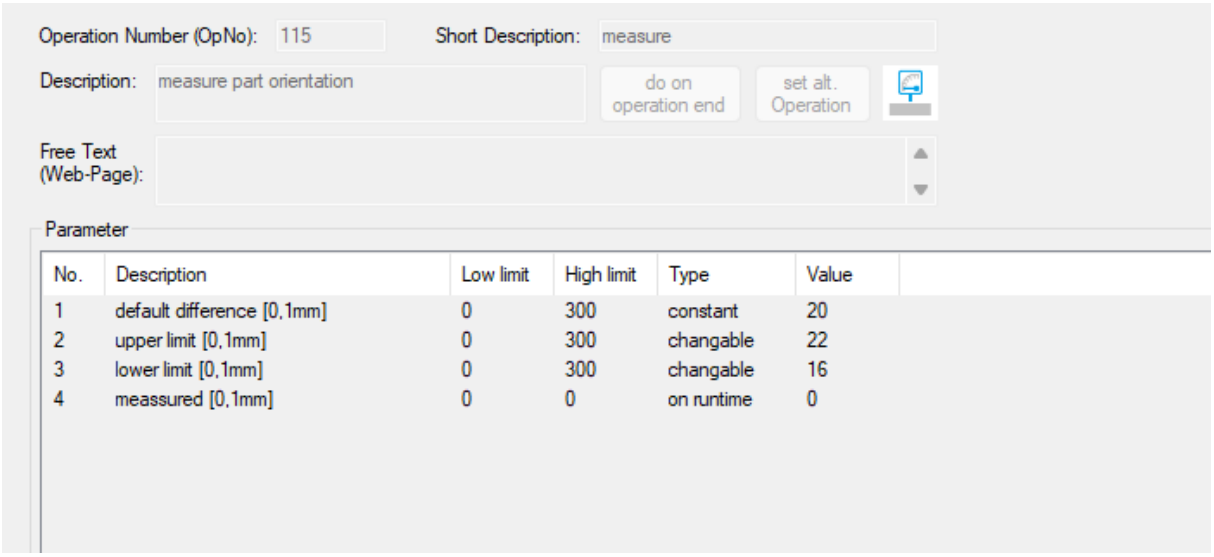


Illustration similar

The following MES-operations are available for the AM MEAS.

| Operation number | Description |
|---|---|
| 115 | Measure / measure part orientation |



### 8.6.2 Default Parameter (MEAS)

| Parameter number | Description |
|---|---|
| 1 | **Programme number**<br>Setpoint<br>Limitation: No limitation of the value in the transition table |
| 2 | **Upper limit** |
| 3 | **Lower limit** |
| 4 | **Measured value** |

# 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

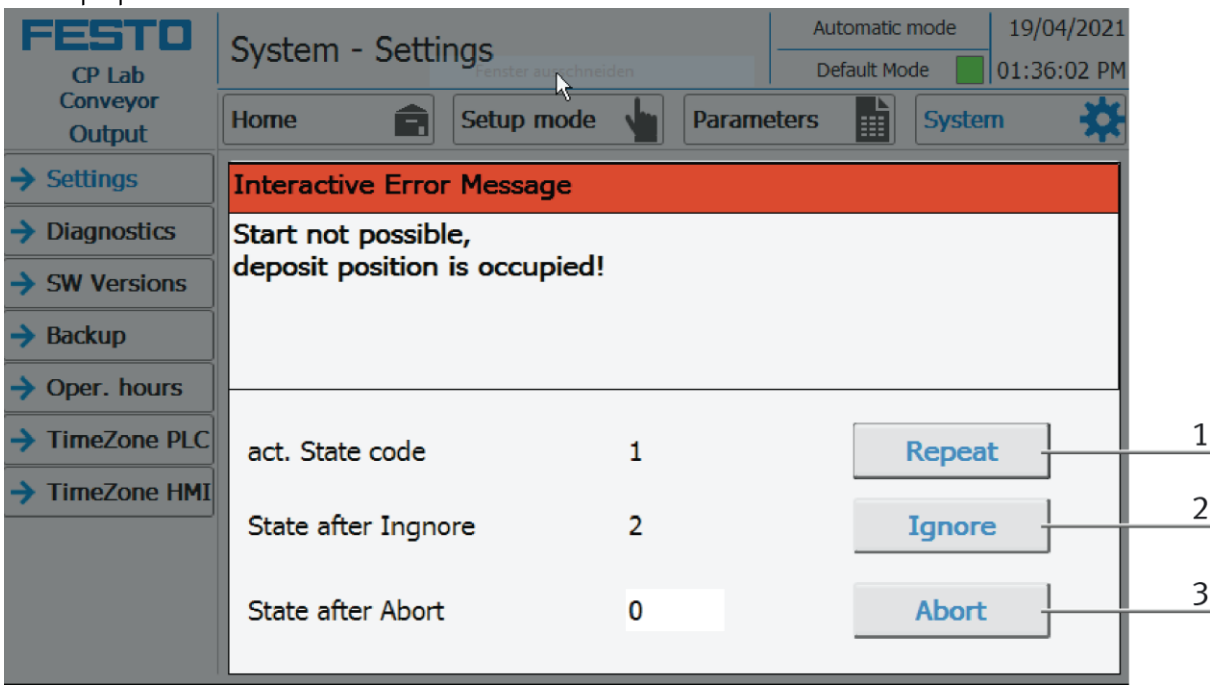
Actual there are no message texts available.

## 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.



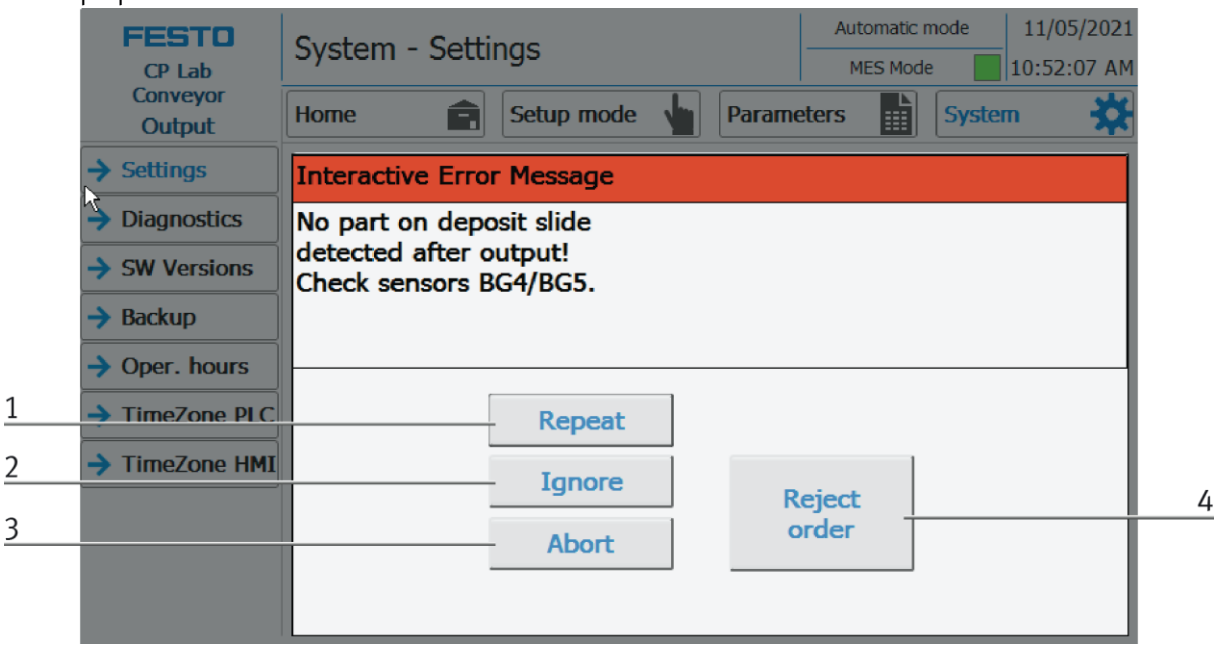

Example application module output - interactive error message in default mode

| 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 measuring

| Value | Text | Fix error |
|---|---|---|
| 5040 | Measured value is out of defined range! | Check workpiece and measurement unit / check parameter for limit value |

# 10 Spare part list

## 10.1 Electric parts

| Description | Part number | Res.Ident | Use |
|---|---|---|---|
| analogue terminal | 526213 | XD2A | |
| height measurement 1 / distance sensor Sick | 6050513 | BG2 | |
| workpiece request / light guide | 552812 | BG1 | |
| signal lamp / Turck / BAN.K50L2RGB7Q | 802145 | P1 | |
| I/O module | 537823 | BG3 | |
| height measurement 2 / distance sensor Sick | 6050513 | BG1 | |
| workpiece request / lightguide | 8027412 | XD1 | |

# 11 Service and cleaning

The components and systems from Festo Didactic are maintenance-free.
At regular intervals you should have checked:

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

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

**NOTE**

Do not use aggressive or abrasive cleaners.

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

# 12 Further information and updating

Further information and updates on the technical documentation of Festo Didactic components and systems can be found on the Internet at:
www.ip.festo-didactic.com

# 13 Disposal

**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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