CyBio FeliX
Operating instructions

Copyright	
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Order number	30-5015-100-24BLE
Document type	Translation of Original instructions
Serial number	Refer to product nameplate

EC Declaration of Conformity (reproduction of the content)

Name and address of the manufacturer:

Analytik Jena GmbH+Co. KG

Konrad-Zuse-Straße 1

D-07745 Jena

Herewith we declare, that the product described below

CyBio FeliX

- 30-5015-100-24
- 30-5015-600-24
- 30-5015-125-25

is complying with all corresponding requirements of the Machinery Directive 2006/42/EC.

In addition the product is in conformity with the EC Directive relating to electromagnetic compatibility 2014/30/EU. The safety objectives of the Low-Voltage Directive are taken into account.

Harmonized Standards used:

EN ISO 12100 - Safety of Machinery - General principles for design - Risk assessment and risk reduction

EN 61010-1 - Safety requirements for electrical equipment for measurement, control and laboratory use

The person authorized to compile the relevant technical documentation:

Analytik Jena GmbH+Co. KG, Konrad-Zuse-Straße 1, D-07745 Jena

EC Declaration of Conformity (reproduction of the content)

Name and address of the manufacturer:

Analytik Jena GmbH+Co. KG

Konrad-Zuse-Straße 1

D-07745 Jena

Herewith we declare, that the product described below

CyBio FeliX

- 30-5015-500-25

is complying with all corresponding requirements of the Machinery Directive 2006/42/EC.

In addition the product is in conformity with the EC Directive relating to electromagnetic compatibility 2014/30/EU. The safety objectives of the Low-Voltage Directive are taken into account.

Harmonized Standards used:

EN ISO 12100:2011 - Safety of Machinery - General principles for design - Risk assessment and risk reduction

EN 61010-1:2011 - Safety requirements for electrical equipment for measurement, control and laboratory use

The person authorized to compile the relevant technical documentation:Analytik Jena GmbH+Co. KG, Konrad-Zuse-Straße 1, D-07745 Jena

ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFI

America

CERTIFICATE

No. U8 037158 0008 Rev. 00

Holder of Certificate: **Analytik Jena GmbH**
Konrad-Zuse-Str. 1
07745 Jena
GERMANY

Production Facility(ies): 037158

Certification Mark:

Product: **Laboratory equipment**

Model(s): **CyBio FeliX**

Parameters:

Rated voltage:	100-240 VAC
Rated current:	2 A
Rated fraquency:	50/60 Hz
Protection class:	I

Tested according to:
UL 61010-1:2012/R:2018-11
CAN/CSA-C22.2 No. 61010-1:2012/A1:2018-11
UL 61010-2-081:2019
CAN/CSA-C22.2 No. 61010-2-081:2019

This product was voluntarily tested to the relevant safety requirements referenced on this certificate. It can be marked with the certification mark above. The mark must not be altered in any way. This product certification system operated by TÜV SÜD America Inc. most closely resembles system 3 as defined in ISO/IEC 17067. Certification is based on the TÜV SÜD "Testing and Certification Regulations". TÜV SÜD America Inc. is an OSHA recognized NRTL and a Standards Council of Canada accredited Certification body.

Test report no.: 028-713039674-100

Date, 2020-12-15

(Abdul Sabbagh)

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1 General information

1.1 Notes

These operating instructions provide information on the design and function of the device and qualified operating personnel with the necessary knowledge for safe operation.

Furthermore, the operating instructions contain information on the care of the device and the maintenance scope provided by the manufacturer.

In addition, you can use the operating instructions to analyze possible causes of malfunctions and determine suitable measures for eliminating them.

The operating instructions must be accessible to the operating and maintenance personnel at all times.

NOTE

All information represents the state of knowledge at the time of printing.
The manufacturer reserves the right to make changes if deemed necessary in the interest of technical progress.

1.2 Target group

These operating instructions are aimed at:

- Qualified and trained personnel who operate and maintain the equipment (→ *„Requirements On Personnel" on page 17*).
- Employees responsible for
  – the planning of procedures,
  – maintenance and cleaning work,
  – safety devices etc.

1.3 Conventions

1.3.1 Text marks

Instructions for actions which occur in chronological order are numbered, combined in action units
and provided with the corresponding result.

Lists which are not in chronological order are shown as itemized lists, sub-listings or as bullet points.

Safety instructions are indicated by pictographs and a signal word (→ *„Design of notes" on page 3*).
Action-related safety notes always **precede** the corresponding actions.

Commands, buttons, text fields, check boxes and the like are marked as follows - example command "Load".

Optional equipment components/versions are marked with an *.

1.3.2 Design of notes

WARNING

Indicates a potentially hazardous situation which,

if not prevented, can result in death or most serious injuries.

CAUTION

Dangerous situation!

Potential consequences: Mild or minor injuries.

NOTE

Dangerous situation!

Potential consequences: Material damage!

TIP

Useful application tips, no risk or hazard.

TIP

Notes on environmental protection!

1.4 Intended use

The device is a simultaneous pipetting system (depending on model version or pipetting head
from 1 to a maximum of 384 channels) and intended for the automatic processing of microplates.

The system's range of applications is limited by the functional scope of available software and firmware and by the scope of delivery. Users are therefore required to operate this system in no way or mode other than described or specified in these operating instructions.

1.5 Conforming Use

The pipettor is designed for automatic processing of microplates in chemical and biological laboratories.
In the fields of medicine and diagnostics, its use is limited to research.

The basic functions are to aspirate and dispense fluids into and out of microplates, reservoirs, (columns, individual wells and tubes).

The term **conforming use** of the device presumes that:

- the system is operated by qualified and trained research and laboratory personnel
- all operating requirements quoted in this User Manual and described procedural sequences and related safety notes are duly observed
- all specifications in this Manual regarding system start-up, operation, preventive maintenance and care are met
- applicable safety standards or rules are always fulfilled.

Any type of mode of application other than specified herein is considered non-conforming use!
The user will be solely liable for any damage resulting from a non-conformance.

The term **non-conforming use** will include, but is not limited to:

- the use of the device in medical laboratories **not** affiliated with research
- working with explosive or aggressive substances
- working in explosive atmospheres - use in potentially explosive areas is not permitted

NOTE

System operation with involvement of hazardous substances will be the sole responsibility of the user!

This includes compliance with all safety requirements for the protection of people and material goods during work with radioactive, infectious, poisonous, corrosive, combustible and other hazardous substances. The user is under obligation to fulfill all requirements on laboratory equipment and the conduct of personnel handling substances of this nature and on the practices , in place for cleanness, sterilization, environmental protection and waste disposal.

For the use of the device with hazardous substances, the user is recommended - unless otherwise regulated by law - to issue operating instructions.
Accordingly, this User Manual contains no safety notes to protect from personal injury or material damage caused by substances being examined.

Process control must rely on included manufacturer software.
Alterations in or damage to the software may give rise to faults in process flow and damage the system or its components.
Software protection is the sole responsibility of the user.

1.6 Warranty & Liability

The duration of the warranty as well as the liability correspond to the legal regulations as well as the regulations in the general terms and conditions of the manufacturer.

Warranty will be limited to repair services or replacement of damaged parts. It will exclude consequential damage of any kind. Damage to wearing parts is not included in the warranty.

Any deviation from conforming use as defined in this User Manual (operating requirements, process sequences) will result in restricted acceptance of warranty or liability claims in the event of damage.

Warranty and liability claims for personal injury and property damage are excluded if the device is not operated in accordance with section
→ *„Conforming Use" on page 4*.

NOTE

This loss-of-warranty clause shall apply to potential periods of interruption in business and to any system component that had not been directly affected by authorized warranty work.

1.7 Scope of delivery

The scope of delivery of the device - depending on the model version- consists of:

- CyBio FeliX
  - Basic unit or Workstation[1]
  - Pipetting head*
- Accessories
  - Scope of → *„Accessories" on page 87*
- Cable
  - Mains connection cable
  - USB cable
- Documentation
  - Operating instructions
  - Translation of the original operating instructions*
  - EC Declaration of Conformity
  - Accessories catalog*
- Packaging
  - Packing box
  - Transport locks

1 Or version without enclosure/louver.

2 Technical Specifications

2.1 General data

Version with enclosure/louver

Pipettor	
Name	CyBio FeliX
Model number	30-5015-100-24/OL5015-100-24
Pipetting channels	1 – 384 channels (depending on version and pipetting head)
Dimensions and weight	
Dimensions Width x height x depth	approx. 650 x 665/700[1] x 450 mm
Weight: ▪ Basic unit (30-5015-100-24) ▪ Device (ready for operation)	 approx. 50 kg approx. 58 kg
Microplate specifications	
Formats (SBS standard)	96-, 384- shallow well MP 96-, 384- deep well MP
Tubes	0.2 – 2 ml
Deck positions	
Name/number	1 – 12 positions
lower level – max. height (accessory) upper level – max. height (labware)	110 mm 65 mm
Volume range	
	see separate pipetting head instructions
Precision (CV)	
	see separate pipetting head instructions

1 Valid as of serial number SN: 305015 10 1001.

Version without enclosure/louver

Pipettor	
Name	CyBio FeliX
Model number	30-5015-500-24
Model number	30-5015-401-24
Pipetting channels	1 – 384 channels (depending on version and pipetting head)
Dimensions and weight	
Dimensions Width x height x depth	approx. 650 x 645[1]/665[2] x 450 mm
Weight:	
▪ 30-5015-500-24	approx. 39 kg
▪ 30-5015-401-24	approx. 50 kg
Microplate specifications	
Formats (SBS standard)	96-, 384- shallow well MP 96-, 384- deep well MP
Tubes	0.2 – 2 ml
Deck positions	
Name/number	1 – 12 positions
lower level – max. height (accessory)	110 mm
upper level – max. height (labware)	65 mm
Volume range	
	see separate pipetting head instructions
Precision (CV)	
	see separate pipetting head instructions

1 Model: 30-5015-500-24

2 Model: 30-5015-401-24

2.2 Overview operating data/conditions

Technical operating data		
Application class	Bench-top device, closed room facilities in clean condition	
Permissible altitude	up to 2000 m	
Protection class	I	
Mains voltage Frequency	100 – 240 V AC ±10% 50/60 Hz	see Connection value label on the device (label)
Protective fusing	2 fuses 5 x 20 mm T 4 A 250 V AC, 215.004[1]	
Current consumption	2 A	
Overvoltage category	II	
Degree of contamination	2	
Interfaces	Sub-D 9 pin socket (RS 232 IN) Sub-D 9 pin plug (RS 232 forwarding) USB socket type B RJ 45* (Ethernet)	
Airborne sound emission	< 70 db (A)	
Operating and storage conditions		
Operation: ▪ Permissible ambient temperature ▪ Permissible relative humidity		 +15 °C to +35 °C 45 to 75 % at +35 °C non-condensing
Storage and transport: ▪ Permissible ambient temperature ▪ Permissible relative humidity		 -10 °C to +50 °C ≤ 85 % at +30 °C non-condensing
Floor base requirements	Stable, horizontal, dry, free from vibration	

1 High Breaking Capacity Fuse; Buerklin 42 G 1786

3 Safety instructions

3.1 General

NOTE

For your own safety and to ensure error-free and safe device operation, please read this chapter carefully before commissioning!

Comply with all safety instructions described in these operating instructions in the next chapters before the corresponding measures and with all messages and notes which are displayed on the screen by the software.

In addition to the safety instructions which apply to commissioning and operating of the product, the generally applicable regulations on accident prevention, occupational safety and environmental protection must be observed and complied with.

Notes on possible hazards do not replace the occupational health and safety regulations that must be observed.

Follow these general safety rules:

- Do not examine or use aggressive substances that affect the resistance of the device or its components (additional versions: → *„Chemical Resistance" on page 20*)!
- Do not make changes in system engineering design, unless by prior agreement with Analytik Jena GmbH+Co. KG!
- Do not manipulate or damage the software or its configuration!
- Do not operate the system with safety devices in a defective state or with safety and protection devices installed in a nonconforming manner!
- Operate the device only with the mains voltage that corresponds to the information on the label!
- Observe prescribed maintenance intervals (→ *„Maintenance Work" on page 76*)!
- Use only accessory items, consumable materials and spare parts specified in this User Manual or provided or recommended by Analytik Jena GmbH+Co. KG!
- Service and repair work as well as work for commissioning or for dismantling the device for transport may only be carried out by authorized service personnel!
- Unauthorized conversions or modifications, especially those that affect the safety of personnel and the environment, are not permitted.

3.2 Standards & Directives

The device has been built in accordance with the currently valid rules of technology and the recognized safety rules.

EU directives

The system and its components have been designed in accordance with basic safety and health requirements in applicable laws, standards and guideline regulations.

CE-labeling and a declaration of conformity are included to document the safety of the system and its components.[1]

The partly completed product must not be put into service until it has been established, where applicable, that the product or the installation into which the partly completed product is to be incorporated complies with the provisions of Directive 2006/42/EC on machinery and the EC declaration of conformity has been issued in accordance with appendix II A.[2]

All safety data refer to the currently valid regulations of the European Union. Other specific national laws and regulations must be complied with.

Guidelines for China

The device contains controlled substances– additional instructions
Tabelle 5, “Other symbol markings,” auf Seite 14.

NRTL certification[1]

The device has been tested for its functional and safety characteristics by an approved certification institute. Accordingly, it may be marked with the certification mark → *see Fig. 1*.

Fig. 1: Certification mark on the device

Table 1: Certification details of the device

Description	Specification	Comment
Number (certificate)	U8 15 07 37158 006	additional information: see certificate
Test report number	028-713039674-000	

1 Applies to the basic unit/workstation (e.g. 30-5015-100-24).
2 Applies to the version without enclosure/louver (e.g. 30-5015-500-24).

3.3 Safety markings

Legal prescriptions require safety labeling as a mandatory component of the accident prevention measures. As such, safety labeling helps ensuring health and safety at the workplace.

NOTE

The warning labels and safety symbols attached to the device are an integral part of the device or its components and must be strictly observed!

Before switching on the device, check that warning notes and safety symbols are complete and intact. Do not put the device into operation if warning notes or safety symbols are missing or damaged!

Damaged or missing warning notes or safety symbols can cause incorrect actions leading to personal injury or material damage! Warning notes and safety symbols must not be removed! Immediately replace any damaged warning notes or safety symbols!

Pay attention to the following symbols/labels:

Table 2: Warning label

Warning label[1]	Meaning	Comment
	General Warning label!	Warning labels must include the following (as per documentation): ■ the nature of the possible, potential hazard ■ the actions required to prevent the occurrence
	Warning of a Hazard point	Warning against mechanical hazards resulting from device components which are moving
	Warning against hazardous electric voltage	Tabelle 4, “Warning note,” auf Seite 14
	Warning against hand injuries	Warning against crushing resulting from device components which are moving

1 Warning labels warn the operator of potential hazards and thus help increasing the operator's attention and attentiveness.

Table 3: Mandatory action labels

Mandatory action labels[1]	Meaning	comment
	Observe the instructions!	
	Wear eye protection!	Define type and quality of the protection measure[2] within the framework of the work-place evaluation.
	Pull the mains plug!	
	Wear hand protection!	Define type and quality of the protection measure[3] within the framework of the workplace evaluation.
	Wear protective clothing!	Define type and quality of the protection measure within the framework of the workplace evaluation.
	Wash your hands!	

1 Mandatory signs request the operator to behave or react in a particular way.

2 If necessary, refer to EN 166 "Personal eye protection – specifications".

3 If necessary, refer to EN ISO 374 "Protective gloves against dangerous chemicals and micro-organisms".

Table 4: Warning note

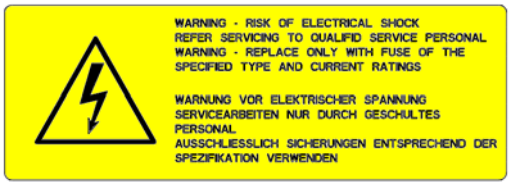
Warning note	Meaning
	Warning against hazardous electric voltage Never open the device! All repairs must be performed by qualified expert staff only! Only replace defective fuses by fuses of the specified type!

Table 5: Other symbol markings

Symbol markings[1]	Meaning
	China RoHS label The device contains substances subject to regulation (according to the directive "Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products"). Analytik Jena warrants that these substances will not be released from the device within the next 25 years provided the device is employed as intended.

1 A symbol marking confirms compliance with a particular convention or directive.

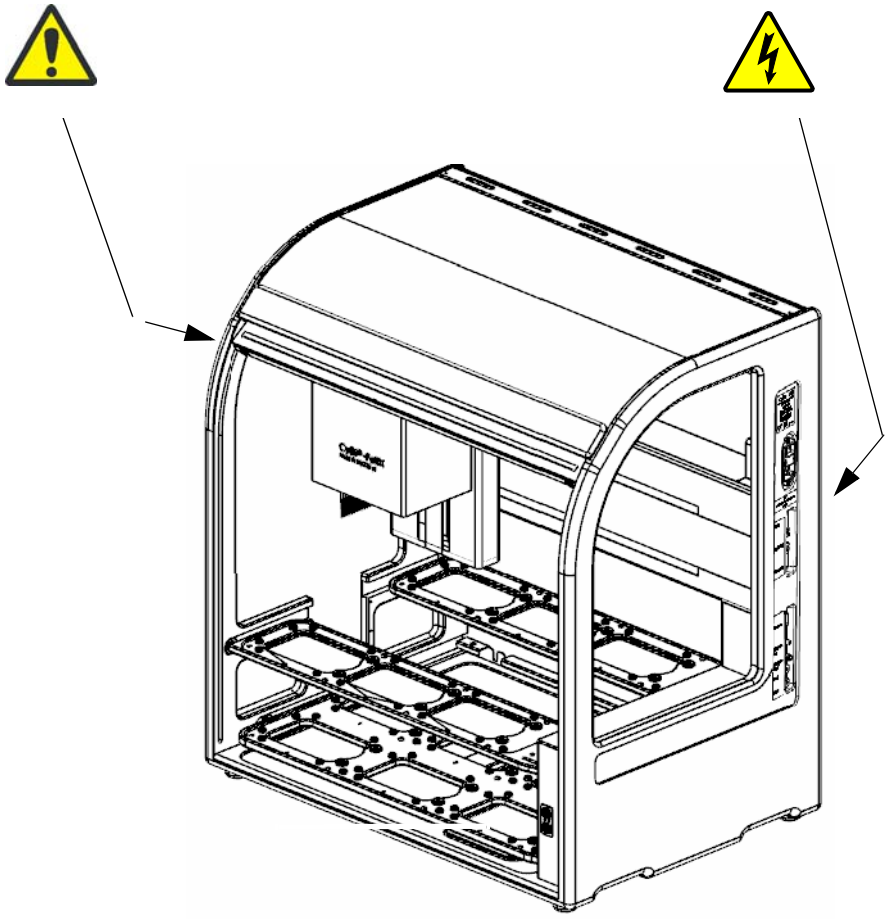


Fig. 2: Warning signs on the device

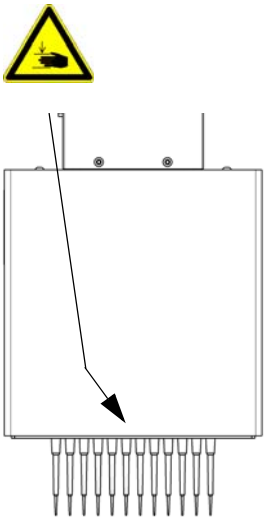


Fig. 3: Warning sign on pipetting head

3.4 Danger areas

The movements of assemblies can pose a risk to the operating personnel.

Failure to observe warning notes may result in pinching or crushing of one's hands. Any interference with the instrument during operation can cause material damage to the instrument and the specimens.

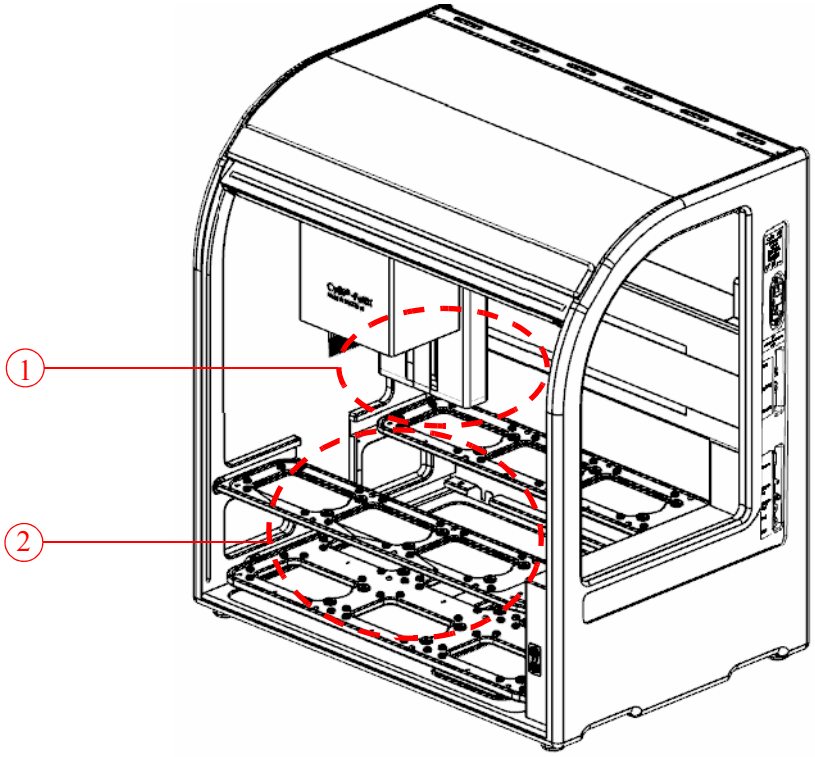


Fig. 4: Danger areas

1 Operating range of the pipetting head (motor-driven displacement in X and Z direction)
2 Deck movements (motor Y displacement)

Observe the following general instructions:

- Do not place your hands or fingers, including objects you are holding, into a mechanical motion path at any time during operation
- Faulty action or maloperation may cause material damage or physical injury. Always correct any incorrect movements with the aid of the software or switch off the device at the power switch before you intervene.
- A program stop is achieved by opening the louver[1].

1 Does not apply to the version without enclosure/louver (e.g. 30-5015-500-24).

3.5 Protective devices

The open external E-STOP* signals that a monitored room - outside the device - is accessible (e.g. the door of an enclosure is open).

3.6 Requirements On Personnel

Requirements that arise from a device-specific perspective:

- The system may not be started up, operated or maintained other than by duly trained expert personnel having received instructions on operational safety. Such training will also include familiarization with the contents of this Manual and manuals of related system components or additional equipment units as may be appropriate from case to case.
- The operation or servicing of the device by minors or individuals under the influence of alcohol, drugs or medication is not permitted.
- It must be ensured that only authorized personnel work at the system.
- You are prohibited from eating, drinking, smoking or using open fire at or near the system installation site!

Requirements that arise from a lab-specific perspective:

- Operating personnel must be aware of the potential dangers that emanate from substances being processed. If necessary, appropriate body protection equipment must be used.
- Before a break in operation or on completion of work, adequate measures should be taken for skin cleaning and skin protection.

3.7 Safety Requirements for Transportation & Installation

The system must be installed by service personnel of the manufacturer or duly trained and authorized expert personnel in all cases. Unauthorized assembly and installation is not permitted. Incorrect installation can create serious hazards.

Follow these general safety rules:

- Insufficiently secured components pose a risk of injury! When transporting the device components, secure them in accordance with the regulations of the respective means of transport and in accordance with the information in these operating instructions (→ *„Safety Notes" on page 39*).
- Only transport the device in its original packaging! Make sure that all shipping retainers are installed and system components are completely empty where necessary.
- When moving (lifting and carrying) the device in the laboratory, observe the guideline values and legally prescribed limits for lifting and carrying loads without aids and be sure to comply with them, to avoid damage to health.

3.8 Safety Notes for Operation

3.8.1 General

- Operating personnel are obliged to convince themselves of the proper technical condition of the system and its components, including any safety devices, before they can proceed to action for powering up. This applies in particular after each modification or extension of the system or its repair.
- Do not operate the device, unless all protective devices are in place, properly installed and fully functional.
- Protection and safety devices must not be removed, altered or defeated during normal operation.
- Ensure easy access to the main power switch, as well as emergency shutdown and locking points at any time during system operation.
- Take care that all ventilation devices of the system are in a properly functioning condition. Obstructed ventilation grids, air inlet/outlet slits, etc. may result in malfunction or system damage.
- Operating personnel are required to immediately notify the owner of any change identified in the system and likely or known to impact the level of safety

3.8.2 Explosion Protection, Fire Prevention

- The device must not be operated in an explosive environment or using explosive substances. Smoking or the use of open fire are forbidden inside of the operating room!
- Operating personnel must be duly informed about the locations and the proper handling of fire-extinguishing equipment in the operating room.

3.8.3 Electrics

- Working on electrical and electronic parts of the system and its components may only be carried out by a suitably qualified electrician according to latest binding electrical regulations.
- Never start up the device if cables are damaged (e.g. cuts in cabling, worn or chafed places)!
- Observe prescribed maintenance intervals (→ *„Maintenance Work" on page 76*).
- The main power plug includes a ground (PE) contact that may only be connected to a to a socket with ground contact.
  The grounding conductor may not be interrupted (e.g. through the use of a voltage regulating transformer). Do not use extension cables without a grounding conductor!
- Power cabling must be installed in a workmanlike manner!
- To detach this cable from the mains socket, always hold it by the plug. Do not contact or hold the line plug with wet hands!
- Under no circumstances may system shielding be removed. There is life-threatening danger due to electrical shock if shielding parts are removed!
- Do not insert objects into a system opening and make sure that no liquid can penetrate through openings or joints into the inner system space.
- The main fuse prevents danger of fire from electrical overload situations. Do not short-circuit the fuse and, when changing the mains fuse, use only a version in accordance with the specifications in these operating instructions (High Breaking Capacity Fuse).

3.8.4 Basic Maintenance & Care

- The device is always serviced by the manufacturer's service personnel or by specialist personnel authorized and trained by them.
- Unauthorized maintenance work may cause damage to the system.
  Therefore, the operator may basically only perform the listed activities
  (→ *„Maintenance & Care" on page 75*).

- Always turn system power off before you perform work for maintenance or cleaning of the system. Before doing so, disconnect the power plug from the mains socket.

3.8.5 Handling of Dangerous Substances

NOTE

When working on the device or on accessories it is recommended to wear personal protective equipment (PPE).

The exterior of the device and any control elements located on the exterior must not be touched with gloves which were used for working on the device interior and which may have been contaminated during this work!

The scope of the safety labeling (as a mandatory component of accident prevention measures) is shown in the chapter → *„Safety markings" on page 13*.

The operator of the device is the sole responsible for ensuring compliance with all safety requirements to protect individuals and property when handling radioactive, infectious, toxic, caustic, flammable and other hazardous substances.

For operating the device with hazardous substances, the operator is recommended to elaborate corresponding operating instructions. Safety instructions intended to prevent injury and material damage which may be caused by the examined substances are **not** part of this user manual.

3.8.6 Chemical Resistance

The manufacturer cannot be held liable if the operator of the device analyzes aggressive substances which may affect the durability of the components.

- Caution when handling bases, acids and organic solutions. These substances may negatively affect the useful life of the device.
- Only use substances compatible with the materials listed.

The following components have direct contact with the processed substances:

Table 6: Components

Component	Material
Pipette tips	PP
Piston seals[1]	PE-HD
Reagent cups	PMMA PTFE
Hoses	Silicone
Wash tubs	PEEK
Reservoir	PEEK Teflon Stainless steel
Waste boxes	Stainless steel Teflon
Tip magazines	Stainless steel Aluminum (anodized)

1 Aerosols may lead to indirect contact between the substances and the piston seals or the piston. The pistons are made of stainless steel, the piston seals are made of polyethylene (high density).

The components listed in the overview (Tabelle 6, “Components,” auf Seite 20), the Basic device CyBio FeliX (including the corresponding pipetting heads) and any accessories are **not** resistant to the following substances:

Table 7: Substances

Substances[1]
Hydrofluoric acid (HF)
Highly concentrated acids
Cleaning powder
Paint thinner
Naphtha (straight-run gasoline)
Gasoline
Acetone
Cleaning spray
Ozone
Oxidative solutions
Sodium hypochlorite
Halogens
Highly concentrated alkaline solutions

1 This table is not exhaustive.

The following table contains the permissible / possible methods and agents for disinfecting the device:

Table 8: Disinfection methods / disinfectants

Disinfection method	Disinfectant[1]	Comment
Spray disinfection	Not applicable	Impermissible disinfection method
Wipe disinfection	Incidin Liquid (Manufacturer: ECOLAB)[2]	Standard disinfection method for – Housing parts – Pipetting heads – Accessories
Immersion disinfection	3 % Korsolex basic solution (manufacturer: BODE Chemie)[2]	Consider the restricted scope of application

1 Depending on the application, it may be possible to use other disinfectants. Such agents must be generally conceived for this application, tested (if required) and must **not** be restricted (by any requirements in this manual).

2 Proof of suitability (including approval) carried out using tests.

Disinfection and chemical resistance

Approved for *wipe disinfection* (Tabelle 8, “Disinfection methods / disinfectants,” auf Seite 21):

- CyBio FeliXBasic units (OL5015-2X-1XX / OL5015-2X-5XX)
- CyBio FeliX Heads (OL3316-14-X5X)
- Cover magazine (transport protection; OL3316-11-200)
- BioShake 3000 series (QINSTRUMENTS-2016-0XXX)
- BioShake wiring
- Mounting Kit – BioShake 3000 series (OL3317-23-692)
- Adapter for BioShake 3000 series (848-2016-1XXX)
- Liquid handling adapter (OL3316-11-3XX / OL3317-11-3XX)
- Gripper (OL3317-11-800)
- ALPAQUA MAGNUM FLX Enhanced Universal Magnet Plate (OL3317-11-285)
- Waste box I (small) (844-00430-0)
- Tip transfer tool 96/250 µl DW; filter / 96/1000 µl (OL3396-352-25 / OL3396-25-354)
- TipRack 96/1000 µl (OL3317-11-140)
- 96-channel magazine (OL3810-13-024)
- Supports (OL3317-11-1XX)

NOTE

Any other disinfection method for the above mentioned devices and assemblies is not permissible because it may cause irreparable damage.

Approved for *immersion disinfection* (Tabelle 8, “Disinfection methods / disinfectants,” auf Seite 21):

- Waste box I (small) (844-00430-0)
- Tip transfer tool 96/250 µl DW; filter / 96/1000 µl (OL3396-352-25 / OL3396-25-354)
- TipRack 96/1000 µl (OL3317-11-140)
- 96-channel magazine (OL3810-13-024)
- Supports (OL3317-11-1XX)

TIP

If in doubt, consult Analytik Jena GmbH+Co. KG.

3.9 Rules of conduct in case of Emergency

In dangerous situations or in case of accidents, switch off the device immediately by pressing the main switch (on/off switch of the device) and/or pull the mains plug out of the mains socket!

Since prompt reaction can save lives in a situation of danger, make sure that the following requirements are met:

- The operating staff must be familiar with the location of safety equipment, accident and danger alarms as well as first aid and rescue equipment as well as their handling.
- The system owner is responsible to provide adequate training for operating personnel.
- All first-aid items (medical chest, eyewash bottles, stretchers, etc.) and fire-fighting equipment (fire extinguishers) must be kept within easy reach and readily available at all times. All equipment has to be in a sound condition and should be checked regularly.

4 Technical description

4.1 Set-up/components

4.1.1 CyBio FeliX - Overview

Version with enclosure/louver

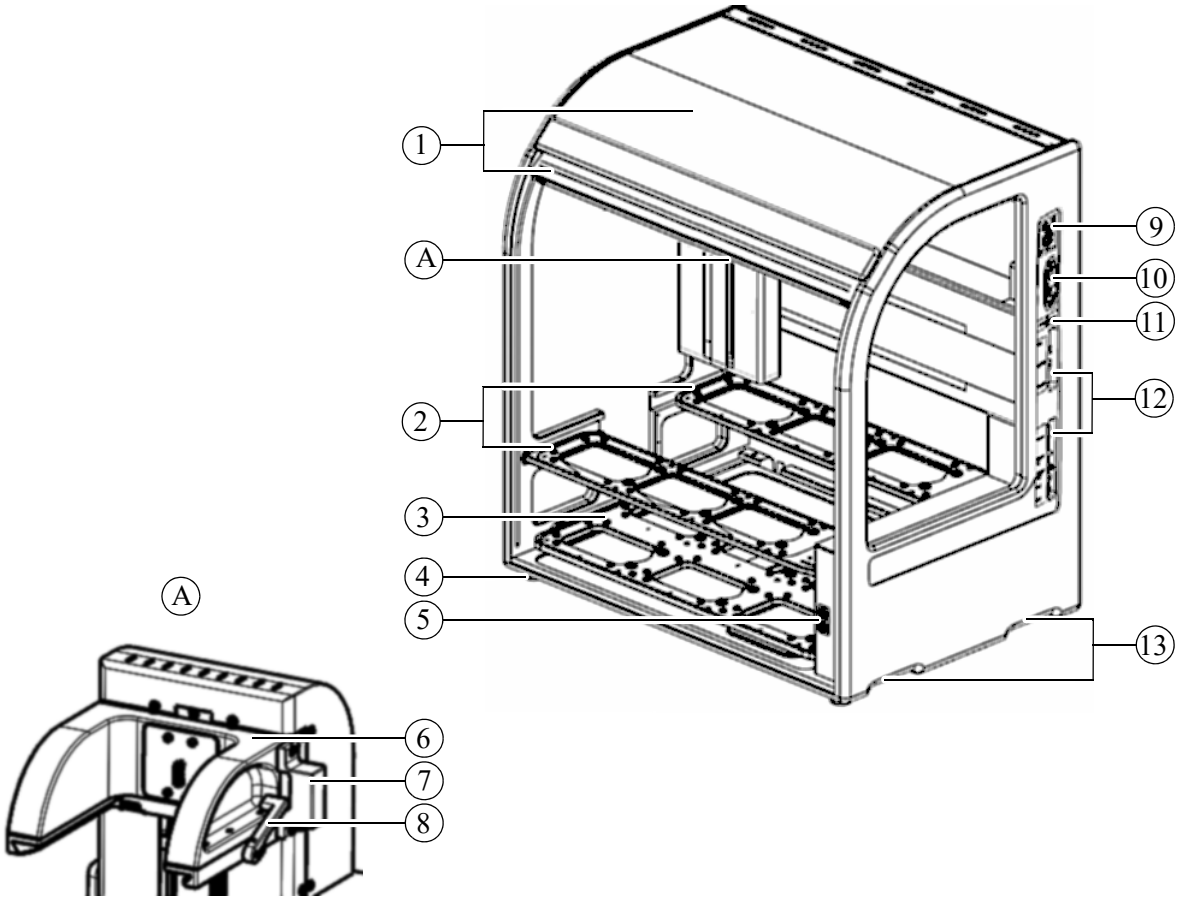


Fig. 5: Version with louver/enclosure[1]

1 Enclosure with louver → *„Enclosure and louver" on page 27*
2 Upper decks
3 Lower deck → *„Decks" on page 28*
4 Device feet
5 LED – operating status indicator and button → *„Operating status indicator" on page 31*
6 Head mount → *„Head mount" on page 33*
7 Bar code reader port* see Accessory instructions
8 Head locking lever *Pos. 3,→ see Fig. 14 on page 33*
9 Type plate → *„Type plate" on page 27*
10 Main switch → *„Switching on (operational readiness)" on page 47*
11 Connection value sticker → *„Overview operating data/conditions" on page 9*
12 Electrical connections → *„Connector panel" on page 35*
13 Recessed handles (2 per side) → *„Packing, transport and storage" on page 39*

1 Figure shows device with the model number: 30-5015-100-24.

Version without enclosure/louver

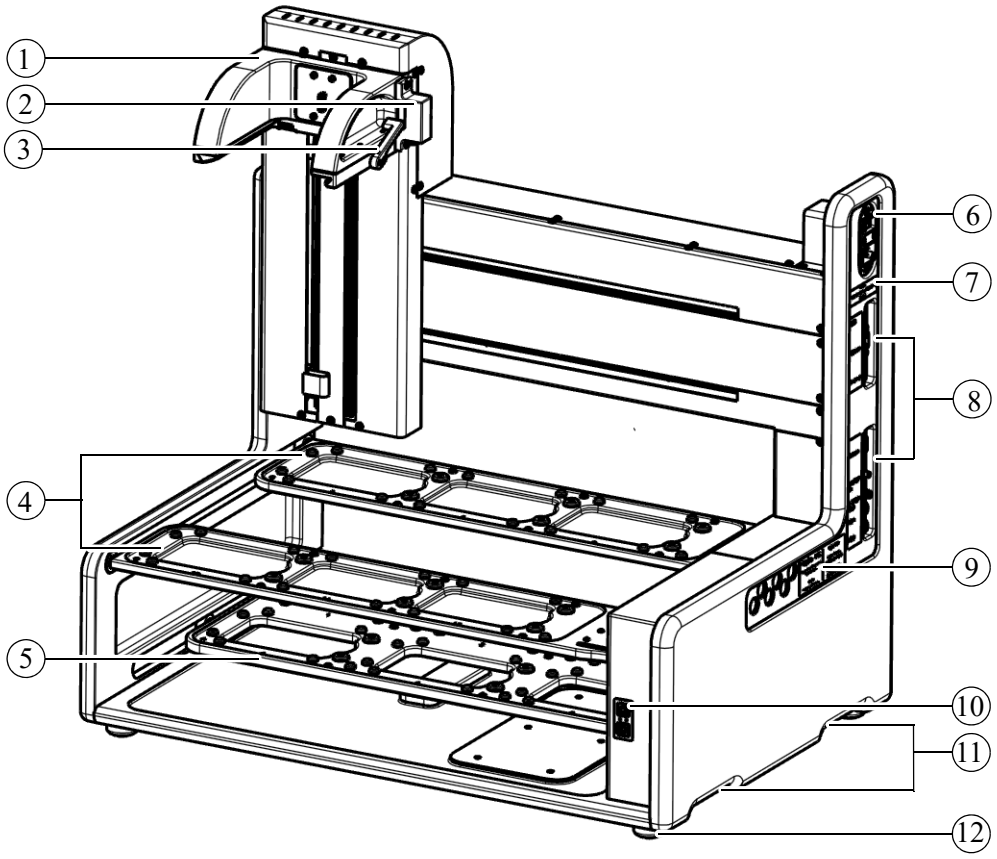


Fig. 6: Version without louver/enclosure[1]

1 Head mount
→ *„Head mount" on page 33*
2 Bar code reader port*
see Accessory instructions
3 Head locking lever
Pos. 3,→ see Fig. 14 on page 33
4 Upper decks
5 Lower deck
→ *„Decks" on page 28*
6 Main switch
→ *„Switching on (operational readiness)" on page 47*
7 Connection value label
→ *„Overview operating data/conditions" on page 9*
8 Electrical connections
→ *„Connector panel" on page 35*
9 Type plate
→ *„Type plate" on page 27*
10 LED – operating status indicator and button
→ *„Operating status indicator" on page 31*
11 Recessed handles (2 per side)
→ *„Packing, transport and storage" on page 39*
12 Device feet

Observe the basic requirements (→ *page 100*) to use this device version (partly completed machinery according to Directive 2006/42/EC on machinery) as a machine.

1 Figure shows device with the model number: 30-5015-500-24.

4.1.2 Type plate

Fig. 7: Type plate for the version with enclosure/louver

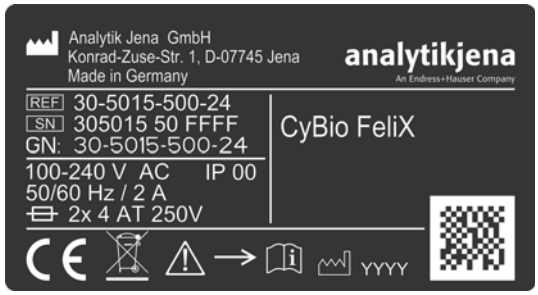


Fig. 8: Type plate for the version without enclosure/louver

Information on the type label:

- Manufacturer's information
- Product designations (type designation, trade name)
- Identification mark (model, serial number)
- Year of manufacture

4.1.3 Enclosure and louver[1]

The enclosure protects the user from a hazard (→ *„Danger areas" on page 16*) from moving assemblies as well as from samples, chemicals, etc.

Optional addition to the enclosure is a decontamination device (UV)*.

The louver is made of transparent Plexiglas to view processes and is an intrusion guard that protects the process taking place.

If the blind is opened, all movements are immediately interrupted.

After closing the louver, the originally intended movements (of the decks and the pipetting head) are continued.

The position of the blind is monitored and signalized by the operating status indicator

1 Only applies to the version with enclosure/louver.

(LED)
→ *„Operating status indicator" on page 31*.

4.1.4 Decks

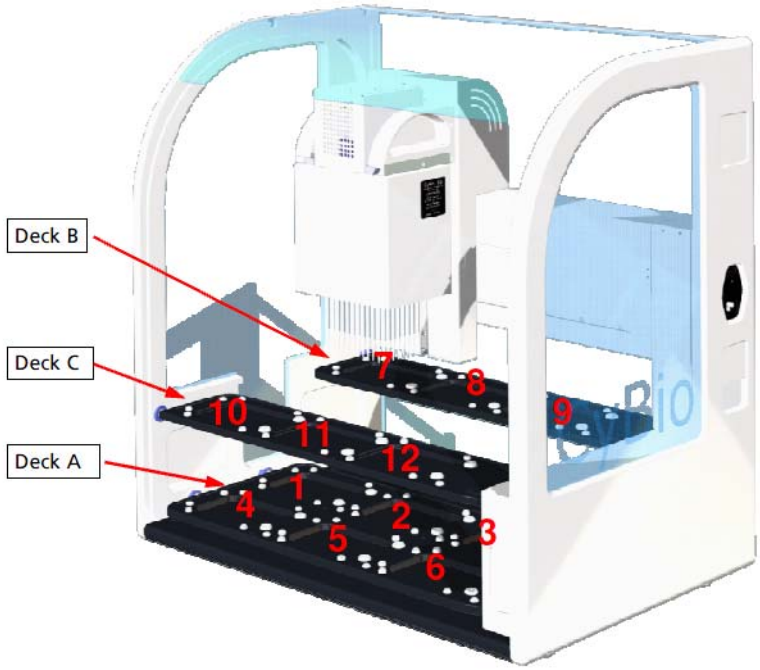


Fig. 9: Deck positions

Observe the following position assignment:

- Deck A (lower deck): Positions 1 – 6
- Deck B (upper, rear deck): Positions 7 – 9
- Deck C (upper, front deck): Positions 10 – 12

The decks are used to position microplates, reservoirs and accessories.

- Upper decks for microplates and reservoirs
- Lower deck for accessories and tips

Additional information: → *„Deck Configuration" on page 55*.

The upper level decks (decks B and C) of the CyBio FeliX are intended for receiving/dispensing of CyBio RoboTipTrays, for depositing the protective magazine as well as all types of micro plates and reservoirs in SBS format.

Marking of conforming use

Movements are always performed **without** force acting on the upper decks!

NOTE

Dangerous situation - potential consequences: Material damage!

On the rear upper deck (deck B → *see Fig. 9*), a height of 70 mm [→ *„Deck heights (device with 70 mm height - deck B/C)" on page 30*] above deck level "zero" must not be exceeded - risk of collision with moving Z axis.

In the case of receiving/dispensing with the action of force there is a danger of permanent deformation of the upper decks - for example if it is intended to pick up tips from tip boxes. Procedures of this kind are not permitted!

On the upper level decks (Decks B and C) the raster (spacing between the deck positions) is optimized for quick dispensing between micro plates (height[s] in acc. with SBS standard).

If it is intended to use accessories on the upper level decks that are adjacent higher than micro plates that are lying on “Zero” deck level, height observation is required because of the optimized raster.

NOTE

Dangerous situation - potential consequences: Material damage!

If no height observation/adjustment is performed, there is the danger of collisions of the pipetting head with the accessories on the neighboring deck positions!

Deck heights (device with 55 mm height - deck B/C)

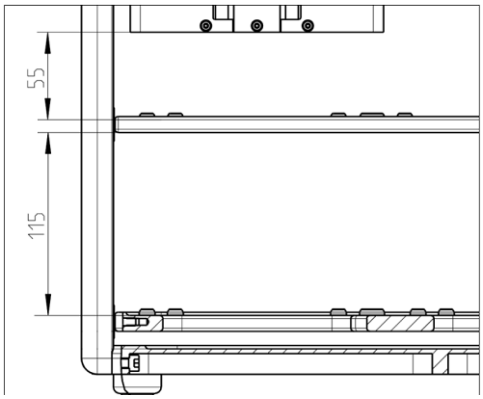


Fig. 10: Heights – deck A, B and C

Refer to the figure and the following table for detailed information:

Table 9: Compilation

Deck	Height	Description	Remarks[1]
A	115 mm	Height	
	110 mm	Usable height (accessory)	
B a. C	55 mm	Height	
	50 mm	Usable height (labware)	for all tip types (except 1000 µl)
	29 mm	Usable height (labware)	using 1000 µl Tips

1 Applies to SN 305015-10-0021 to 305015-10-0118

Deck heights (device with 70 mm height - deck B/C)

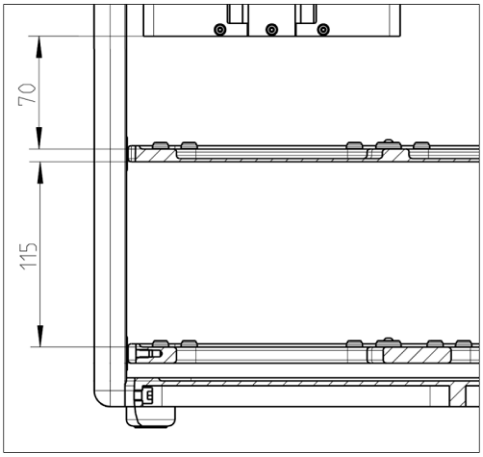


Fig. 11: Heights – deck A, B and C

Please refer to the figure and the following table for detailed information:

Table 10: Compilation

Deck	Height	Description	Remarks
A	115 mm	Height	
	110 mm	Usable height (accessory)	
B a. C	70 mm	Height	
	65 mm	Usable height (labware)	for all tip types (except 1000 µl)[1] for all tip types (incl. 1000 µl)[2]
	45 mm	Usable height (labware)	using 1000 µl Tips[1]

1 Applies to SN 305015-10-0121 to 305015-10-0140.

2 Applies as of SN 305015 10 1001.

4.1.5 Operating status indicator

LED – Operating status indicator/ Arrow keys ▽/△

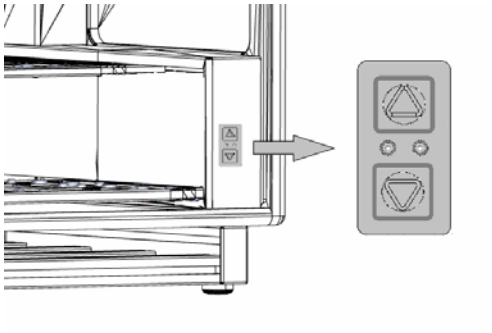


Fig. 12: LED – Operating status indicator/ Arrow keys

The operating status indicator is located on the front panel of the device. This provides the operator with information about the current status of the device and is visible from the outside when the louver is closed.

Table 11: Red/green LED

Indicator	Comment
GREEN[1]	The device is operational. It can be operated via the PC.
GREEN/FLASHING	Device is in operation and runs a procedure (specified by an external control).
RED	The device indicates that there is an error.
RED/FLASHING	Errors are signaled by red flashing codes → *„LED flashing – red" on page 73*.

1 Off: Lack of operational readiness is signaled.

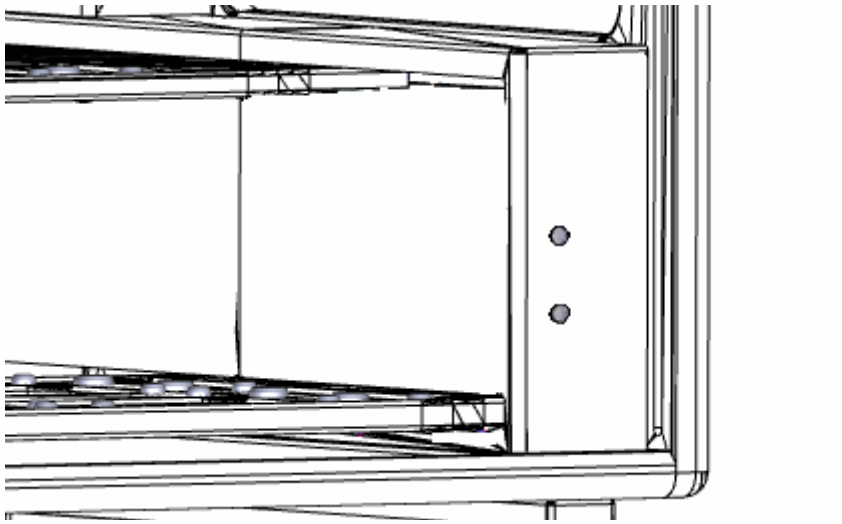
Table 12: Yellow LED

Display	Comment
YELLOW[1]	Louver open[2]

1 OFF: Safety device closed.

2 Does not apply to the version without enclosure/louver (e.g. 30-5015-500-24).

LED – operating status indicator/



button **Fig. 13: LED – Operating status indicator/button**

The operating status indicator is located on the front panel of the device. This provides the operator with information about the current status of the device and is visible from the outside when the louver is closed.

The upper LED is an operating status indicator - the lower LED has an additional button function for manual operation.

Table 13: Upper LED

Indicator	Comment
GREEN	The device is operational. It can be operated via the PC.
GREEN/FLASHING	→ *„Move the pipetting head in the Z direction" on page 53*
RED	The device indicates that there is an error → *„LED flashing – red" on page 73*.

Table 14: Lower LED button

Display	Comment
YELLOW	Note: Louver open[1] → *„Adjustment mode (LED button version)" on page 54*

1 Does not apply to the version without enclosure/louver (e.g. 30-5015-500-24).

4.1.6 Head mount

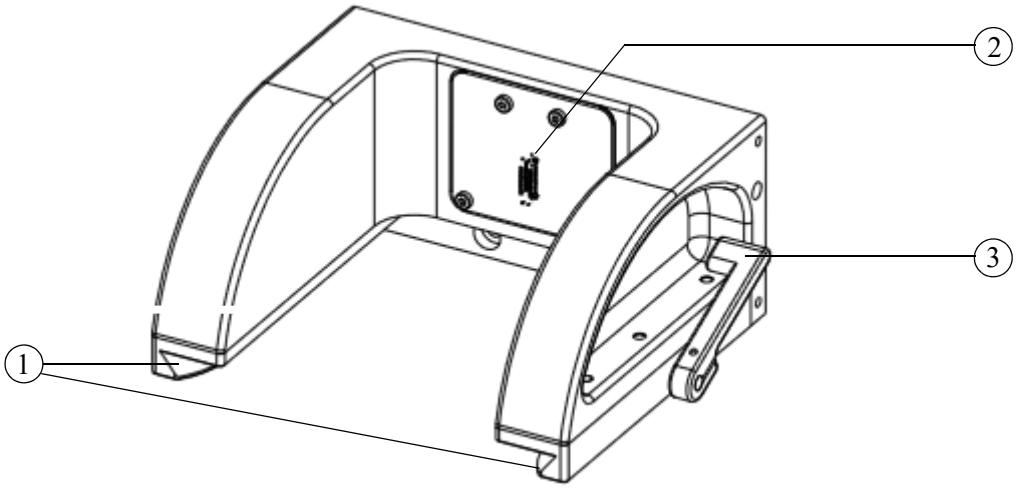


Fig. 14: Head mount

1 Dovetail guide
2 Electrical connection
3 Head locking lever

Note:
Swivel the head locking lever (*Pos. 3, → see Fig. 14*) forward if no pipetting head is attached (the pipetting head may only be pushed on in this position of the head locking lever; then swivel the head locking lever backward).

4.1.7 Pipetting heads (Pipetting heads)/versions*

The following pipetting head versions are provided for the device:

- CyBio FeliX pipetting head T
- CyBio FeliX pipetting head R
- CHOICE pipetting head

TIP

It is possible that - at the time of printing of these instructions - different pipetting head versions are not yet part of the sales offer.

CyBio FeliX head T — The pipetting head has a mounting mechanism for CyBio TipTrays (manual tip change).

CyBio FeliX head R — The pipetting head has a mounting mechanism for automatic mounting of CyBio RoboTip-Trays and liquid handling adapters.

CHOICE head — The pipetting head has a mounting mechanism for automatic mounting of CHOICE adapters.

Additional information on the design and mode of operation of the pipetting heads: see separate instructions.

4.1.8 Fan

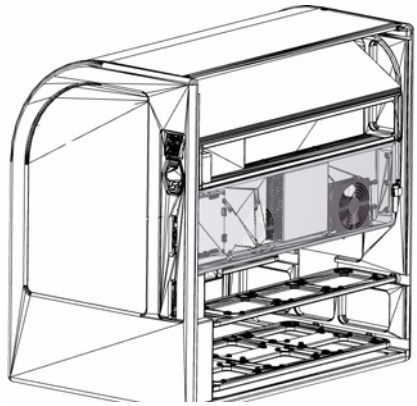


Fig. 15: Rear of the device (rear panel removed, fan marked)

The fans are located at the rear of the device.

NOTE

Only set up the device in such a way that air circulation is always ensured. Maintain a safety distance of at least 150 mm.

4.1.9 Connector panel

The connectors and interfaces are located at the side of the device.

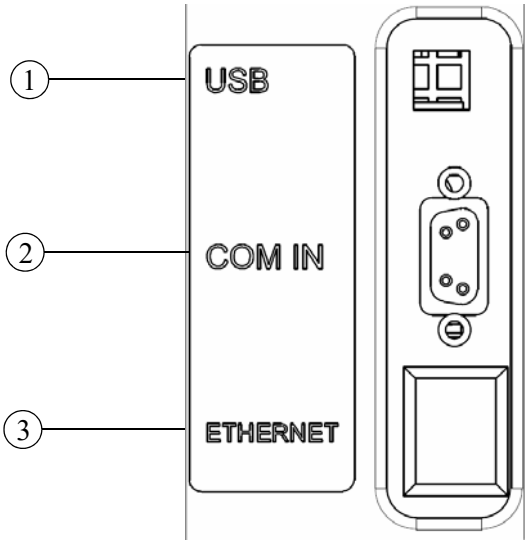


Fig. 16: Connectors

1 USB socket type B
2 Sub-D socket 9-pin (COM IN)
3 Network socket*

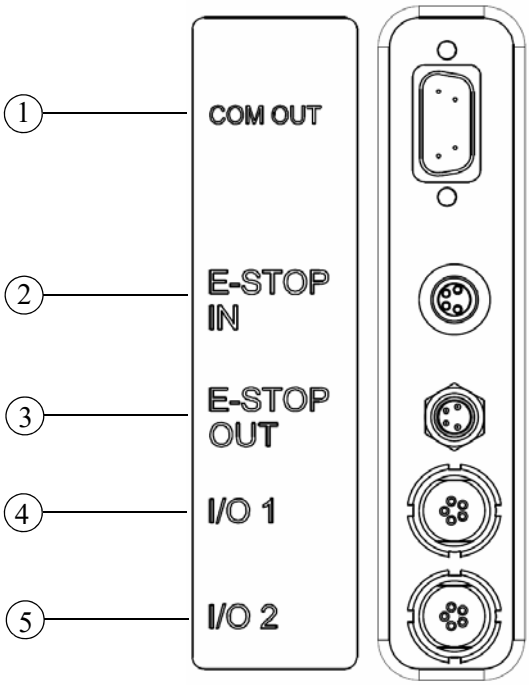


Fig. 17: Connectors

1 Sub-D plug 9-pin (COM OUT)
2 M8 4-pin plug (E-STOP IN)
3 M8 4-pin bushing (E-STOP OUT)
4 I/O 1
5 I/O 2

Table 15: Communication interfaces

→ *see Fig. 16 on page 35*[1]	Description
USB	USB communication interface (to HOST-PC)
COM IN	RS 232 communication interface (to HOST-PC)
ETHERNET	Network connection

1 Communication interfaces

TIP

Consult the manufacturer regarding dedicated interfaces (→ *see Fig. 17*).

Table 16: Dedicated interfaces

→ *see Fig. 17 on page 35*[1]	Description
COM OUT	Forwarding interface to another device
E-STOP IN	Connection for an opening switching element (STOP function)
E-STOP OUT	Forwarding socket to a second device
I/O 1	Signal interface for accessories
I/O 2	(Additional) signal interface for accessories

1 Dedicated interface

4.2 Working mode

The pipettor operates according to the air displacement principle. The pipette tips and internal seals form air spaces. In it move the pistons, which are mechanically connected to a common drive.

TIP

The piston movement creates a negative or positive pressure, which causes the suction and discharge of liquids. The respective process is completed when the pressure is equalized. The time required to reach this state depends - among other factors - on the properties of the liquid.

4.3 Operating Modes

The following operating modes are possible:

- PC control (automatic)
  → *„Software-controlled operation" on page 56*
- Manual mode
  (control of the Z axis by means of a button)
  → *„Move the pipetting head in the Z direction" on page 53*

5 Packing, transport and storage

5.1 Safety Notes

CAUTION

Risk of injury or damage to property!

Always reach under the frame. Make sure that the transport locks are in place.

NOTE

Environmental influences, mechanical shocks or formation of condensed water may destroy individual system components!

Adequate precautions should be taken to protect all components from environmental impacts, mechanical shock or formation of condensed water during transportation or shipment!
Temporary open-air storage of the system is prohibited!

NOTE

Improper packaging is likely to cause damage to the system!

Use only original packaging for transportation and shipment of the device and its accessories.

TIP

Please notify the manufacturer's service department if there are any doubts regarding the packaging and transport of the device.

5.2 Packaging

5.2.1 Attach transport locks

1. Check that the head mount is in the center.
2. Check that the lower deck is pushed to the rearmost position and the upper decks are fully apart.
3. Insert transport lock of the decks.

4. Insert the transport lock of the head mount.

5. Close louver[1].

1 Does not apply to the version without enclosure/louver (e.g. 30-5015-500-24).

✓ The transport locks provided are fastened.

5.2.2 Packing the device

CyBio FeliX transport box:

- Plywood box with upholstered panels (approx. 1000 x 740 x 800 mm)
- Upholstery strips
- Bag with matching screws and washers

1. Place the device on the bottom of the packaging.
2. Pay attention to the recess provided for the handle bar.
3. Cover the device with protective film.
4. Place the upper fittings.

5. Stow accessories safely - cushion free spaces.

6. Close box and provide with warning stickers and shock indicators.

✓ The device is packed.

5.2.3 Storage

If the CyBio FeliX is not installed immediately after arrival of product shipment or is not required for a longer period of time, it should preferentially be stored in its original packing case.

The following requirements are placed on the climatic conditions in the storage room of the device:

- Temperature range:-10 °C to +50 °C
- Allowable relative air humidity: ≤ 85 % at 30 °C, no condensate formation

6 Start-up

6.1 Site requirements

6.1.1 Installation Requirements

The following requirements are placed on the climatic conditions in the operating room of the device:

- Temperature range: +15 °C to 35 °C
- Allowable relative air humidity: +45 to 75 % at 35 °C, no condensate formation

The atmosphere inside the operating room should be dust-free to a maximum possible degree, free from drafts and free from etching vapors. You are prohibited from smoking in dthe operating room.

For pipettor site selection, the following rules should be observed:

- The operating room floor must be stable, horizontal, dry and vibration-free.
- Do **not** install the device in the direct vicinity of doors, windows or heat sources nor near sources of electromagnetic interference.
- Prevent direct exposure to sunlight and radiation emitted by heaters. Provide air conditioning for the room if necessary.
- Always ensure free accessibility to the device and do not under any circumstances obstruct ventilation slots with other devices or furnishings.
- Allow the device to acclimatize sufficiently at the installation site - especially when the storage and installation locations are different.
- When choosing the location of the device, make sure in any case that the on/off switch[1] is **easily** accessible at all times.

NOTE

Non-observance of the installation conditions/regulations impairs the correct operation of the device and negatively affects the precision.

6.1.2 Spatial Requirements

The required space depends on the device dimensions.
Sufficient space should also be provided for a PC, monitor and optional accessories (e.g. pumps).

NOTE

Only set up the device in such a way that air circulation is always ensured. Maintain a safety distance of at least 150 mm.

1 Power plug included.

6.1.3 Power Supply

WARNING

If the grounding conductors are interrupted, there is risk of fatal injury due to electric shock!

Never connect the mains plug of the device to a mains socket without a protective earth contact! Make sure that the protection effect is not rendered ineffective by extension cables without a PE contact or by the use of a voltage regulating transformer.

CAUTION

Operation at a mains voltage level or frequency other than specified on the label may result in destruction of the device.

Make sure that power supply specifications in the operating room comply with label details! In case of deviating data, the device must not be put into operation.

The device operates on single-phase alternating current. The device has a wide-range power supply and operates with the voltages AC 100 - 240 V at a frequency of 50/60 Hz.
Make absolutely certain that label specifications are actually met and power is supplied with values as indicated on the label.

6.2 Initial start-up and configuration

Due to the complexity of the device and in order to ensure proper functioning, the installation, initial start-up and configuration in your house will be carried out entirely by the manufacturer's customer service or by specialized personnel authorized by them.

Initial start-up essentially includes:

- Installation and adjustment of the device components
- Providing cable connections and connecting power supply cables
- Software installation (factory-performed) and configuration
- Briefing and on-the-job training

Check - as part of the initial start-up - that the on/off switch or power plug are **easily** accessible at all times.

WARNING

On/off switches (or power plugs) that are not easily accessible hinder the immediate shutdown of the device in dangerous situations.

6.3 Function Tests

TIP

After production, the tests described in this chapter are carried out under standardized conditions (measuring room).
The logs* are part of the scope of delivery.

6.3.1 Precision test

Testing for variation coefficient (variation coefficient percentage standard deviation) is performed, using a dye solution in a 96 well or 384 well microplate with flat transparent bottom.

A suitable vertical photometer is used for measuring. The photometer's own precision must be verified and documented according to manufacturer instructions prior to measurement.

TIP

The pipetting head-specific parameters (and further instructions for carrying out the measurement) are contained in the separate instructions.

6.3.2 Accuracy Test

Accuracy defines the degree to which a measured dispensed volume (mean value of all readings measured for a 96 well or a 384 well microplate) is in agreement with a pre-defined (target) volume.

TIP

The pipetting head-specific parameters (and further instructions for carrying out the measurement) are contained in the separate instructions.

6.3.3 Leak Test

Leak testing is required, in order to make sure that the pipettor head is free from points of leakage.

The test is performed by aspirating a specified volume of dye solution into the pipette tips and observing the liquid level over a period of 30 minutes.

TIP

The pipetting head-specific parameters (and further instructions for carrying out the measurement) are contained in the separate instructions.

7 Operation

7.1 Switching on (operational readiness)

1. Check that power cord is correctly connected to the line power supply point .
2. Check if the louver[1] is closed.
3. Switch the power switch (on the right device side) to position "I" (→ *see Fig. 18*).
4. Observe operating status indicator (LED):

- Red (flashing/on continuously): An internal error is signaled (Error analysis → *„LED flashing – red" on page 73*).
- Green (on continuously): Completion of initialization - display of readiness for operation.

5. Make sure that the PC is correctly connected to the device, switched on and the control software is called up.

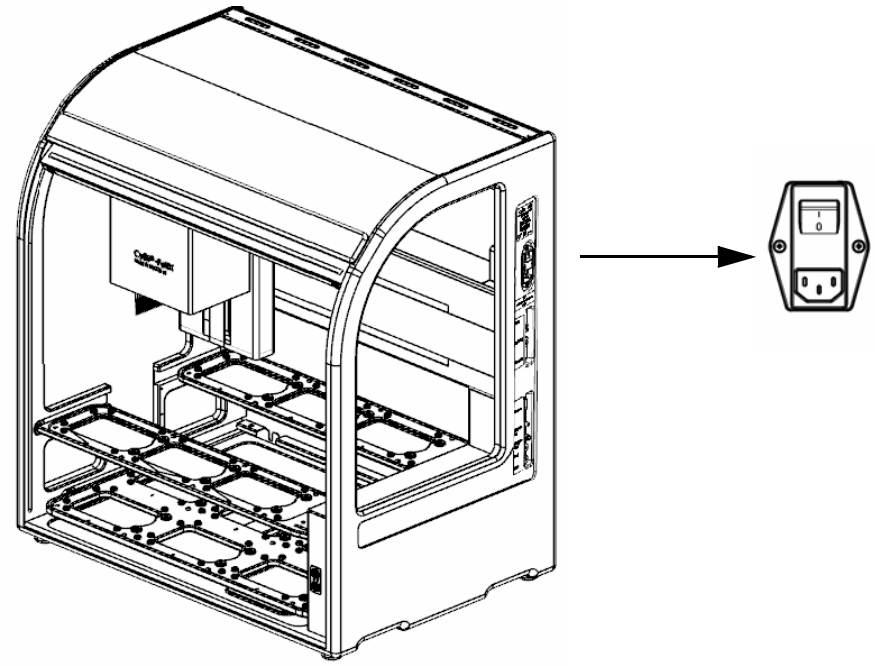


Fig. 18: Power switch

✓ The unit is ready for operation (insert head if necessary) and it can be operated by means of computer control.

1 Does not apply to the version without enclosure/louver (e.g. 30-5015-500-24).

7.2 Establish operation after abort (e.g. due to power failure)

After an unforeseen failure

- e.g. after a power failure, or
- after an abort (by switching off or interruption of the PC link),

you can put the pipettor back into operational readiness.

First make sure that a safe start-up is possible, and then perform the following steps:

Move the pipetting head out of the danger zone	Move the pipetting head in the Z-direction (by means of PC control or manually → *„Move the pipetting head in the Z direction" on page 53*) and/or move the pipetting head in the X direction (manually).
Remove labware	Remove the labware as required.
Remove residue liquid from tips	Switch off the device and switch it on again after a short pause, if necessary restore the operational readiness of the PC and start an empty CyBio Composer method. (The device initializes. Follow the instructions on the screen - to dispense any residual liquid in the tips).
Discard tips	Release CyBio TipTray (pipetting head T) as follows: → *page 62* Release CyBio RoboTipTray (pipetting head R) as follows: → *page 63* Release the tips of a liquid handling adapter (pipetting head R and CHOICE head) as follows: → *page 63*
Set down the liquid handling adapter (LH adapter)	Place holder for the LH adapter on the deck. Set down LH adapter by means of PC control: → *page 66*

TIP

If the pipette tips are pulled off the cones by hand, it is still necessary to perform the re-commissioning routine.

The given action steps are only recommendations and depend on the particular situation.

7.3 Changing the pipetting head

CAUTION

Dangerous situation!

Risk of crushing as the louver[1] is opened and closed.

1 Does not apply to the version without enclosure/louver (e.g. 30-5015-500-24).

CAUTION

Dangerous situation!

Risk of crushing - the pipetting head has a mass of approx. 6 - 7 kg.
Always hold the pipetting head with both hands.

- The pipetting head can be inserted / replaced while the device is switched on or off.
- Ensure sufficient acclimatization (same temperature at the place of installation of head and device).
- The seating of the head (X axis) should be in central position (can be moved manually).
- The seating of the head (Z axis) should not be in its topmost position. We recommend an offset of - 30 mm starting from the top vertical position for replacing the head.

NOTE

Make sure that the cover magazine (transport protection; OL3316-11-200) was attached before removing the pipetting head because the head must only be put down when resting on this protective cover.

This is essential for preventing damage to the device!

7.3.1 Insert the pipetting head

1. Make sure that the head mount is in the center of the unit and not in the uppermost vertical position.
2. Swivel the clamping lever forward.

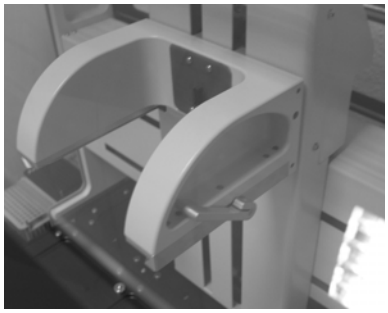


Fig. 19: Head mount (clamping lever swiveled forward)

3. Insert the pipetting head.

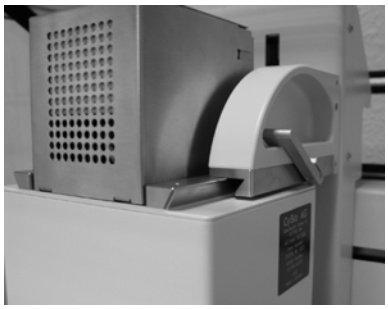


Fig. 20: Push on the pipetting head

4. Secure the pipetting head, i.e. swivel the clamping lever back.

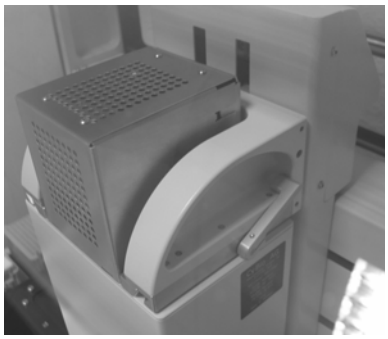


Fig. 21: Pipetting head ready for operation

5. Check the fastening and close the louver[1].
6. Remove transport lock → *„Attach/remove transport lock" on page 58*.

1 Does not apply to the version without enclosure/louver (e.g. 30-5015-500-24).

7.3.2 Removing the pipetting head

X- and Z-axis should be in head change position
→ *„Changing the pipetting head" on page 49*.

1. Insert transport lock
→ *„Turning off" on page 68*.
2. Open louver[1].
3. Swivel the clamping lever forward.

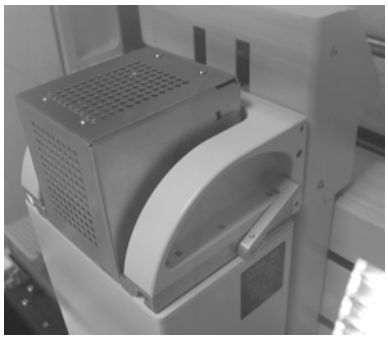


Fig. 22: Pipetting head (fastened)

4. Remove the pipetting head.

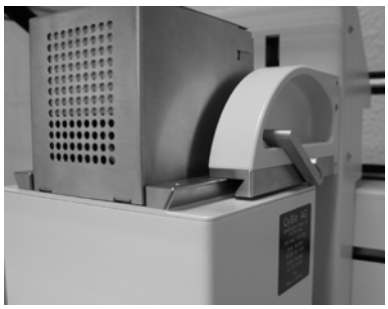


Fig. 23: Take off the pipetting head

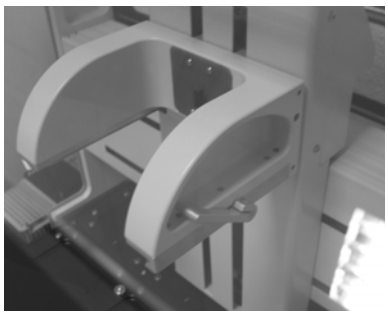


Fig. 24: Head retainer (clamping lever swiveled forward)

5. Close the louver[2] or insert another pipetting head if required.

1 Does not apply to the version without enclosure/louver (e.g. 30-5015-500-24).
2 Does not apply to the version without enclosure/louver (e.g. 30-5015-500-24).

7.4 Manual operation

CAUTION

Risk of crushing!

Potential consequences: Mild or minor injuries.

7.4.1 Axes of motion

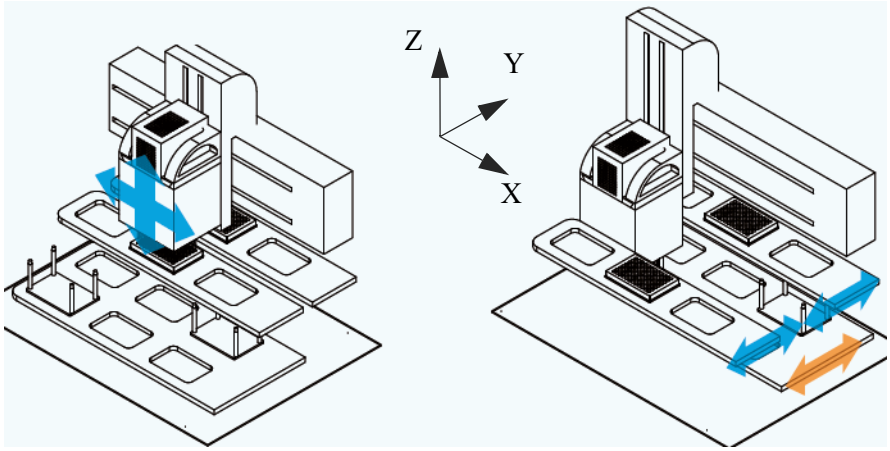


Fig. 25: Axes of motion

Pipetting head/decks - direction of movement

- Pipetting head: X and/or Z direction
- Decks: Y direction

The following manual/electric adjustment options are available:

Table 17: Manual and electric adjustment options

Direction	Pipetting head	Decks
X	manual/electric	–
Y	–	manual/electric
Z	electric	–

When moving manually, pay attention to the following:

- Movement is possible in off and on state
- Movement only with a moderate application of force
- Proceed with caution

The electric displacement is possible by executing the control commands of the computer (or by using the corresponding buttons*/controls*).

7.4.2 Move the pipetting head in the Z direction

Move pipetting head (arrow key version △/▽)

CAUTION

Dangerous situation!

Movements are executed slowly.
Nevertheless, do not reach into the device when drives are being moved.

Only possible if the louver[1] is closed.

The function is used to move the pipetting head in the Z direction so that it can be removed or changed.

1. Louver closed.
2. Press  or  (> 3 sec. – **LED (green) flashes fast**).
3. **Release** the button

TIP

When the operating status indicator flashes green the "Move the pipetting head in Z direction"mode is activated.

4. Press  or  and **hold** – observe the pipetting head (is moved).

Pipetting head is moving:

- to the top vertical position
- down to the end position

Stop pipetting head

1. Release  or  .

To reactivate, the typing sequence must be repeated.

1 Does not apply to the version without enclosure/louver (e.g. 30-5015-500-24).

Moving the pipetting head (LED button version)

CAUTION

Dangerous situation!

Movements are executed slowly. Nevertheless, do not reach into the device when drives are being moved.

Only possible when the louver[1] and/or the external E-STOP* are open.

The function is used to move the Z axis in order to be able to move the pipetting head upwards so that it can be removed or changed.

1. Check if LED (YELLOW) is permanently on → *see Fig. 13 on page 32*.
2. Press LED (YELLOW) (> 3 sec. – **yellow/off**).
3. Release LED (YELLOW).
   The "Move pipetting head in Z direction" mode is activated when the **LED (YELLOW) lights up and the operating status display flashes green.**
4. Press and **hold** the LED (YELLOW) - observe the pipetting head (is moved).

The pipetting head moves to the top vertical position and then to the end position.

Stop pipetting head

1. Release LED (YELLOW).

To reactivate, the typing sequence must be repeated.

The open external E-STOP* signals that a monitored room - outside the device - is accessible (e.g. the door of an enclosure is open).

Adjustment mode (LED button version)

Only possible when the louver[2] and/or the external E-STOP* are open.

The Adjustment mode function is intended for software-controlled safe operation with the louvers open, e.g., to better view the processes when determining pipetting heights in a microplate or determining an offset starting from a specific position.

1. Check that the lower LED/button (YELLOW) lights up.
2. Briefly press the LED/button (YELLOW) once (< 3 sec. - **yellow/fast flashing**).
3. Within 2 sec. keep LED/button (YELLOW) pressed for 3 sec. - (yellow off) and then release it.
   The "Adjustment mode" is activated when the LED (YELLOW) **flashes slowly**.

With the next PC command, the movements take place at a reduced speed for the Adjustment mode.

Deactivate Adjustment mode

1. Press LED (YELLOW) (or close the louver) - (yellow off).

To reactivate, the typing sequence must be repeated.

1 Does not apply to the version without enclosure/louver (e.g. 30-5015-500-24).

2 Does not apply to the version without enclosure/louver (e.g. 30-5015-500-24).

7.5 Deck Configuration

The pipettor CyBio FeliX has 3 decks (A, B and C) arranged in 2 levels (→ *„Axes of motion" on page 52*).

Deck A (below) is designed to provide accessories such as tips and tip wash station. The maximum labware height on this deck is 110 mm.

Deck B (top, rear) and Deck C (top, front) are designed for microplates and reservoirs whose max. height does not exceed 65 mm.

CyBio-TipBoxes may only be used on deck A.

When working column by column, positions 1, 2, 4 or 5 are recommended for positioning the tips and waste containers.

Microplates and reservoirs can be positioned on deck B and C. A total of 10 positions are available for column-by-column work.

For working row by row, the tips should be positioned at positions 1, 2 or 3.

Deck B is available for microplates and reservoirs. Working by row or by line is possible on a total of 6 positions. Single-channel working is only possible on 5 positions. Deck A (bottom) position 1 and 2 for tips and tip waste rack if necessary and deck B for microplates, reservoirs and tube holders.

Position 6 is provided for the tip washing station.

The remaining positions on deck A are available for holders to place and hold CyBio RoboTipTrays and liquid handling adapters/CHOICE adapters.

In exceptional cases, a liquid handling adapter or a CyBio RoboTipTray can also be positioned on deck C if there is no labware of the same height (reservoir or other holder) directly next to it - also applies to adjacent positions on deck B.

7.6 Software-controlled operation

The CyBio FeliX is controlled by a software (CyBio Composer), which allows the simple and fast compilation of specific laboratory routines
(Explanations - see the following table, the following sections or the Help menu of the software).

7.6.1 General commands (overview)

Sym-bol	Function	Explanation
	Ansaugen Aspirate	▪ A volume is aspirated. The aspiration volume indicates how much liquid is to be aspirated during the cycle. The permissible volume range depends on the head type and tips used ▪ Optional overstroke volume is possible
	Ausstoßen Dispense	▪ The volume is discharged normally or with residual discharge/blow-out.
	Kolben in Nullposition Piston to zero position	▪ Pistons are moved to their zero position
	Spülen/Mischen Rinse/Mix	▪ Rinsing the pipette tips or mixing a volume
	Pipettiergeschwindigkeit Pipetting speed	▪ Setting the pipetting speed
	Überwachung Supervision	▪ Volume cycle monitoring
	Deckposition anfahren Move to deck position	▪ X and Y axis movement with respect to the specified deck position ▪ Reference point of the Z axis corresponds to absolute zero[1] ▪ (Switch reference point between absolute zero and deck position reference*)[2]
	Labware anfahren Move to labware	▪ X, Y and Z axis movement in relation to the labware ▪ The reference point of the Z axis is the bottom or top of the well of the respective plate
	Vertikalantrieb Vertical drive	▪ Movement of the pipetting head in the Z direction

Sym-bol	Function	Explanation
		▪
	Anbringen Load	▪ CyBio TipTrays are mounted by electric motor (manual change) ▪ Automatic pick-up of CyBio RoboTipTrays and liquid handling adapters at selected position ▪ Picking up tips from tip container
	Entfernen Unload	▪ CyBio TipTrays are released by electric motor (manual change) ▪ Automatic deposit of CyBio RoboTipTrays and liquid handling adapters at selected position ▪ Dropping tips into waste containers
	Werkzeuginformation setzen Set tool info	▪ Selection of the components attached to the pipetting head or selection of the tip type (in combination with liquid handling adapter).
	Antriebsgeschwindigkeit Drive speed	▪ Setting the drive speeds and accelerations of the respective drive in X, Y, and Z direction
	Licht ein-/ausschalten Turn lights on/off	▪ Turns the lights* on/off[3]
	Volumenkorrektur Volume correction	▪ Volume correction curve (user-specific)[4]

1 Up to CyBio Composer software version 2.54.
2 As of CyBio Composer software version 2.55.
3 As of CyBio Composer software version 2.52.
4 As of CyBio Composer software version 2.57.

7.6.2 Attach/remove transport lock

Pipetting head R

After inserting the pipetting head, the transport lock must be removed to make it ready for operation.
Proceed as follows with the help of the software:

1. Check that the device and PC are switched on.
2. Check whether the pipetting head is inserted correctly.
3. Select the "Unload" command.
4. Set a position on deck A and adjust the support.

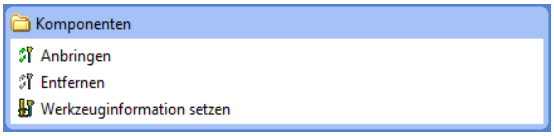


Fig. 26: Commands

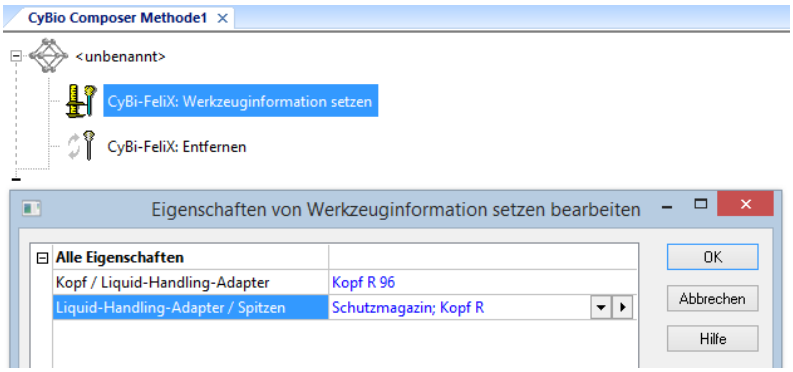


Fig. 27: Settings (Set tool information)

5. Move Z axis upwards ("Vertical drive" command).
6. Start method and remove transport lock after depositing.

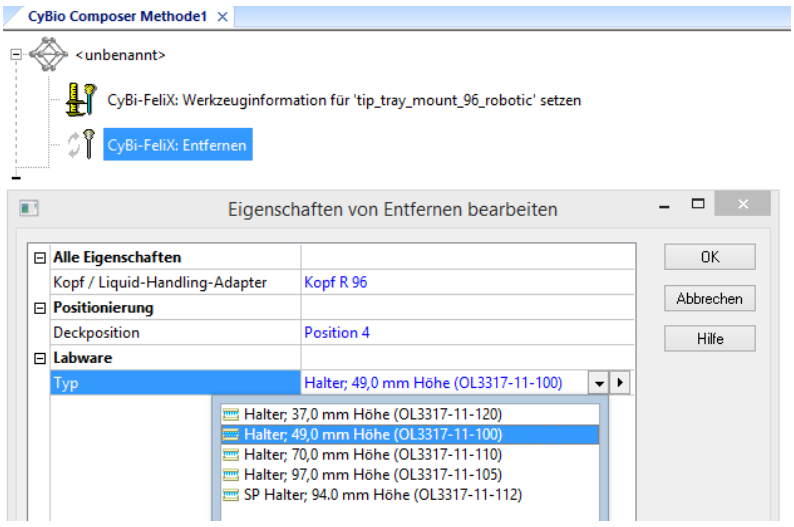


Fig. 28: Settings for depositing

7.6.3 Preparation of head change / switch off

NOTE

Dangerous situation!

Insert the transport lock before changing the pipetting head to prevent material damage.

Perform the following steps:

1. Select the "Load" command.

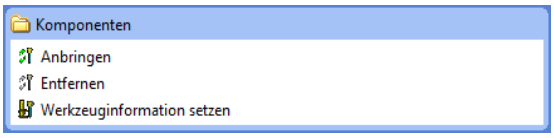


Fig. 29: Component window

2. Perform the following configuration:

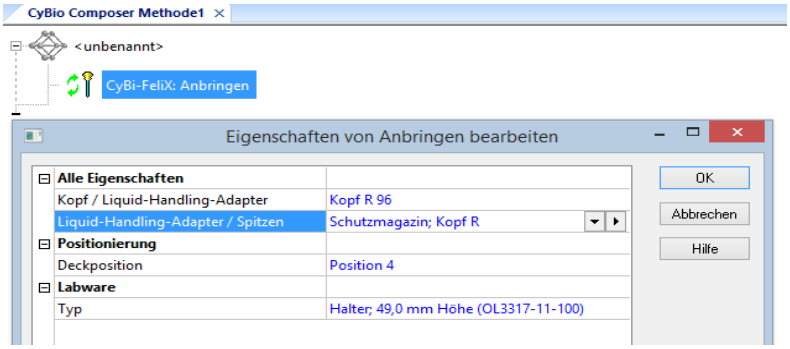


Fig. 30: Attach transport lock

7.6.4 Movements in X, Y and Z directions

With software-based control, the pipette tips are positioned directly above a plate/reservoir using the "Move to deck position" command.

The Z axis is in the uppermost position.

Select the reference point for the Z axis as follows:[1]

- Topmost vertical position
- Deck position or
- Plate adapter position

The "Move to labware" command also positions the Z axis to the labware. With the command "Vertical drive" only the Z axis can be positioned at a certain height.

Move to deck position

- Select position as reference point of X and Y axis
- Z axis: top vertical position
- Offset adjustable for all axes

Fig. 31: Window: Positioning

Move to labware

- Select position as reference point of X, Y and Z axis
- Z axis:
  Reference point Well bottom or Well top
- Offset adjustable for all axes

Vertical drive

The following reference points are possible:

Top vertical position

Move downwards starting from the absolute zero point of the Z axis - only negative values are possible.

Current position

Move up/down starting from current Z axis position - it is possible to enter negative and positive values.

Well bottom/Well top[2]

Starting from the bottom of the well (or the top edge of the well), move the last labware approached upwards/downwards. The input of negative/positive values is possible.

1 As of CyBio Composer software version 2.55.

2 As of CyBio Composer software version 2.55.

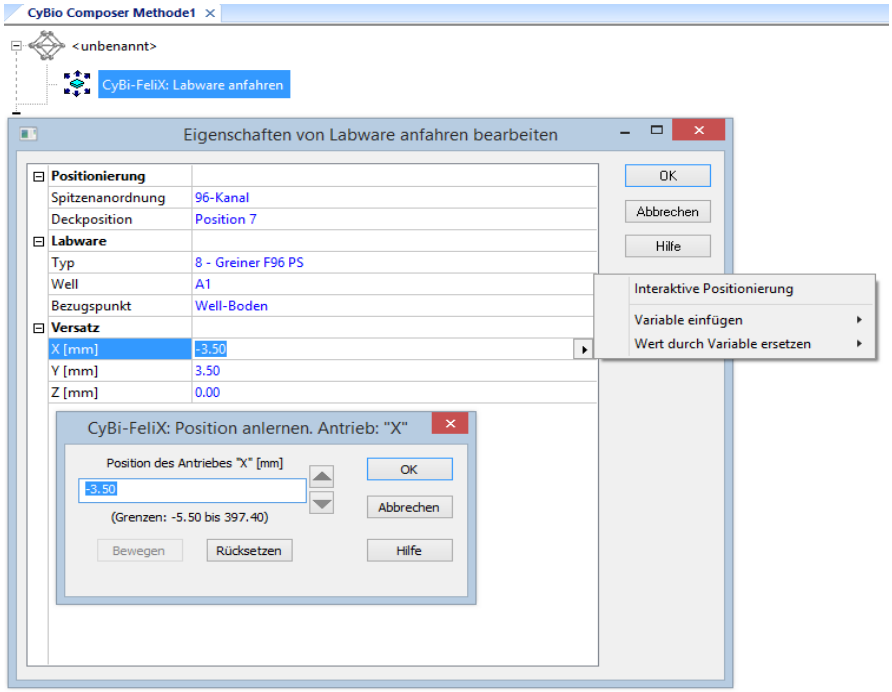


Fig. 32: Interactive positioning for setting an offset

The "Offset" parameter can be used to address positions that are not in the center of the well (e.g., liquid delivery at the edge or use of asymmetric plates such as addressing the reservoir of a protein crystallization plate). The center of the well is equal to the "0" of the coordinate system.

For the movement to the left, a negative value results for X, e.g. -3.5 mm. For the backward movement Y becomes positive, e.g. 3.5 mm. When these coordinates are entered, the pipette tips are positioned at the upper left edge. Depending on the plate type (number of wells, well geometry), these values may vary and must be adjusted individually.

Clicking the arrow on the right in the input line opens a menu window → *see Fig. 32* and select Interactive Positioning. Values can be set using the arrow keys. If the desired value is reached, the position can be approached by means of the "Move" button. The "Ok" button accepts the value - "Cancel" keeps the initial value.

7.6.5 Tip pick-up/change - pipetting head T

With the **pipetting head T**, tip change is performed exclusively **manually**, but the software is required to loosen and tighten the tips or the transport lock - this is done with the "Load" and "Unload" commands.

Only the corresponding CyBio TipTrays are used
(see chapter "Accessories" in the pipetting head instructions).

Perform the following steps:

1. Select the "Load"/"Unload" command.
2. Set appropriate parameters (head type, tips, etc.).

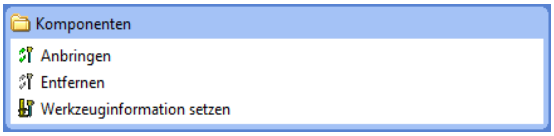


Fig. 33: Component window

3. Execute method and perform manual change.

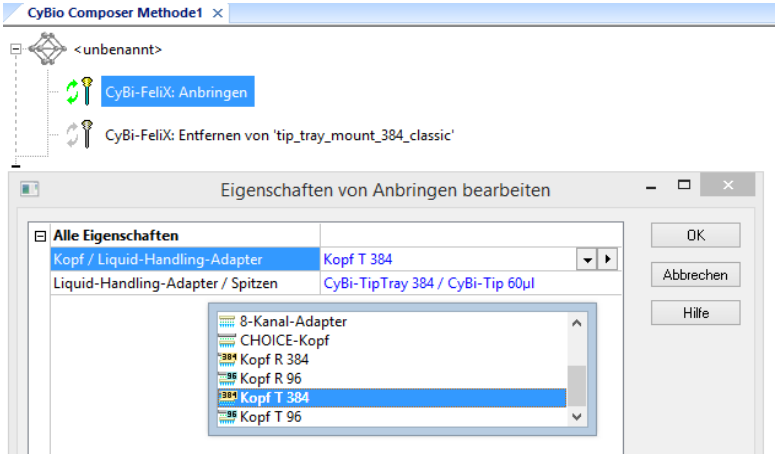


Fig. 34: Method for manual change

7.6.6 Tip pick-up/change - pipetting head R

With the **pipetting head R**, pipette tips are picked up and deposited automatically. An empty suitable holder must be available on deck A (below, optionally on deck C) for depositing pipette tips.

A suitable holder with the corresponding CyBio RoboTipTray on deck A must be available for holding pipette tips.

Pipetting heads R can additionally accommodate LH adapters for column, line and single-channel work.

The **CHOICE head**can only be operated with **CHOICE** adapters. Only processing by column and line or single-channel processing of microplates is possible. To accommodate a liquid handling adapter, a suitable support must be positioned on deck A with the LH adapter.

Additional information:
see chapter "Accessories" in the pipetting head instructions

see Tabelle 24, “Liquid handling /CHOICE adapter,” auf Seite 89

see Tabelle 25, “Holder for LH adapter/tips,” auf Seite 89

CyBio RoboTipTray pick up

The "Load" command contains all necessary inputs (position, holder, head and tip type). Perform the following steps:

1. Select the "Fit" command.
2. Make settings.
3. Move Z axis upwards ("Vertical drive" command and execute method).

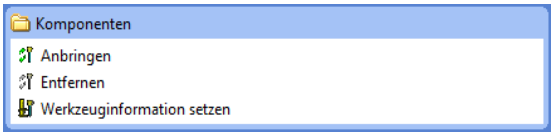


Fig. 35: Component window

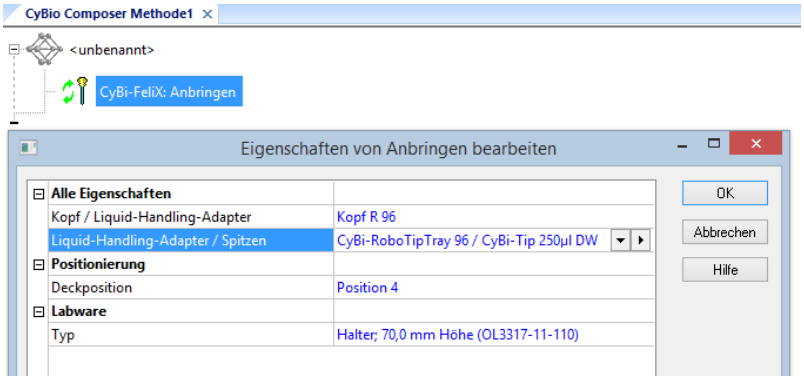


Fig. 36: Example: Pick up CyBio RoboTipTray

Pick up pipette tips, liquid handling and CHOICE adapters

The fitting of the LH and CHOICE adapters is done in the same way as the fitting of CyBio RoboTipTrays – see → *see Fig. 38* (Example for the parameter inputs).

When using LH adapters, the corresponding pipette tips must be included. For this purpose, the corresponding CyBio-TipBox or the holder for 1000 µl tips* is positioned on deck A.

After picking up an adapter, the information about the pipette tips - attached to the adapter picked up - must be set as follows:

1. Select the command: “Setting tool info”
2. Make a selection under the appropriate adapter type. If an adapter without pipette tips has been picked up, the "Tips" property "No add-on" must be selected.

The pipette tips are picked up from the box/rack using the "Load" command. This contains all necessary input parameters → *see Fig. 38*.

When selecting the pipette tips, note the compatibility with the LH adapter → *page 65*.

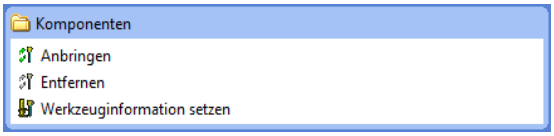


Fig. 37: Component window

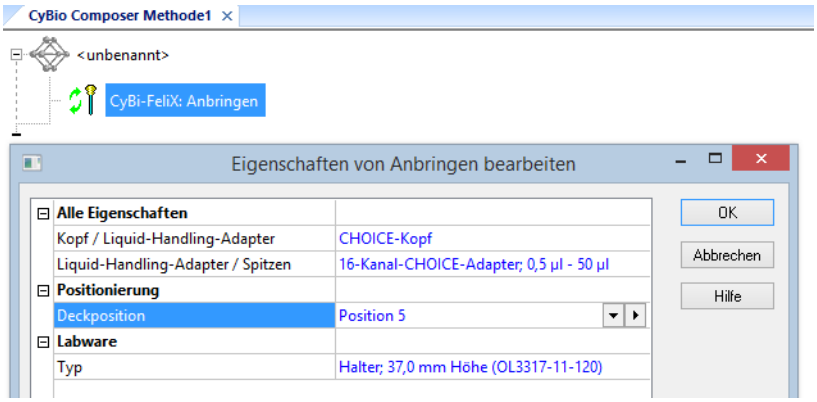


Fig. 38: Example: Pick-up of CHOICE adapters

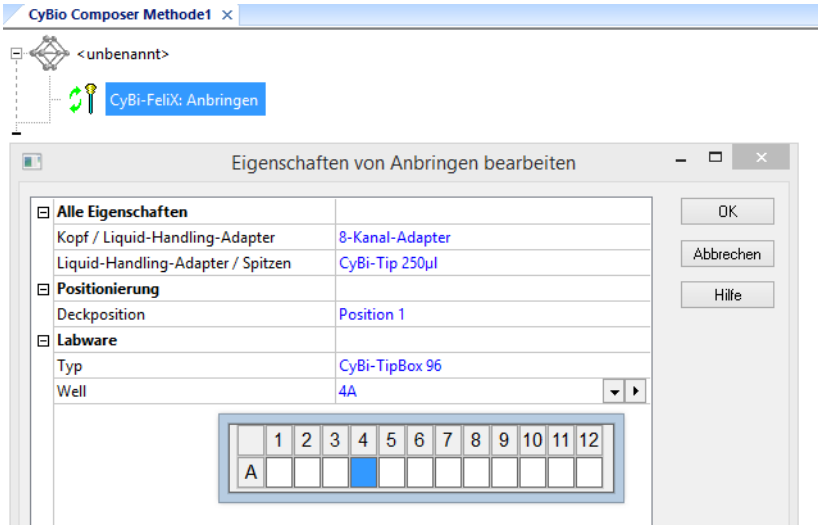


Fig. 39: Method Pick up pipette tips (example)

Compatibility between pipette tips and LH adapters

TIP

The specified usable volumes of the pipette tips may be limited by the software depending on the pipetting head used. This also applies to pipette tips with filters (filter tips), where a small net volume may be available.

Table 18: Compatibility overview

Tip type	Description
CyBio-TipRack 96/1000 µl	1-/8-/12-channel CHOICE adapter; 10 µl - 1000 µl
CyBio-TipBox 96/250 µl	1-/8-/12-channel CHOICE adapter; 10 µl - 1000 µl 1-/8-/12-channel adapter; Head R 96
CyBio-TipBox 96/50 µl	8-/12-channel CHOICE adapter; 0.5 µl - 50 µl 1-/8-/12-channel adapter; Head R 96
CyBio-TipBox 192/60 µl	1-/16-/24-channel CHOICE adapter; 0.5 µl - 50 µl 1-/16-/24-channel adapter; Head R 384

Deposit pipette tips, liquid handling and CHOICE adapters

The CHOICE or liquid handling adapter can also be set down with the tips using a suitable holder (→ *see Fig. 42* - this procedure is recommended if the pipette tips are to continue to be used).

Otherwise, in a 1st step the pipette tips and then, if necessary, the adapter is to be deposited. In both cases, the "Unload" command must be selected.

When you deposit tips, the adapter type (or in case of an adapter, the head type) must be selected.

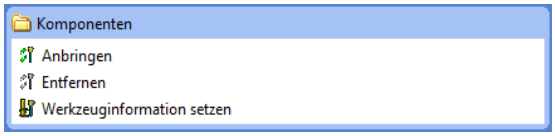


Fig. 40: Component window

When depositing tips, the labware used and the position must be defined - for depositing an adapter, the corresponding holder is defined.

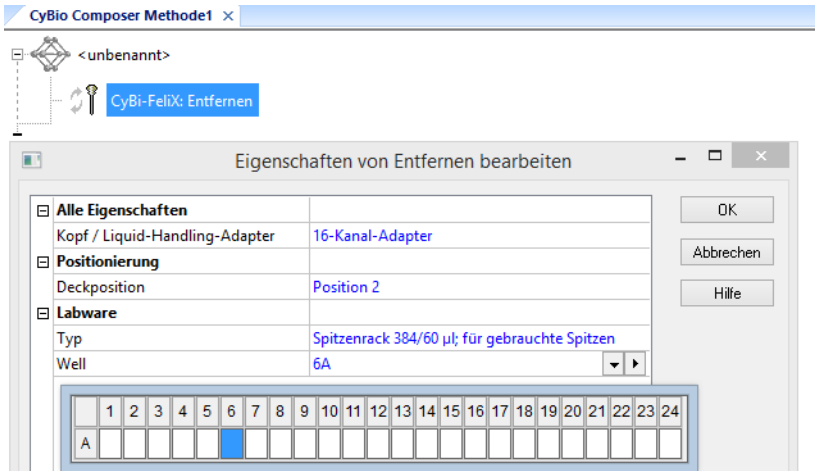


Fig. 41: Example of setting down tips

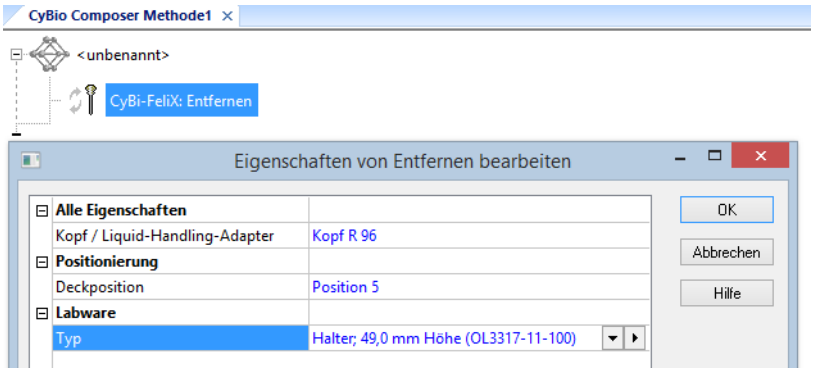


Fig. 42: Depositing an LH adapter (if necessary with tips, make sure to use a suitable holder)

7.6.7 Pipetting

Each piston movement creates a negative or positive pressure during suction or discharge.

In order to achieve the corresponding precision, the pressure equalization in the tips must be waited for.

In terms of the program, the "Pause" command is used for this purpose. The time required to reach this state depends - among other factors - on the properties of the liquid being handled. A waiting time of two seconds proves long enough with most watery solutions.

A complete volume cycle contains the commands "Suction", "Discharge" (partial volumes if necessary), the blow-out (combined with "Discharge" or separately) and the command "Piston in zero position". Two methods are distinguished for a liquid transfer - pipetting of a single volume and reverse pipetting.

NOTE

Dangerous situation!

Always move to zero position without liquid to avoid damage!

Pipetting (single volume)

Perform the following steps:

1. Suction without overstroke.
2. Discharge with residual discharge.
3. Move to the zero position (without liquid).

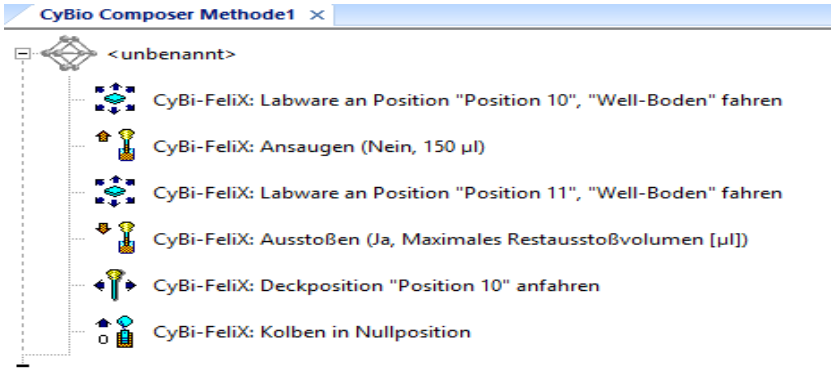


Fig. 43: Course of events

Reverse pipetting (single volume or partial volumes)

In 'Reverse pipetting', a defined volume plus an additional excess volume is aspirated with overstroke and then the defined volume is dispensed exactly. This sequence can be executed as a repetition if necessary. The residual volume remains in the tip and is discharged into a reservoir at the end. Reverse pipetting is particularly suitable for small volumes and for foaming or viscous liquids.

When dispensing multiple partial volumes, it is recommended that an additional surplus volume be taken and dispensed back into the source.

Perform the following steps:

1. Suction with overstroke.
2. Discharge (single volume or subvolumes).
3. Residual discharge of the overstroke volume.
4. Move to the zero position (without liquid).

Fig. 44: Course of events

7.7 Turning off

To turn the device off, proceed as follows :

1. Wait until all work operations have been completed.
2. Set the pipette tips and/or the LH adapters down using the function
   → *„Deposit pipette tips, liquid handling and CHOICE adapters" on page 66*.
3. Switch off the CyBio FeliX at the on/off switch on the side of the device. The status indicator light on the front of the device goes off.
4. If necessary, close the control software and turn the PC off.
   ✓ The CyBio FeliX is safely out of service now.

7.8 Troubleshooting

7.9 Safety notes

TIP

Do not carry out any repair work independently. Any warranty claims shall lapse immediately.

WARNING

Danger due to electrical voltage!

Observe the safety rules when troubleshooting cables.

7.10 Device not working

Check all potential error sources on occurrence of an error. If problems remain after this check or on identification of an undescribed error, you should notify the manufacturer's customer service or an authorized service partner.

7.10.1 Further errors

Error	Cause	Remedy
Despite connection to the mains socket, the device does not work, display remains dark	The mains plug is not properly inserted into the mains socket or into the combination element of the device.	Check mains plug or insert correctly.
	Mains socket is de-energized	Use a different power outlet or have the one you are using checked by a specialist.
	Device fuse is defective	Pull out the mains plug and replace the device fuse (→ *page 72*).

7.11 Error messages by software

Error/Error code	Cause	Error correction
E 1	Tightening mechanism defective	Contact your service partner or contact the manufacturer.
E 2	Unknown head type	Remove the pipetting head. Switch off the device. Insert the pipetting head correctly. Turn on the device and start an empty software method for initialization. If the error still occurs, contact your service partner or the manufacturer.
E 3	Error accessing FRAM	Contact your service partner or contact the manufacturer.
E 4	Tips are possibly not tightened	Remove the pipette tips using the software. Reattach the pipette tips. If the error still occurs, contact your service partner or the manufacturer.
E 5	No tip magazine or liquid handling adapter existent	Check the software method and - whether there are tips or an LH adapter on the specified position. If necessary, check the correct fit of the CyBio TipTray. Reattach the pipette tips/LH adapters. If the error still occurs, contact your service partner or the manufacturer.
E 6	Head not properly inserted.	Insert the pipetting head correctly. Start an empty software method for initialization. If the error still occurs, contact your service partner or the manufacturer.
E 7	Internal error	Contact your service partner or contact the manufacturer.
E 8	The internal zero position could not be found	Contact your service partner or contact the manufacturer.
E 9	One of the passed firmware parameters is outside the permissible range or has a wrong type	Check the value of the entered parameter and correct it accordingly. If the error still occurs, contact your service partner or the manufacturer.
E 10	The firmware command to be executed is not implemented	Contact your service partner or contact the manufacturer.
E 17	Piston drive error	Contact your service partner or contact the manufacturer.
E 18	A firmware command expects additional parameters	Contact your service partner or contact the manufacturer.
E 19	Unknown tip magazine	Contact your service partner or contact the manufacturer.
E 20	Execution was canceled by operator	Restart the method.
E 24	Command not practicable at moment	Check the software method to see if the specifications match the hardware used. If the error still occurs, contact your service partner or the manufacturer.

Error/Error code	Cause	Error correction
E 27	Head is not responding	Remove the pipetting head. Switch off the device. Insert the pipetting head correctly. Restart the device and start an empty software method for initialization. If the error still occurs, contact your service partner or the manufacturer.
E 29	Internal error	Contact your service partner or contact the manufacturer.
E 34	Drive not calibrated	Start an empty software method for initialization. If the error still occurs, contact your service partner or the manufacturer.
E 36	Head not clamped	Insert the pipetting head correctly. If the error still occurs, contact your service partner or the manufacturer.
E 37	Liquid handling adapter not properly inserted	Switch off the device. Restart the device and start an empty software method for initialization. Restart the method for attaching the LH adapter, make sure it is positioned correctly. If the error still occurs, contact your service partner or the manufacturer.
E 38	Liquid handling adapter not working	Contact your service partner or contact the manufacturer.
E 39	Unknown liquid handling adapter	Switch off the device. Restart the device and start an empty software method for initialization. Restart the method for attaching the LH adapter, make sure it is positioned correctly. If the error still occurs, contact your service partner or the manufacturer.

TIP

In case of repeated error messages, switch off the device and the software first and then switch them on again. A reinitialization takes place.
Inform your service partner or contact the manufacturer if the error messages occur again.

7.12 Troubleshooting - Instructions

7.12.1 Changing the device fuse

WARNING

Danger due to electrical voltage!

Always unplug the power cord from the power outlet before changing the fuse. Check that there is no voltage on the device.

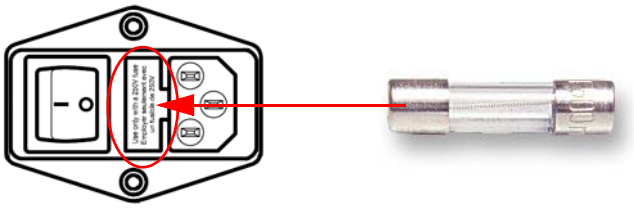


Fig. 45: Fuses (2x) in the combination element at the rear of the device

Name	Type/Value[1]
Mains fuse	T 4 A, 250V AC, 5x20 mm

1 High Breaking Capacity Fuse (Details → *„Overview operating data/conditions" on page 9*)

Changing the device fuse

1. Switch off the device.
2. Unplug the power cord from the device and the power outlet.
3. Pull the fuse holder out of the combination element using a small screwdriver (→ *see Fig. 45*).
4. Check which fuse is defective.
5. Remove the defective fuse from the fuse holder.
6. Place the replacement fuse in the fuse holder.
7. Reinsert the fuse holder.
8. Switch on the device.

✓ Device fuse has been changed.

7.12.2 LED flashing – red

Detected errors are signaled by red flashing codes as follows:

Flashing code	Detected error type/comment
once	Error on internal motor bus
twice	Defect in the E-STOP system
three times	Defect in louver monitoring
four times	Defect in external E-STOP monitoring
five times	Defect in the E-STOP motor current cut-off
six times	Defect in the E-STOP motor current cut-off
ten times	Data memory version number deviation
eleven times	Data memory version number illegible
twelve times	Data memory device configuration illegible
thirteen times	Data memory
fourteen times	Synchronization error

The blink codes are repeated continuously after a pause.

In this case, do the following:

1. Switch the device off and - after a short pause - on again.
2. Contact the responsible service department if the error is signaled again.

7.12.3 Establish operation after aborts (e.g. due to power failure)

After an unforeseen failure

- e.g. after a power failure, or
- after an abort (by switching off),

you can put the pipettor back into operational readiness.

Further information: → *„Establish operation after abort (e.g. due to power failure)" on page 48*

First make sure that a safe start-up is possible!

7.12.4 Manual axis movement after an abort

The pipetting head can be moved manually in the X direction with little effort. Likewise, the decks can be moved manually - while the device can be switched on or off. In the Z direction, the pipetting head can only be moved with the aid of the PC control or in manual mode (device switched on).

8 Maintenance & Care

8.1 Safety Notes

WARNING

Note that contact with voltage-carrying system parts may lead to physical injury or even death!

Turn system power off and detach power cable from the line socket before you proceed to any kind of maintenance or care! Secure the device against unintentional restart!

Operating personnel are prohibited from performing work for maintenance, repair or adjustment of voltage-carrying system parts!
Maintenance, repair and adjustment of system modules under electrical voltage may only be carried out by a qualified electrician!

CAUTION

Material damage to electrical and electronic components due to penetrating liquid!

Make sure that no liquid can penetrate into the inner space during any kind of work for maintenance or care.

TIP

All interventions on mechanical and electronic parts inside the device may only be carried out by the manufacturer's customer service department or by specially authorized specialist personnel.

To ensure that your device preserves optimal adjustment and will faultlessly function over a longer period of time, we recommend the conclusion of a service/maintenance contract with the manufacturer.

8.2 Maintenance Work

Carry out maintenance and care work according to the specified intervals regularly, observing the following instructions:

Contamination and natural wear of modules give rise to increased strain levels and, hence, an increased probability of failure. Check for signs of wear and tear on assemblies under mechanical strain and initiate necessary replacements promptly on identifying wear and tear.

All systems parts capable of manual or motorized motion are subject to natural wear. Similarly, electronic components have no unlimited lifetime.

TIP

Dirt, e.g. dried-on liquid, may increase wear dramatically in some cases. Always maintain clean working conditions.

8.2.1 Overview

Table 19: Maintenance overview

Maintenance task	Maintenance intervals		
	Weekly	Monthly	Every six months
→ *„Cleaning the basic unit (including decks)" on page 79*	x		
Replace used tips	when needed or at least once a week		
Empty the tip waste system* and clean it	when needed or at least once a week		
Clean all liquid-holding vessels* and the outside of tubes * with disinfectant		x	
→ *„Service the head mount" on page 80*		x	
→ *„Cleaning cones" on page 80*		X	
→ *„Check/replace the O-rings" on page 81**		x	
→ *„Check the function of the louver" on page 83*[1]			x
Perform a precision test (see separate instructions)			x
Perform a leak test (see separate instructions)			x
Check electrical components and cabling, test grounding (PE) conductor (only qualified electrician!)			x

1 Does not apply to the version without enclosure/louver (e.g. 30-5015-500-24).

8.3 Maintenance/testing/cleaning - Instructions

TIP

When working on the device or on accessories it is recommended to wear personal protective equipment (PPE).

The exterior of the device and any control elements located on the exterior must not be touched with gloves which were used for working on the device interior and which may have been contaminated during this work!

The scope of the safety labeling (as a mandatory component of accident prevention measures) is shown in the chapter → *„Safety markings" on page 13*.

NOTE

Remove contamination and damage immediately!

However, never use the following substances for cleaning purposes:

- Solvents (thinner)
- Cleaning powder
- Corrosive or flammable agents (e.g. gasoline, acetone)
- Phenols or caustic alkaline solutions

These cause corrosion on the device surfaces.

Carefully observe the information regarding this topic in chapter → *„Chemical Resistance" on page 20*.

Processing biological samples of a risk group

Take particular care when using the device for processing biological samples of a risk group because the CyBio FeliX cannot be decontaminated as a whole.

In this case, we recommend applying the WHO safety recommendations (WHO Laboratory Biosafety Manual). For servicing which involves FeliX heads or liquid handling adapters the operator is obliged to decontaminate these components prior to shipment. This process must be documented in a decontamination declaration which must be attached to the outside of the packaging and readable for the recipient of the shipment. The form for the declaration of decontamination is provided by Analytik Jena GmbH+Co. KG when servicing is requested.

For surface disinfection of the device, we recommend using suitable chemicals which are featured on the most recent version of the RKI list (Robert-Koch-Institut, Germany) or the DVV list (German Association for the Control of Viral Diseases).

TIP

If in doubt, consult Analytik Jena GmbH+Co. KG.

8.3.1 Cleaning the basic unit (including decks)

NOTE

Use a lint-free cloth with a disinfecting / cleaning agent which is recommended by WHO guidelines and which is not excluded in this manual (such as Incidin Liquid, produced by ECOLAB) for cleaning the CyBio FeliX and any accessories which may only be treated using the *wipe disinfection* method (see chapter → *„Chemical Resistance" on page 20*).

To prevent damage on the device, the interior and exterior parts must NEVER be cleaned / decontaminated using the spray disinfection method!

TIP

Never treat surfaces in dry condition!

Never apply on hot surfaces or on voltage-carrying electrical equipment.

Procedure:

1. Remove the tips.
2. Load the cover magazine (transport protection; OL3316-11-200).

Fig. 46: Cover magazine (transport protection) attached

3. Press the device switch to turn off the CyBio FeliX and pull the mains plug.
4. Remove any micro plates, reservoirs, wash tubs and other accessories.
5. Remove the pipetting head (see chapter → *„Changing the pipetting head" on page 49*) and place it on the head's cover magazine (transport protection).
6. Clean the interior and the decks.
7. Clean the pipetting head and all accessories (must only be performed without applying pressure).
8. Wait until all cleaned surfaces have completely dried.
9. Reinsert the pipetting head and put all accessories which were removed for cleaning back into the decks.
10. Close the louver and clean the device from the outside.
11. Wait until all cleaned surfaces have completely dried.
12. Insert the mains plug back into the power outlet and press the device switch to turn on the device. The device is now ready for operation. Detach the cover magazine (transport protection), if attached.

8.3.2 Service the head mount

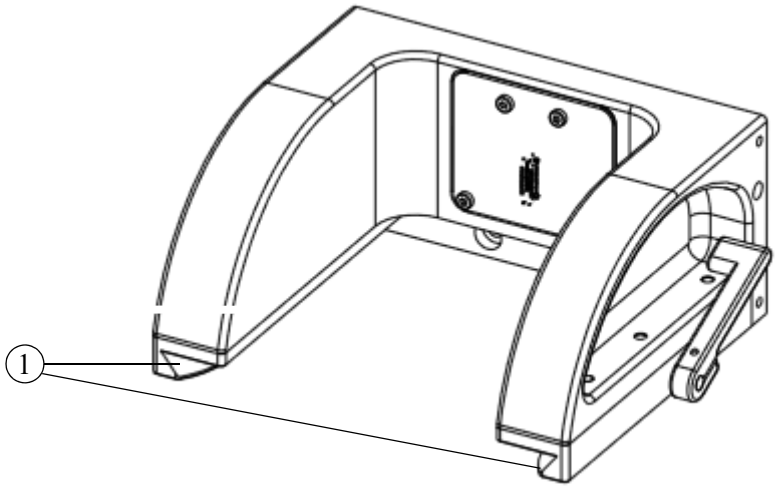


Fig. 47: Head mount

1 Guides

Note:

1. Check guides (rails) (cleanliness, burrs, warps, etc.)
2. Grease the rails very thinly with silicone grease.
   Wipe off any excess grease.

8.3.3 Cleaning cones

For security reasons and to ensure tightness, it is important that the cones of the liquid handling adapters are free of soiling when using these adapters. Therefore, the cones must be cleaned in regular intervals using a dry lint-free cloth (e.g. to remove dust).

TIP

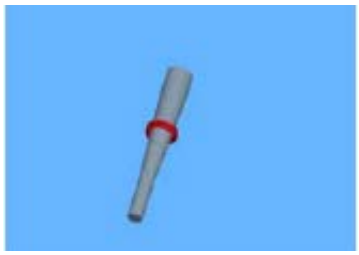
O-rings positioned on the cones must not be displaced or turned out of position!

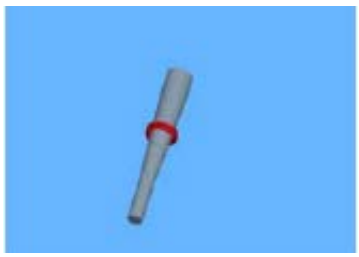
8.3.4 Check/replace the O-rings

The O-rings of the CyBio FeliX are constantly subjected to mechanical stress (when using liquid handling adapters) due to contact with the pipette tips. Thus, for safety reasons and to ensure tightness, the O-rings on the cones must be replaced at regular intervals. If a maintenance contract is in place, the Analytik Jena GmbH+Co. KG service department will perform an O-ring replacement at each visit. Otherwise, the O-rings should be replaced if there are visible signs of wear. This can be done with the help of the enclosed tool.

Preparation:

1. Switch off the device (→ *„Turning off" on page 68*).
2. Take the O-rings and slide them one after the other over the O-ring guide pin.





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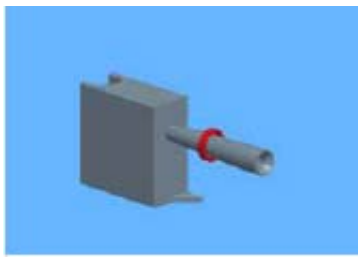
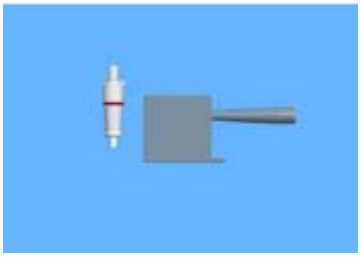
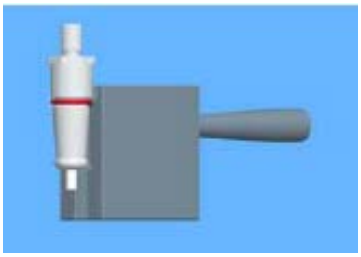
3. Take the O-ring guide pin with the O-rings fitted, insert it into the opening provided and press it into the opening as far as it will go.

=

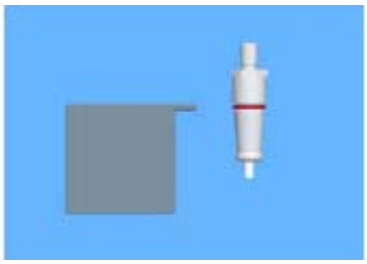


Removing the old O-ring:

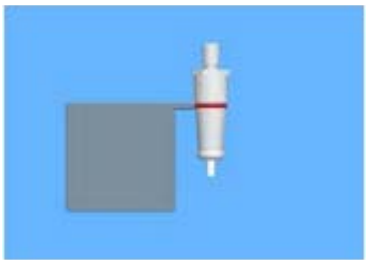




1. Take the O-ring assembly tool with the side intended for the cone facing forward and push the tool, with the groove at O-ring height, towards the cone. Then apply a small amount of pressure, finally remove the O-ring assembly tool and the O-ring from the cone.



2. If this attempt at O-ring removal was unsuccessful, there is still an alternative solution for removing the O-ring. To do this, turn the O-ring assembly tool around. There is a tip here (on the side of the O-ring guide pin) that can also be used to remove the O-ring. For this purpose, press the tip against the O-ring and then remove it.



Fitting the new O-ring

1. Turn the side of the O-ring assembly tool so that the O-ring guide pin is facing up and press it lightly against the cone.

2. Slowly slide one of the threaded O-rings along the O-ring guide pin toward the cone until it reaches its groove.

✓ Work can now continue as usual.

8.3.5 Check the function of the louver

To ensure safety, check the functionality of the louver[1] as follows:

1. Switch on the device.
2. Operate the louver and check:
   - for ease of movement
   - that all movements are interrupted when opening

1 Does not apply to the version without enclosure/louver (e.g. 30-5015-500-24).

9 Shutting Down

CAUTION

There is danger of injury and damage to the pipettor if cables are removed before power is turned off!

Do not remove cables as long as they are energized! Make absolutely certain that power supply has been cut before you remove a cable!

If the CyBio FeliX is not required for a longer period of time, perform shut-down action as described hereafter:

1. Remove the pipette tips; if necessary, discard the liquid handling adapters.
2. Insert the transport lock into the pipetting head (or have it installed).
3. Switch the power switch on the device side to position "0".
4. Turn system power supply off (using main switch or socket bar for this purpose).
5. Disconnect power cord from socket bar or line power socket.
6. Remove all microplates, reservoirs or accessories.
7. Clean and disinfect the pipettor and its components as described in handling instructions for the most recently used materials and substances.
8. Protect the device from dust deposits.
   ✓ The system has been completely shut down.

10 Accessories and Spare parts

TIP

The pipettor and its accessories are factory-matched to each other. Use only accessories recommended by the manufacturer.

The manufacturer will refuse any warranty in the event of damage or function failure as a result of system operation with unspecified accessory items.

10.1 Accessories

Selected assortment - further information/scope of delivery → price list.

10.1.1 Pipette tips

TIP

Pipette tips are disposable items. If used several times, the functionality of the tips or the CyBio FeliX is not ensured.

Table 20: Pipette tips for pipetting heads with automatic tip change

Pipetting head	Tip type	Order number
Head R 96/250 µl	CyBio RoboTipTray 96/250 µl DW	OL3810-26-661
	CyBio RoboTipTray 96/250 µl DW PCR-certified, pre-sterilized	OL3810-25-664
	CyBio RoboTipTray 96/250 µl DW PCR-certified, pre-sterilized, filter	OL3810-25-669
Head R 96/60 µl	CyBio RoboTipTray 96/60 µl	OL3810-25-441
	CyBio RoboTipTray 96/60 µl PCR-certified, pre-sterilized	OL3810-25-444
	CyBio RoboTipTray 96/60 µl net volume 18 µl PCR-certified, pre-sterilized, filter	OL3810-25-449
	CyBio RoboTipTray 96/40 µl	OL3810-25-431
	CyBio RoboTipTray 96/40 µl PCR-certified, pre-sterilized	OL3810-25-434
Head R 384/60 µl	CyBio RoboTipTray 384/60 µl	OL3810-25-241
	CyBio RoboTipTray 384/60 µl PCR-certified, pre-sterilized	OL3810-25-244
	CyBio RoboTipTray 384/60 µl net volume 18 µl PCR-certified, pre-sterilized, filter	OL3810-25-249
	CyBio RoboTipTray 384/40 µl	OL3810-25-231
	CyBio RoboTipTray 384/40 µl PCR-certified, pre-sterilized	OL3810-25-234

Table 21: Pipette tips for 1-, 8- and 12-channel liquid handling adapters (Head R 96 and CHOICE head)

Pipetting head	Tip type	Order number
Head R 96/60 µl Head R 96/250 µl CHOICE head	CyBio TipBox 96/50 µl PCR-certified	OL3811-25-535-N
	CyBio TipBox 96/50 µl PCR-certified, pre-sterilized	OL3811-25-635-S
	CyBio TipBox 96/50 µl PCR-certified, pre-sterilized, filter	OL3811-25-935-F
Head R 96/250 µl CHOICE head	CyBio TipBox 96/250 µl PCR-certified, pre-sterilized	OL3811-25-637-S
	CyBio TipBox 96/250 µl PCR-certified, pre-sterilized, filter	OL3811-25-937-F
Head R 96/1000 µl CHOICE head	CyBio TipRack 96/1000 µl PCR-certified	OL3811-25-539-N
	CyBio TipRack 96/1000 µl PCR-certified, pre-sterilized	OL3811-25-639-S
	CyBio TipRack 96/1000 µl PCR-certified, pre-sterilized, filter	OL3811-25-939-F

Table 22: Pipette tips for 1-, 16*- and 24*-channel liquid handling adapters (Head R 384 and CHOICE head)

Pipetting head	Tip type	Order number
Head R 384/60 µl CHOICE head	CyBio TipBox 192/60 µl	OL0008-25-575-N
	CyBio TipBox 192/60 µl	OL0008-25-585-N

10.2 Pipetting Heads

Table 23: Pipetting Heads

Description	Order number
CHOICE head	OL3316-14-250
CyBio FeliX Head R 384/60 µl	OL3316-14-550
CyBio FeliX Head R 96/60 µl	OL3316-14-750
CyBio FeliX Head R 96/250 µl	OL3316-14-850
CyBio FeliX Head R 96/1000 µl	OL3316-14-950
CyBio FeliX Head T 96/60 µl[1]	OL3316-14-755

1 No longer in the scope of supply.

10.3 Liquid handling /CHOICE adapter

Table 24: Liquid handling /CHOICE adapter

Description	Order number
1-channel CHOICE adapter 10 – 1000 µl	OL3316-11-300
8-channel CHOICE adapter 10 – 1000 µl	OL3316-11-330
8-channel CHOICE adapter 0.5 – 50 µl	OL3316-11-332
12-channel CHOICE adapter 10 – 1000 µl	OL3316-11-340
12-channel CHOICE adapter 0.5 – 50 µl	OL3316-11-342
1-channel CHOICE adapter 0.5 – 50 µl	OL3316-11-350
16-channel CHOICE adapter 0.5 – 50 µl	OL3316-11-380
24-channel CHOICE adapter 0.5 – 50 µl	OL3316-11-390
1-channel adapter head R 96	OL3317-11-300
8-channel adapter head R 96	OL3317-11-330
12-channel adapter head R 96	OL3317-11-340
1-channel adapter head R 384	OL3317-11-350
16-channel adapter head R 384	OL3317-11-380
24-channel adapter head R 384	OL3317-11-390

10.4 Holder

Table 25: Holder for LH adapter/tips

Description	Height mm	Order number	Comment
Holder	49	OL3317-11-100	for 384-well tips 60 µl and 40 µl
Holder	70	OL3317-11-110	for 96-well tips 250 µl DW
TipRack 96/1000 µl	95	OL3317-11-140	for 1000 µl tips

10.5 Further Accessories

Table 26: Further Accessories

Description	Order number
UV decontamination; 230 VAC	OL5015-24-954
Block 2.0 ml	844-00136-0
Block Combi	844-00137-0
Tip wash basin 96 DW (bottom connection)	OL3317-11-180
Tip wash station 384 DW (bottom connection)	OL3317-11-190

TIP

Detailed information on available accessories can be obtained directly from Analytik Jena GmbH+Co. KG or in the Internet.

10.6 Spare parts

Table 27: Spare parts

Spare part	Order number	Comment
O-ring 3x1	30-071-400[1] 30-073-662	
(O-ring replacement tool)	30-0008-907-24	for O-ring 3x1
Cone, glued	30-3316-310-12	
Electrical fuse		→ *„Changing the device fuse" on page 72*
E-stop jumper plug	30-5003-041-91	

1 DIN 377.

11 Disposal

11.1 Consumables

TIP

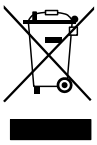
Consumable materials must be disposed in accordance with binding workplace safety and environmental provisions of law.

11.2 Reagents

TIP

- Biological samples must be treated in accordance with locally binding regulations for the handling of infectious material.
- Hazardous substances and related containers may not be disposed as domestic waste nor be allowed to penetrate into a sewage system or the soil. The appropriate rules and practices must be closely followed for disposal of such substances.

11.3 System & Accessories



TIP

Unless agreed otherwise, the system or its components must be disposed of in accordance with the statutory provisions after their use. The responsibility rests with the owner of the system.

The statutory basis for the disposal are the following EU directives or their implementation in national law within the EU:

- EU Directive RoHS
- EU Directive waste electrical and electronic equipment

Index

A 1 Automation systems

CAUTION

Potential danger if not properly integrated into a system. The integrator must integrate the "CyBio FeliX automation system" component safely.

The device is covered by the scope of Directive 2006/42/EC and is an partly completed machine. This means that the safety requirements are specified in the declaration of incorporation.

Furthermore, the following applies in this context: The partly completed machinery may not be put into operation until it has been established, where applicable, that the machinery or the system into which the partly completed machinery is to be incorporated complies with the provisions of Directive 2006/42/EC on machinery and the declaration of conformity has been issued in accordance with Annex II Part 1, Section A.

The device complies with the requirements according to Directive 2014/30/EU and 2011/65/EU.

All information on safety refers to the currently valid regulations of the European Union. Additional country-specific laws and regulations must be observed.

The following automation solutions[1] are available for the pipettor CyBio FeliX (version without louver):

- Version I:
  CyBio FeliX, integrated in a safety workbench with pane monitoring[2]
  - Drawing/Order number: OL5015-500-25
  - Description and details → *refer to page 96*
- Version II:
  CyBio FeliX, integrated in a safety workbench with light curtain[3]
  - Drawing/Order number: OL5015-505-25
  - Description and details → *refer to page 98*

Both automation solutions ensure comprehensive personal protection.

TIP

All information represents the state of knowledge at the time of printing.
The manufacturer reserves the right to make changes if deemed necessary in the interest of technical progress.

1 Also refer to the price list.
2 Transponder principle.
3 for the monitoring of the working area.

A 1.1Version I

The safety workbench has a transponder solution for monitoring.

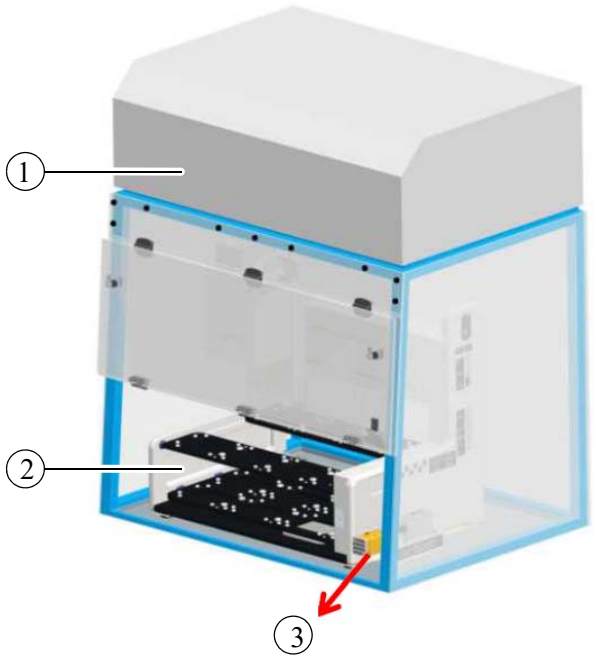


Fig. 48: Safety workbench incl. door monitoring set[1]

1 Safety workbench
2 CyBio FeliX
3 Door monitoring set

Table 28: Components

→ *Fig. 48*	Description	Description/Comments
1	Safety workbench	Model Safe 2020/Maxisafe 2020[1]
2	CyBio FeliX	30-5015-500-24
3	Door monitoring set	OL3317-23-480

1 If a different model is to be used, a test is required. In any case, consult the manufacturer.

1 Schematic diagram

A 1.1.1Door monitoring set

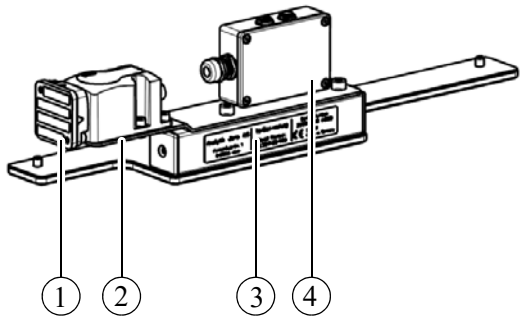


Fig. 49: Door monitoring set

1 Transponder
2 Switch
3 Type plate
4 E box

Table 29: Components

→ *Fig. 49*	Description	Description/Comments
1	Transponder	PSEN cs1.1[1]
2	Switch	PSEN cs1.1p[2]
3	Type plate	Specifications: Manufacturer, product designation (trade name), identification (model, serial number), year of manufacture
4	E box	Wiring between switch and CyBio FeliX

1 Distance to the switch: 20 mm
2 POWER/Fault" LED lights up in green: Ready for operation.

A 1.2Version II:

This version is equipped with an active optoelectronic protective device (safety light curtain).

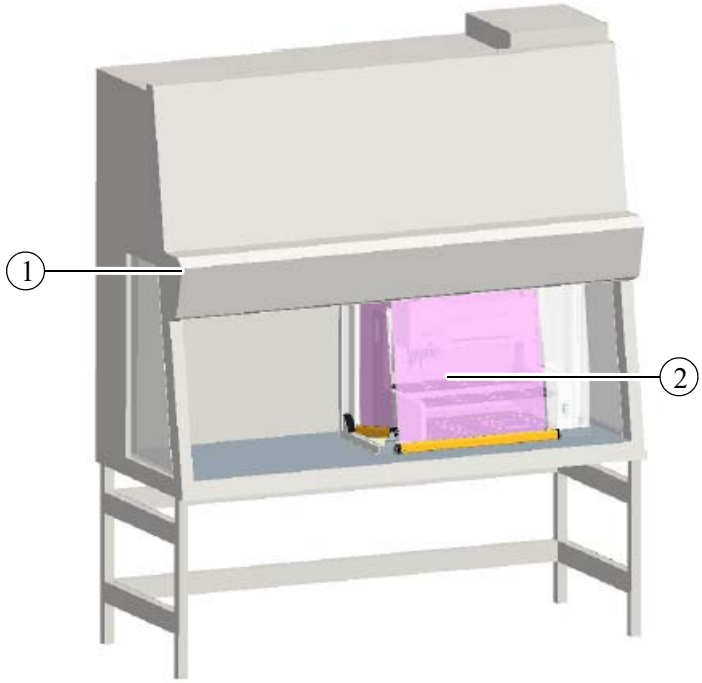


Fig. 50: Safety workbench

1 Safety workbench
2 Light curtain

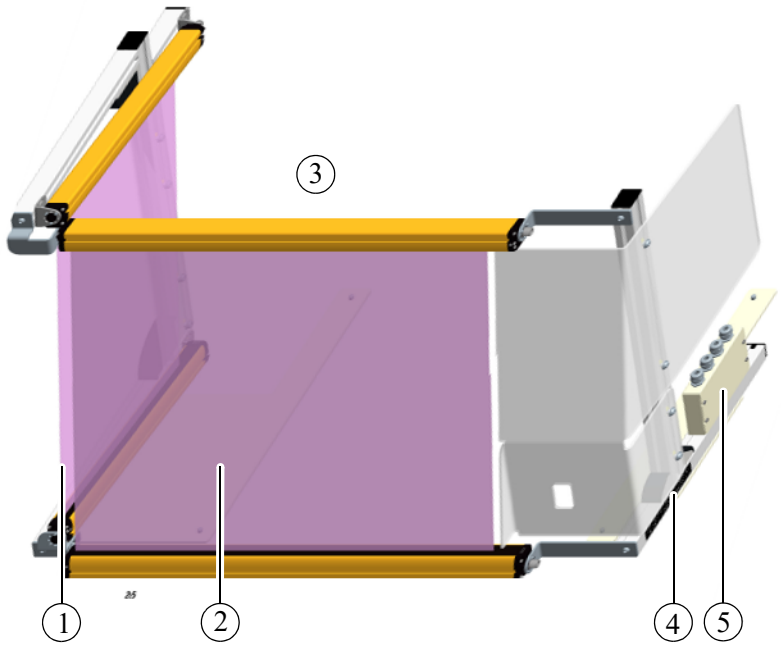


Fig. 51: Safety light curtain[1]

1 Side curtain
2 Front curtain
3 Protected/monitored area
4 Type plate
5 E box

Table 30: Description

→ *Fig. 51*	Description	Description/Comments
1/2	Light curtains	
3	Protected area	E.g. for CyBio FeliX (30-5015-500-24)
4	Type plate	Specifications: Manufacturer, product designation (trade name), identification (model, serial number), year of manufacture
5	E box	Wiring

The light curtain is intended for safety workbenches (e.g. model Safe 2020/Maxisafe 2020).

1 Schematic diagram of version OL3317-23-460

A 2 Incomplete machine

CAUTION

Potential danger if not properly integrated into a system. The integrator must integrate the "CyBio FeliX automation system" component safely.

The device is covered by the scope of Directive 2006/42/EC and is an partly completed machine. This means that the safety requirements are specified in the declaration of incorporation.

Furthermore, the following applies in this context: The partly completed machinery may not be put into operation until it has been established, where applicable, that the machinery or the system into which the partly completed machinery is to be incorporated complies with the provisions of Directive 2006/42/EC on machinery and the declaration of conformity has been issued in accordance with Annex II Part 1, Section A.

The device complies with the requirements according to Directive 2014/30/EU and 2011/65/EU.

All information on safety refers to the currently valid regulations of the European Union. Additional country-specific laws and regulations must be observed.

The pipettor CyBio FeliX (variant without louver[1]) is a partly completed machinery (according to Directive 2006/42/EC on machinery).

Among other things, a risk assessment must be prepared that evaluates and minimizes hazards (→ *„Danger areas" on page 16*).

TIP

All information represents the state of knowledge at the time of printing.
The manufacturer reserves the right to make changes if deemed necessary in the interest of technical progress.

A 2.1Assembly instructions - Notes

The following instructions must be observed in order to assemble or integrate the product safely:

- Always lift/transport the device with 2 people.
- The device is intended for integration into laboratory or safety workbenches and automated systems. The workspace must be limited.
- To minimize the risk of injury (from moving parts), it must be integrated into the external safety circuit.
  Connections on the device → *„Connector panel" on page 35*.
- The safety of the system into which the device is integrated is the responsibility of the system installer.

1 E.g. version 30-5015-500-24.

Declaration of Incorporation (reproduction of the content)

Name and address of the manufacturer:

Analytik Jena GmbH+Co. KG
Konrad-Zuse-Straße 1
D-07745 Jena

We declare herewith that the following „partly completed machinery" as a result of design, construction and the version put in circulation complies with the essential requirements of the Directive 2006/42/EC on machinery:

Annex I, article
1.1.2, 1.1.3, 1.1.5, 1.1.6, 1.2.1, 1.3.1, 1.3.2, 1.5.1, 1.5.2, 1.5.8, 1.6.3
Designation of the partly completed machinery:

CyBio FeliX
30-5015-500-24

The safety objectives of the Low-Voltage Directive are taken into account.
We commit to transmit, in response to a reasoned request by the market surveillance authorities, relevant documents on the partly completed product by our documentation department.

The partly completed product must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of Directive 2006/42/EC on Machinery, where appropriate, an until the EC declaration of conformity according to annex II A is issued.

The person authorized to compile the relevant technical documentation

Analytik Jena GmbH+Co. KG, Konrad-Zuse-Straße 1, D-07745 Jena

A 2.2Pin assignment

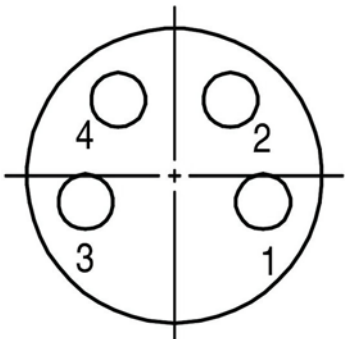


Fig. 52: Pin assignment for the ESTOP IN connection

Table 31: Description

Description	Description/Comments
PIN 1	5 V supply
PIN 2	Receiving line (signal line)
PIN 3	Mass
PIN 4	Transmission line (reporting line)

An opening switching element between PIN 2 and PIN 4 interrupts the current flow, resulting in an E-STOP