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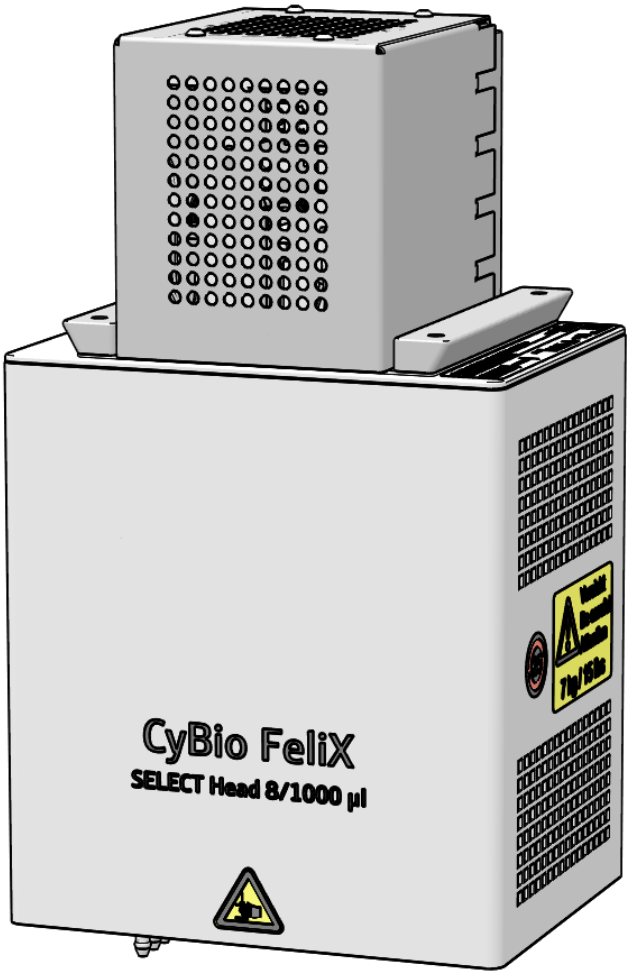
Operating Manual

CyBio FeliX SELECT Head
Pipetting head for CyBio FeliX



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For a proper and safe use of this product follow the instructions. Keep the operating manual for future reference.

General Information

http://www.analytik-jena.com

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Technical Documentation

Analytik Jena GmbH+Co. KG

Table of contents

1 Notes on the operating manual

Content

The operating manual describes the following device models:

- CyBio FeliX SELECT Head 8/50 µL
- CyBio FeliX SELECT Head 8/250 µL
- CyBio FeliX SELECT Head 8/1000 µL

In this manual, these models are collectively referred to as pipetting head or CyBio FeliX SELECT Head.

The pipetting head is intended for use on the CyBio FeliX pipetting platform (flexible pipetting platform for fully automatic single-channel to multi-channel pipetting). This device is referred to simply as a pipetting platform in this manual. The device is controlled via the CyBio Composer software. The pipetting platform and software have their own separate manuals.

The pipetting head is intended to be operated by qualified specialist personnel observing this operating manual.

This operating manual provides information about the design and operation of the pipetting head and provides the operating personnel with the necessary know-how for the safe handling of the pipetting head and its components. Furthermore, the operating manual includes information on the maintenance and servicing of the pipetting head as well as hints on potential causes for malfunctions and their correction.

Conventions

Instructions for actions are marked with a black triangle (▸). Results of actions are marked with a checkmark (✔).

Warnings are indicated by a warning triangle and a signal word. The type, source and consequences of the hazard are stated together with notes on preventing the hazard.

Elements of the control and analysis program are indicated as follows:

- Program terms are in bold (e.g., the **System** menu).
- Menu items are separated by vertical lines (e.g., **System** | **Device**).

Symbols and signal words used in this manual

The user manual uses the following symbols and signal words to indicate hazards or instructions. These warnings are always placed before an action.

WARNING

Indicates a potentially hazardous situation which can cause death or very serious injuries with permanent damage.

CAUTION

Indicates a potentially hazardous situation which can cause slight or minor injuries.

NOTICE

Provides information on potential material or environmental damage.

2 Intended use

NOTICE

The device is intended for **general laboratory use**. In the field of medicine and diagnostics, its use is limited to research (research use only).

The device may only be used for the applications described in this operating manual.

The manufacturer does not accept liability for any other use.

TheCyBio FeliX SELECT Head pipetting head is intended for use with the CyBio FeliX pipetting platform.

The CyBio FeliX pipetting platform is a fully automatic pipetting system for chemical and biological laboratories. Its basic function is the aspiration and dispensing of liquids from and into microplates, reservoirs and tubes. The pipetting platform has a head accommodation that allows easy replacement and selection of the head used depending on the desired range of functions.

The CyBio FeliX SELECT Head pipetting head allows individual control of the 8 built-in channels. The channels can be moved up and down independently of each other and pipette different volumes in parallel.

You can control the pipetting head together with the pipetting platform via the CyBio Composer software.

By using the optionally available CyBio SELECT Adapter accessory, the CyBio FeliX SELECT Head pipetting head can reach every well of a microplate with every active cone. Special applications such as hit picking are simplified by this accessory.

The CyBio FeliX SELECT Head pipetting head is suitable for working with 96- and 384-well microplates, reservoirs and tubes. Note that all cavities must have a minimum diameter of ≥ 3 mm.

Only use the tips suitable for each of the three CyBio FeliX SELECT Head device models, which you can obtain from Analytik Jena.

3 Safety

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

Observe all safety instructions listed in this user manual and all messages and information displayed on the monitor by the software.

3.1 Safety instructions for operation

The operator must make sure that the device and its safety equipment is in sound condition each time before starting up the device. This applies especially after any modification or adaptation of the device or any maintenance or repair.

Observe the following:

- The device may only be operated if all items of protective equipment (e.g., covers in front of electronic components) are in place, properly installed and fully operational.
- The sound condition of the protection and safety equipment must be checked regularly. Any defects must be corrected as soon as they occur.
- Protective and safety equipment must never be removed, modified or switched off during operation.
- The ventilation equipment must be in good working condition. Covered ventilation grates or slots, etc. can result in malfunctions or device damage.

3.1.1 Safety instructions – protection against explosion and fire

The device may not be operated in an explosive environment.

Smoking or handling open flames are prohibited in the room in which the device is operated!

3.1.2 Safety instructions – electrical equipment

- Work on the electronics may only be carried out by the customer service of Analytik Jena and specially authorized technicians.
- 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 any objects into any device openings, and ensure that no liquid can get into the device through openings or joints.
- Operate the device only at a line voltage that complies with the nameplate specifications!

3.1.3 Safety instructions for maintenance and repair

The device is generally maintained by the customer service department of Analytik Jena or specialist personnel trained and authorized by them.

Unauthorized maintenance can damage the device. For this reason, only the activities described in the user manual in the "Maintenance and care" chapter may be performed by the operator.

- All maintenance and repair work on the device must only be carried out when the device is switched off and the power plug is disconnected (unless specified otherwise).

- Use only original spare parts, wear parts and consumables. These have been tested and ensure safe operation.

Do not use solvents (thinners), aggressive detergents, flammable liquids or caustic alkaline solutions for cleaning. These can lead to damage to the housing components.

3.1.4 Handling hazardous substances

The operator is responsible for the selection of substances used in the process as well as for their safe handling. This is particularly important for radioactive, infectious, poisonous, corrosive, combustible, explosive and otherwise dangerous substances.

When handling hazardous substances, the locally applicable safety instructions and instructions in the safety data sheets from the manufacturers of the auxiliary and operating materials must be complied with.

3.1.5 Chemical resistance

Aggressive substances may cause damage. Although the materials used are resistant to most of the commonly used substances, material damage from aggressive substances cannot be completely excluded.

- Before using any aggressive substances (e.g., bases, acids, or organic solutions): Check that the materials with direct contact to these substances are resistant.
- Only use substances compatible with the materials listed. Do not use any aggressive substances that impair resistance.

The following components come into direct or indirect contact (e.g., via aerosols) with the substances to be processed:

Component that comes into contact with substances	Material
Pipette tips	PP
Plunger seals	PE-HD
Plunger	Stainless steel

None of the components mentioned above are resistant to any of the following substances:

- Hydrofluoric acid (HF/hydrofluoric acid)
- Highly concentrated acids
- Cleaning powder
- Paint thinner
- Naphtha (crude gasoline)
- Gasoline
- Acetone
- Cleaning spray
- Ozone
- Oxidative solutions

If you have any questions, contact Analytik Jena.

Permissible disinfection methods and disinfectants

Disinfection method	Disinfectant	Can be used for
Wipe disinfection	Incidin Liquid	■ Housing parts ■ Accessories

3.2 Safety labeling on the device

Warning and mandatory action labels have been attached to the pipetting head and must always be observed.

Damaged or missing warning and mandatory action labels can cause incorrect actions leading to personal injury or material damage. The labels must not be removed. Damaged warning and mandatory action labels must be replaced immediately!

The following warning and mandatory action labels have been attached to the pipetting head:

Warning symbol	Meaning	Comment
	Warning of a danger point	Warning of mechanical hazard from moving device components
	Warning of crushing	Warning of crushing resulting from moving device components
	Warning of crushing or pinching accidents	Consider the pipetting head's weight for installation or deinstallation work.

3.3 Danger zone

When mounted, the movement of the pipetting head can pose a risk to personnel.

Never reach into the movement range during the movement (especially during the downwards movement).

There is a risk of crushing your hands!

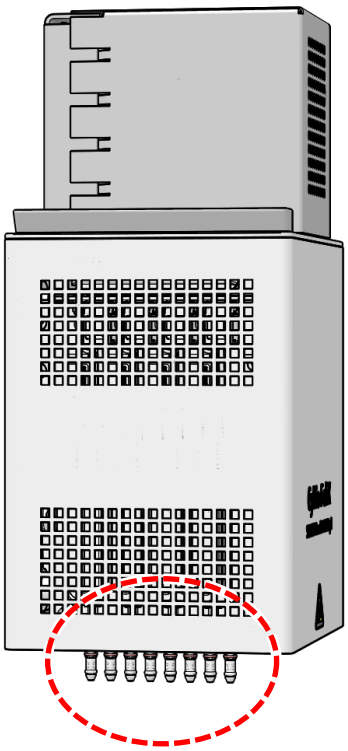


Fig. 1 Danger zone

Observe the following general instructions to avoid dangerous situations:

- When handling, take the weight/mass into account.
- Never reach into the movement range physically or with an object during operation.
- Incorrect handling and operation can result in material damage and personal injury.
- Switch off the pipetting platform before any interventions.

3.4 Requirements for the operating personnel

The device must only be operated by qualified specialist personnel instructed in the use of the device. This instruction also include teaching the contents of this user manual and of the user manuals of the connected system components. We recommend training by qualified employees of Analytik Jena or its representatives.

In addition to the safety instructions in this user manual, the general applicable safety and accident prevention regulations of the respective country the device is operated in must be observed and adhered to. The operator must ensure the latest version of these regulations.

The user manual must be accessible to the operating and service personnel.

3.5 Safety instructions: Transport

- Insufficiently secured components pose a risk of injury. During transport, secure the components as specified in this operating manual.
- Only ship the pipetting head in its original packaging! Completely empty and decontaminate before packing.

3.6 Behavior during emergencies

If there is no immediate risk of injury, switch off the device and the connected system components immediately in hazardous situations or in the event of an accident and/or disconnect the power plugs from the power outlets.

Familiarize yourself thoroughly with the documentation for the entire system in which the pipetting head is operated.

If an emergency stop is available, it must be activated.

4 Function and design

4.1 Design and connections of the pipetting head

The pipetting head is available in the following versions:

Model	Volume range
CyBio FeliX SELECT Head 8/50 µL	1 to 50 µL
CyBio FeliX SELECT Head 8/250 µL	10 to 250 µL
CyBio FeliX SELECT Head 8/1000 µL	25 to 1000 µL

Detailed information on the individual models can be found in the specifications (→ "Specifications" 39).

Top with guide and connection

The upper component of the pipetting head has a dovetail guide on the sides and an electrical connection on the rear. This electrical connection is used to power and control the pipetting head via the CyBio FeliX pipetting platform and the CyBio Composer control software.

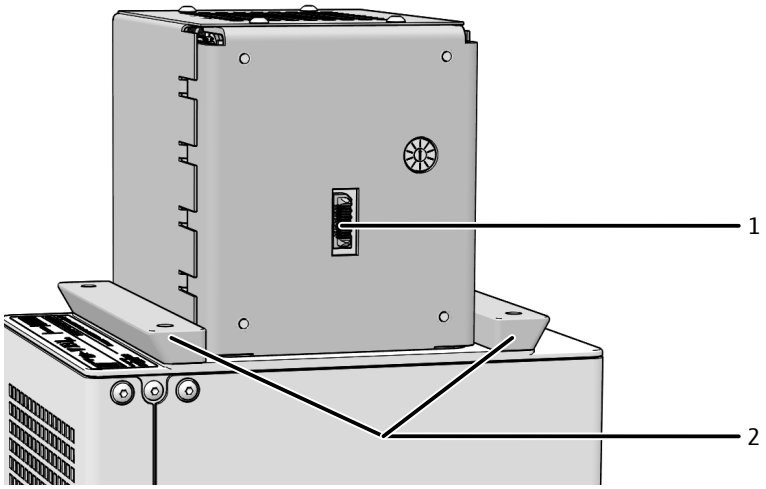


Fig. 2 Guides and connection on the rear of the device

1 Electrical connection 2 Dovetail guide

Bottom of the pipetting head

The pipetting head has a total of 8 channels arranged in a single column. The cones of the individual channels visible on the outside are permanently installed in the pipetting head. Each cone is fitted with an O-ring to ensure tightness when a pipette tip is attached.

An articulated metal plate on the bottom of the pipetting head is used when changing the pipette tips. The individual plate links are lowered and push the pipette tips away from the channels.

The lighting on the bottom of the pipetting head provides better visibility of the current channel positions and pipetting sequences during operation of the pipetting platform.

The following figure shows the bottom of the pipetting head and the elements located there:

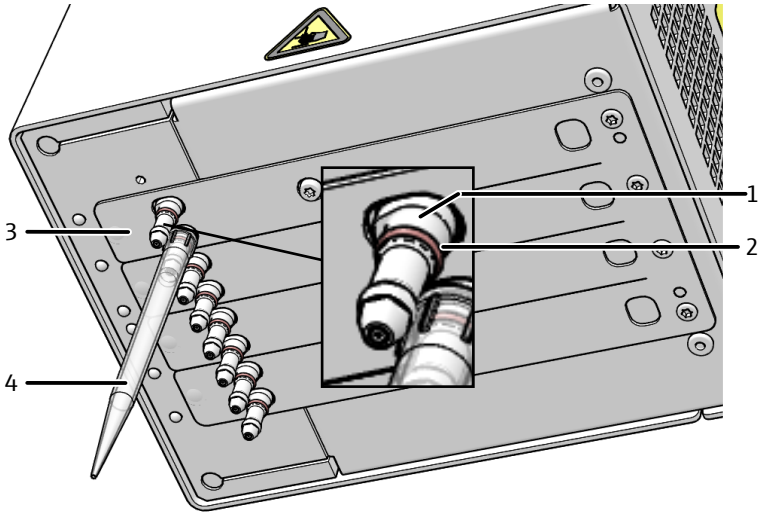


Fig. 3 Bottom of the pipetting head

1 Cone with O-ring
2 O-ring
3 Metal plate for removing the pipette tips
4 Picked-up pipette tip

Accessories

The following accessories are included in the scope of delivery of the pipetting head:

- CyBio FeliX SELECT Head user manual
- "Unboxing SELECT Head" quick reference guide
- Head rest
- Protective caps (not visible here)

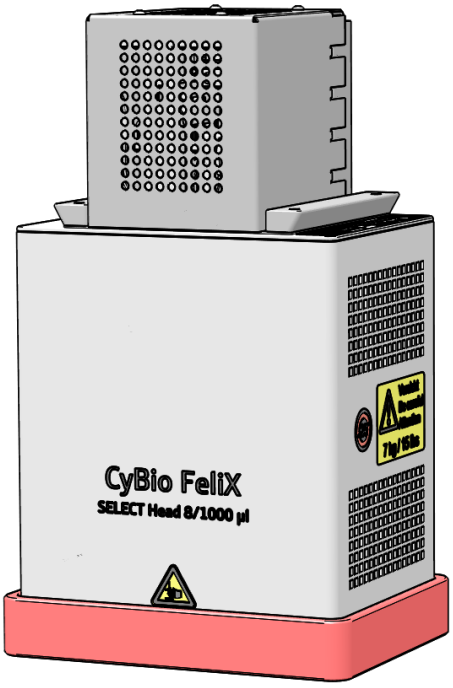


Fig. 4 Pipetting head with head rest

See also

Specifications [▸ 39]

4.2 CyBio SELECT Adapter

By using the CyBio SELECT Adapter accessory, deck positions 13 or 14 are created on the lower deck, on which all wells of a microplate can be reached with all channels of the pipetting head.

The adapter can be placed either above deck positions 1 and 4 or above deck positions 2 and 5. The respective deck positions are covered by the adapter and cannot be used while the adapter is in place.

NOTICE! The adapter is not included in the scope of delivery of the pipetting head.

The adapter is available from Analytik Jena.

Installing the adapter

The two options for positioning the adapter are:
- Above deck positions 1 and 4: deck position 13 available
- Above deck positions 2 and 5: deck position 14 available

On deck position 13:

- ▸ At deck position 1, remove the screw at the bottom right.
- ▸ At deck position 4, remove the screw at the top right.
- ▸ Place the adapter above deck positions 1 and 4.
- ▸ Insert the two screws into the right side of the adapter for safekeeping.

  ✓ The adapter has been positioned.

On deck position 14:

- ▸ At deck position 2, remove the screw at the bottom right.
- ▸ At deck position 5, remove the screw at the top right.
- ▸ Place the adapter above deck positions 2 and 5.
- ▸ Insert the two screws into the right side of the adapter for safekeeping.

  ✓ The adapter has been positioned.

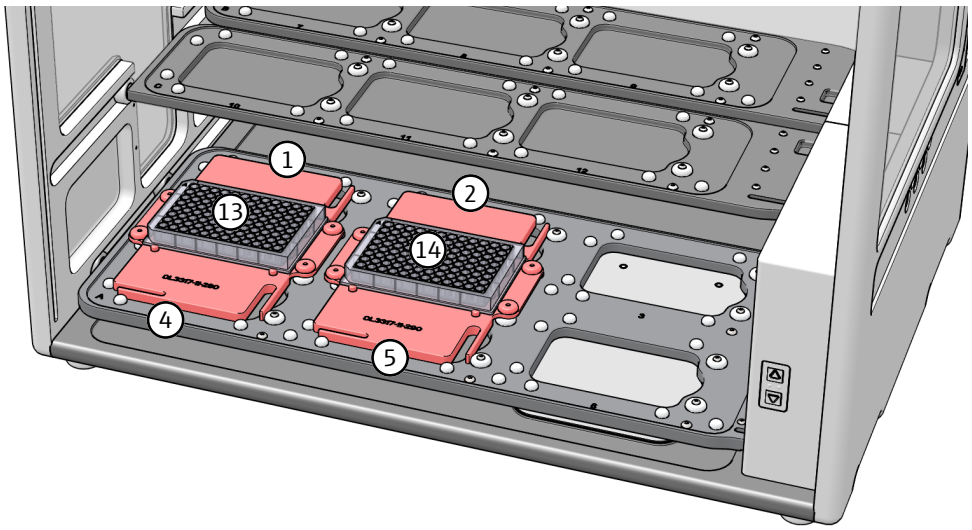


Fig. 5 Adapter on the two possible positions on the lower deck of the pipetting platform

4.3 Type plate

The type plate provides the following information shown in the figure:
- Manufacturer address
- Trademark
- Trade name/device type and model
- Serial number, device number
- CE marking
- Electrical connection data
- Disposal instructions (Do not dispose of as domestic waste!)
- Note: Observe the instructions in the manual!
- IP 20
- Year of manufacture

4.4 Principle of operation

The CyBio FeliX SELECT Head pipetting head is suitable for working with 96- and 384-well microplates, reservoirs and tubes with a minimum diameter of ≥ 3 mm. The 8 channels of the pipetting head can be addressed independently of each other. The individual channels can also pipette different quantities of liquid independently of each other.

The pipetting head works based on the principle of air displacement. The pipette tips are airtight on the pipetting head. Closed air spaces form between the pipette tips and the plungers, in which the plungers move via a mechanical drive. The plunger movement creates negative pressure or overpressure, which causes liquid to be aspirated and dispensed. The process is completed when the pressure is equalized. The time required for pressure equalization depends on the properties of the liquid.

The plunger movement takes place in steps of 0.1 µm. In this way, an accuracy is achieved that is equivalent to a fraction of a microliter.

Other factors influencing the accuracy include:
- Wettability of tips
- Dimensional stability of the outlet opening
- Handling the device and the liquid

Pipetting

A pipetting cycle always consists of the following steps:
- Aspiration (absorption of liquid)
- Dispensing (dispensing of liquid)
- Blowout (ejection of residual volume)
- Returning the plungers to the zero position

Pipetting modes

The pipetting head transfers liquid volumes from a source cavity to a target cavity. Two different pipetting modes for transfer are realized:
- Pipetting
- Reverse pipetting

Pipetting

During pipetting, only the nominal volume of liquid is aspirated from the source cavity for the transfer.

The plunger moves upwards from the starting position (zero position). The volume aspirated by the movement corresponds exactly to the nominal volume. When the volume is dispensed into the target cavity, the plunger moves downwards. The overpressure forces the liquid out of the tip. To empty the tip completely, the plunger is moved beyond the zero position and the remaining liquid is blown out of the tip with the air (blowout).

After the blowout, the plunger returns to the zero position and the next pipetting cycle can begin.

Reverse pipetting

With reverse pipetting, the device aspirates the nominal liquid volume and an additional overstroke volume. Reverse pipetting reduces the risk of frothing and bubble formation. It is therefore particularly suitable for pipetting viscous liquids and liquids with a tendency of frothing. Reverse pipetting is also recommended for the transfer of very small volumes.

The plunger moves upwards from the starting position (zero position). The nominal volume and the additional overstroke volume are aspirated. When dispensing into the target cavity, the plunger only moves down until the nominal volume has been dispensed. The remaining overstroke volume is dispensed back into the source cavity or into a waste cavity with a blowout, i.e., movement of the plunger beyond the zero position.

After the blowout, the plunger returns to the zero position and the next pipetting cycle can begin.

4.5 Applications

With the CyBio FeliX SELECT Head pipetting head, each of the 8 channels can be controlled individually. This feature makes the pipetting head particularly suitable for normalization, hit picking and pooling applications.

NOTICE! An extended description of individual functions of the pipetting head can be found in the Composer help.

Hit picking

During hit picking, volumes of selected wells are aspirated and collected.

Positioning the CyBio SELECT Adapter accessory enables hit picking through the pipetting head.

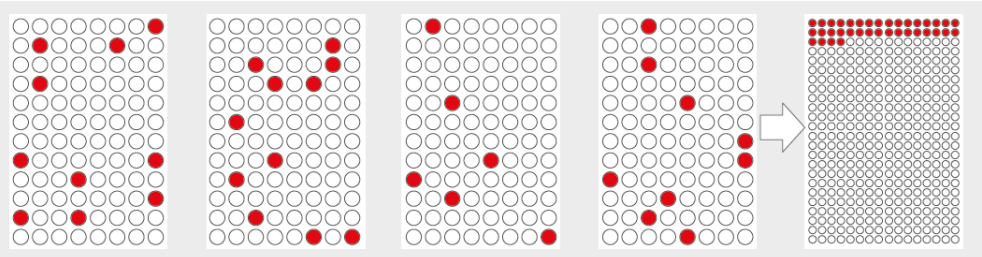


Fig. 6 Hit picking

Normalization

The pipetting head can control the 8 channels individually. The 8 channels can be moved down and up individually, take up samples and transfer individual volumes. This individual control makes it possible to normalize samples. During the normalization process, the volumes or concentrations of samples are adjusted to each other. The following diagram illustrates this process. The different brightness levels of the individual wells represent different volumes or concentrations.

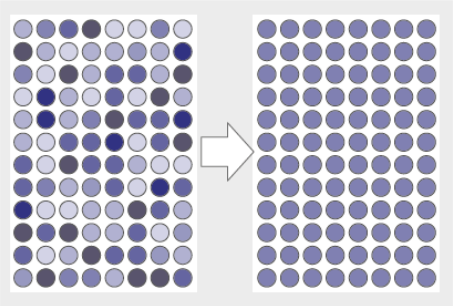


Fig. 7 Normalization

Pooling

You can aspirate liquid from up to eight sources simultaneously and transfer it collectively into a single target cavity, such as a reservoir or a single well.

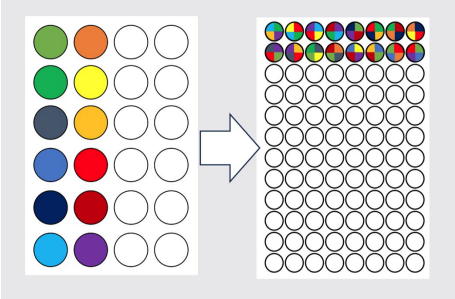


Fig. 8 Pooling

5 Installation and commissioning

5.1 Installation conditions

5.1.1 Ambient conditions

Climatic conditions

The requirements for the climatic conditions at the installation location are set out in the specifications (→ "Specifications" 🖹 39). If required, ensure that the room is temperature-controlled.

Installation location requirements

- Place the device on a stable surface.
- Do not use the device in wet and damp environments. Keep the device surface clean and dry.
- Avoid mechanical shocks and vibrations.
- The installation site must be free of drafts, dust and caustic fumes. Dust and corrosive vapors can cause damage to the device, e.g., due to corrosion.
- Do not locate the device near sources of electromagnetic interference.
- Avoid direct sunlight and radiation from heaters onto the device. If necessary, provide air conditioning.
- The device must be positioned in such a way that allows easy access from all sides.
- Keep the ventilation slits free and do not obstruct them with other devices.

5.1.2 Power supply

The pipetting head is supplied with energy via the pipetting platform. During installation, also observe the information provided in the user manual of the pipetting platform.

5.2 Installation

CAUTION

Danger due to heavy pipetting head

The pipetting head is heavy. Be careful when removing and inserting the pipetting head.

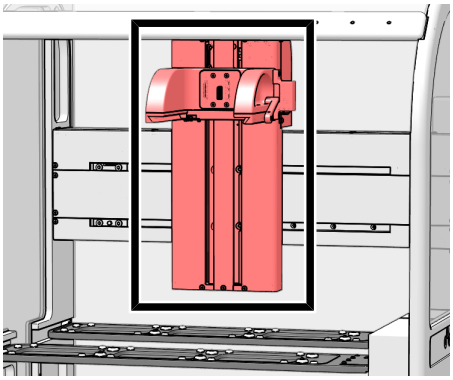
NOTICE

Always store the pipetting head upright and in the head rest provided. Avoid holding the pipetting head in a horizontal position longer than necessary.

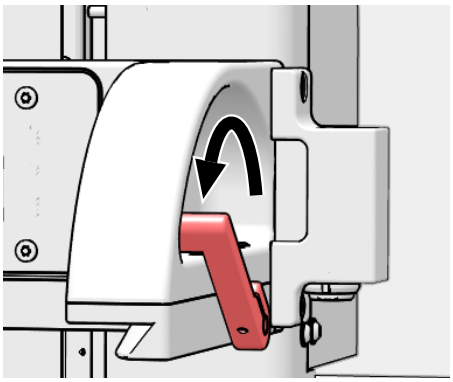
Proceed as follows to install the pipetting head in the pipetting platform:

- ▶ Remove the head rest from the packaging and place it on a stable surface.
- ▶ Remove the pipetting head from the packaging and place it in the securely positioned head rest.

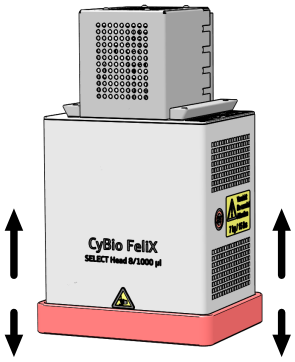
- Verify that the delivery is complete. Check all components of the device for transport damage.
  If the delivery is incomplete or in case of transport damage, contact Analytik Jena.
- Wait until the device has reached room temperature for commissioning.
- Switch on the pipetting platform before inserting the head. Follow the instructions in the operating manual for the pipetting platform when switching on.



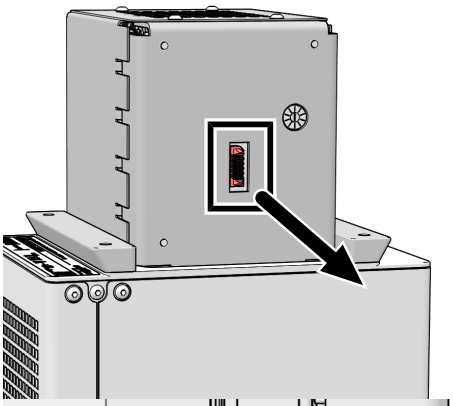
- Use the arrow keys on the pipetting platform to move the head accommodation to the center of the Z-axis.
- Open the blind of the pipetting platform.
- Manually move the head accommodation to the center of the X-axis.

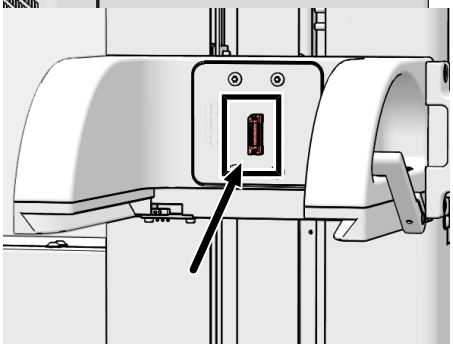


- Fold the head locking lever forwards to unlock.

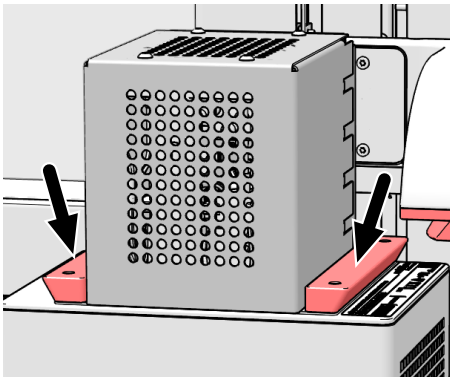


- Remove the pipetting head from the head rest.

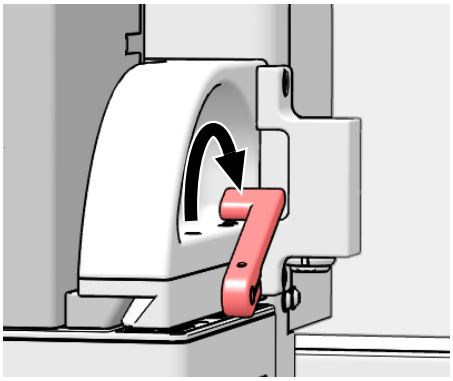




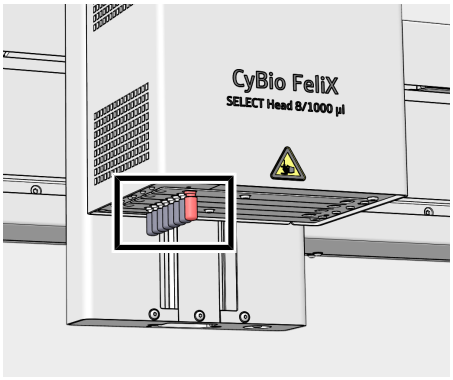
- Place the pipetting head into the head accommodation:
  - Pay attention to the alignment of the pipetting head: The electrical connection of the pipetting head must point towards the head accommodation.



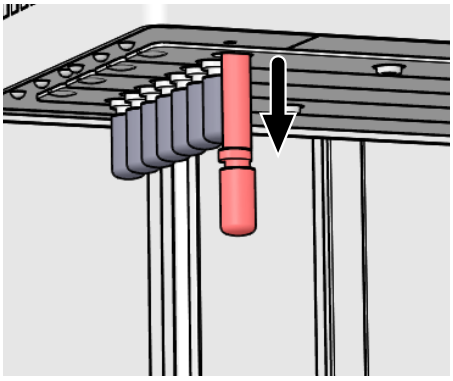
  - Insert the pipetting head into the head accommodation using the dovetail guides (see arrows) and carefully push it back as far as it will go. The electrical connection of the head slides into the connection of the head accommodation.



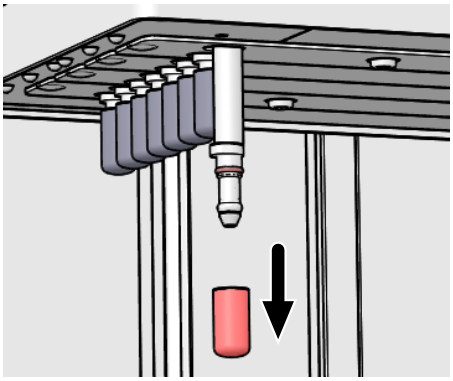
- Fold the locking lever backwards to lock. A lamp lights up on the front of the pipetting head if the connection has been established correctly.
  - ✓ The pipetting head has been attached.



▸ Remove the protective caps from the channels on the bottom of the pipetting head:



– Pull out one channel individually.



– Hold the channel at the cone above the O-ring.
– Remove the protective cap.
– Repeat the process for all eight channels.
✓ The pipetting head is ready for use.

NOTICE! Keep all transport materials, including original packaging, head rest transport locks and protective caps for transportation and storage.

5.3 Installing the CyBio Composer control software and connecting to the CyBio FeliX pipetting platform

Install the CyBio Composer control software and set it up in order to be able to operate the CyBio FeliX pipetting platform with the CyBio FeliX SELECT Head pipetting head.

During installation, the software defines the default settings for using the pipetting head. You can change this later at any time. You can find more detailed information on the settings made in the (→ " Setup in the CyBio Composer control software " 24) section.

Installing Composer

- Open the directory **CyBio Composer X.XX.XX.00\Setup**.
- In the directory, launch the **setup.exe** file. Run the installation with administrator rights.
- Follow the setup instructions.
- Restart the control computer if prompted.
- Select **CyBio FeliX** as the system to be used.

NOTICE! Do not change the default paths!

- Install all the suggested software components.
- Close the **Launch CyBio Composer Setup Wizard** window by clicking on **No**.
- Complete the installation by clicking on **Finished**.

Detecting the serial port

- Start the device manager on the control computer. The device manager can be accessed through the context menu of the START button (Windows operating system).
- Click **+** to expand the **Ports COM and LPT** category. The active serial ports are now listed here.
- If only one serial port is listed: Make a note of the serial port number.
- If several serial ports are listed:
  - Make a note of the available serial ports.
  - Disconnect the pipetting platform at the control computer. The serial port of the pipetting platform disappears when it is disconnected.
  - Re-connect the pipetting platform to the same port. The missing port reappears.

NOTICE! The COM port can change if the pipetting platform connector is plugged into a different interface, if a different pipetting platform is connected, and if the same pipetting platform is connected to a different control computer. If in doubt, check the COM port again before starting the software.

Setting the serial port in the control software

- The CyBio Composer software is open.
- Select **Settings** | **Device Configuration**.
  - ✓ The **Service and device configuration** window opens.
- In the drop-down menu of the **Select configuration** selection field, select **Scripting Studio**.
- Under **Services**, **Serial port** select | **COM CyBio FeliX**.
- Double-click on **COM CyBio FeliX** or click on **Properties**.
  - ✓ The **Properties COM CyBio FeliX** window opens.
- Under **General** | **Port Settings** | **Port** select the detected serial port in the drop-down menu.
- Click **OK**.
  - ✓ The serial port has been set.

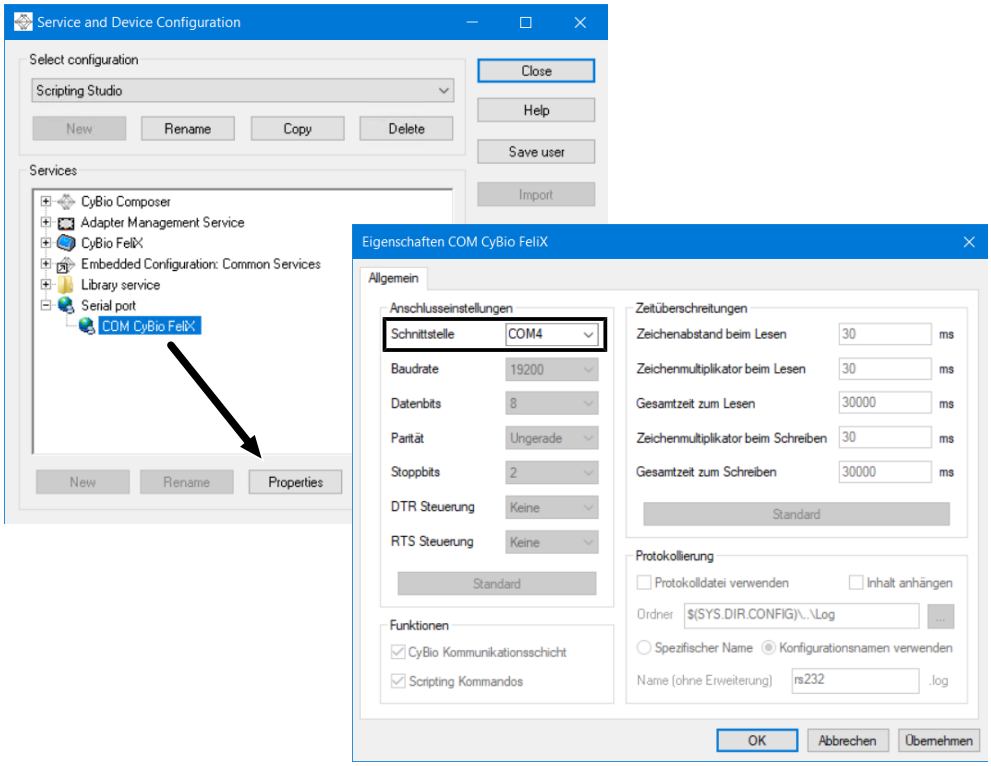


Fig. 9 Setting the serial port

Reading the device information

NOTICE! Do not start reading the device information until after the serial port has been set. If the serial port has not yet been set, an error message will appear when reading the device information.

- The CyBio Composer software is open.
- Select **Settings** | **Device Configuration**.
  - ✓ The **Service and device configuration** window opens.
- In the drop-down menu of the **Select configuration** selection field, select **Scripting Studio**.
- Under **Services**, **CyBio FeliX** select | **CyBio FeliX**.
- Double-click on **CyBio FeliX** or click on **Properties**.
  - ✓ The **Properties of CyBio FeliX** window opens.
- Select **Drive Model** | **Backend Drive** and select the icon with the arrow pointing right ▸.
- In the context menu, click **Read information from device**.
  - ✓ The control software reads the device information from the connected pipetting platform.
- Click **OK**.
  - ✓ The device information has been read and saved.

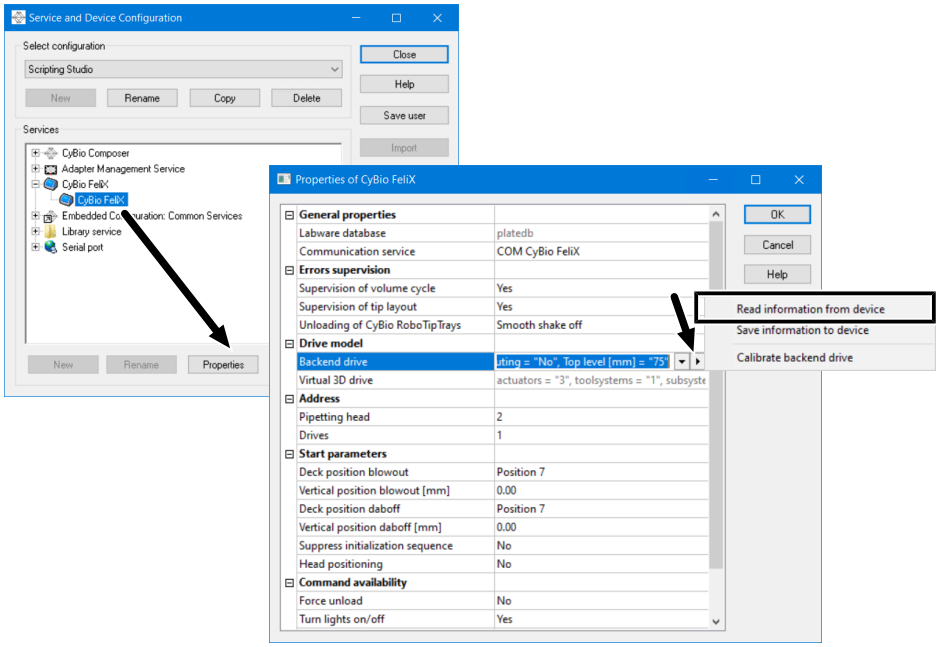


Fig. 10 Reading the device information

5.4 Setup in the CyBio Composer control software

The pipetting head is controlled together with the pipetting platform via the CyBio Composer software.

To be able to use the full range of functions of the pipetting head, the following configuration options are available:

- Activating commands for SELECT Head
- Setting up deck positions 13 and 14
- Optimizing travel paths
- Reducing accelerations
- Showing commands for SELECT Head on the user interface

NOTICE! During installation, the software defines the default settings for using the pipetting head. You can change this later at any time. The settings are described in the following sections.

5.4.1 Activating commands for CyBio FeliX SELECT Head

When using the CyBio FeliX SELECT Head pipetting head, the channels can be selected and controlled individually or in groups in each liquid handling step. Additional commands are available for this control in the CyBio Composer software.

You can find the settings for the commands under the following path:

- ▶ The CyBio Composer software is open.
- ▶ Select **Settings** | **Device Configuration**.
  - ✓ The **Service and device configuration** window opens.
- ▶ In the drop-down menu of the **Select configuration** selection field, select **Scripting Studio**.
- ▶ Under **Services**, **CyBio FeliX** select | **CyBio FeliX**.
- ▶ Double-click on **CyBio FeliX** or click on **Properties**.

✓ The **Properties of CyBio FeliX** window opens.

▶ Collapse the **Command Availability** function by clicking the ⊟ icon and expand it again by clicking ⊞ to display the **SELECT Head** function.

You can activate or deactivate the commands of the pipetting head in the drop-down menu under the **SELECT Head** function.

Then click on **OK** to save the settings and close the window.

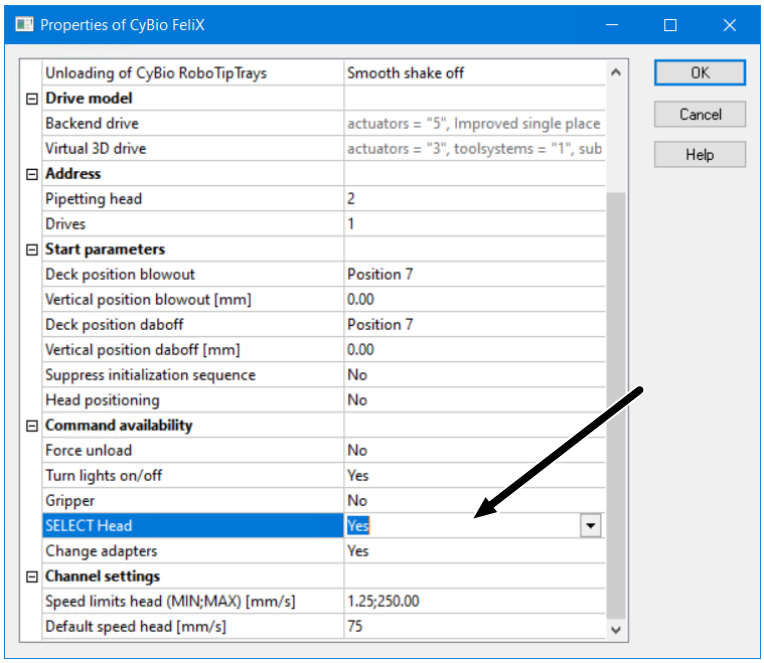


Fig. 11 Activating commands of the SELECT Head

5.4.2 Setting up deck positions 13 and 14

By using the CyBio SELECT Adapter accessory, the full range of functions of the pipetting head can be used. The adapter can be placed either above deck positions 1 and 4 or above deck positions 2 and 5. This creates a new deck position 13 above deck positions 1 and 4 or deck position 14 above deck positions 2 and 5. This position makes it possible to reach all wells of a microplate as well as a reservoir with all channels of the pipetting head.

Place the adapter on the desired deck position on the lower deck of the pipetting platform.

The following figure shows deck positions 13 and 14.

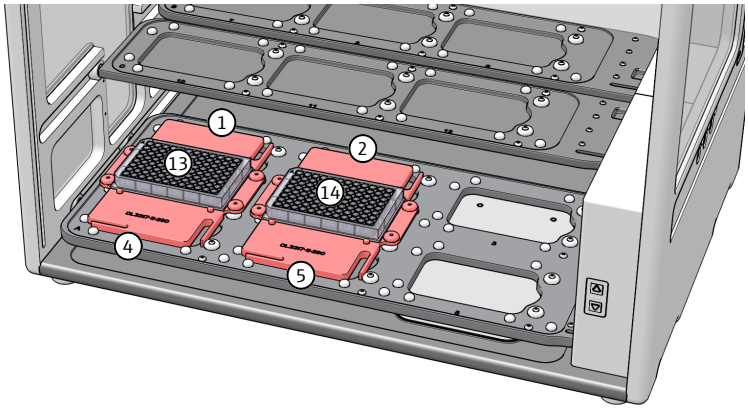


Fig. 12 Deck positions 13 and 14 with one adapter in each position

You can find the settings for deck positions 13 or 14 under the following path:

Setting the number of available positions

- The CyBio Composer software is open.
- Select **Settings** | **Device Configuration**.
  - ✓ The **Service and device configuration** window opens.
- In the drop-down menu of the **Select configuration** selection field, select **Scripting Studio**.
- Under **Services**, **Adapter Management Service** select | **Adapter Management Service**.
- Double-click on **Adapter Management Service** or click on **Properties**.
  - ✓ The **Properties of Adapter Management Service** window opens.
- Select the **Location settings** | **Locations for CyBio FeliX - Virtual 3D drive** function and click on the down arrow icon .
  - ✓ The **Properties of Locations for CyBio FeliX - Virtual 3D drive** window opens.

You can change the number of positions and therefore the available deck positions under **Count Locations**. The positions are then displayed in the list below.

- If you only want to use **deck position 13**, set the number of positions to **13**.
- If you want to use **deck positions 13 and 14**, set the number of positions to **14**.
- If you only want to use **deck position 14**, set the number of positions to **14** and then continue to set up deck position 14 only.

If the number of positions is set to 13 or 14, the new lines appear in the list below: **Adapter location 13** and with 14 positions also **Adapter location 14**. From the drop-down menu for the new lines, select **(no adapter)**.

Then click on **OK** to save the settings and close the window.

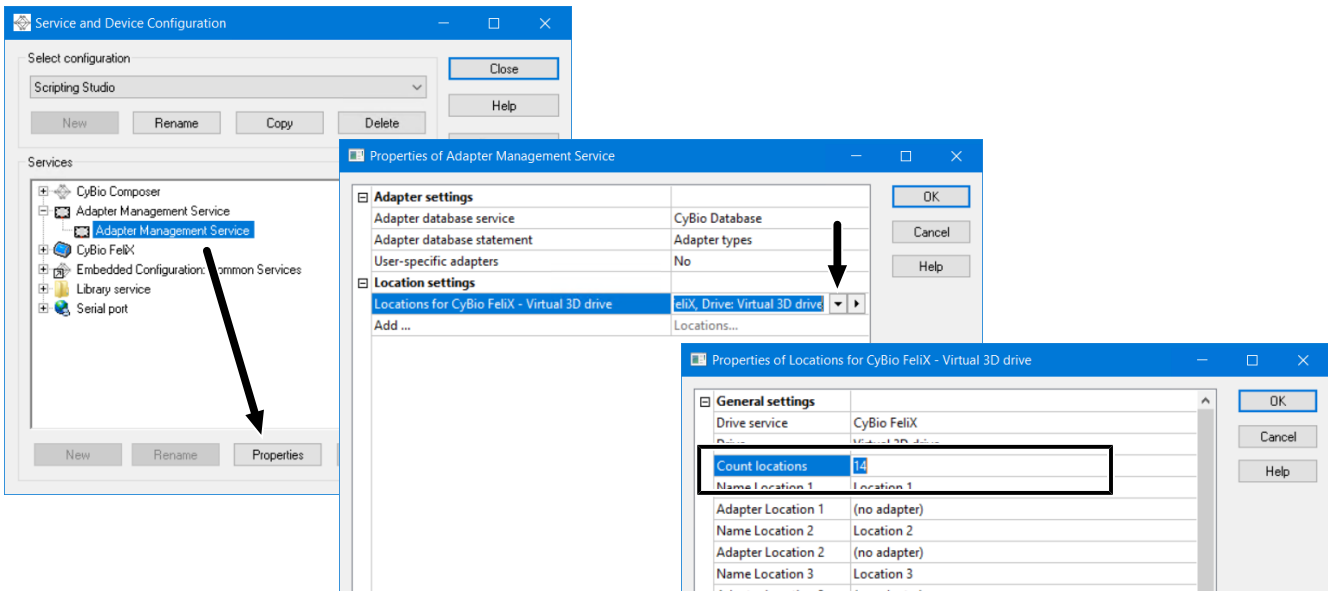


Fig. 13 Setting the number of available positions

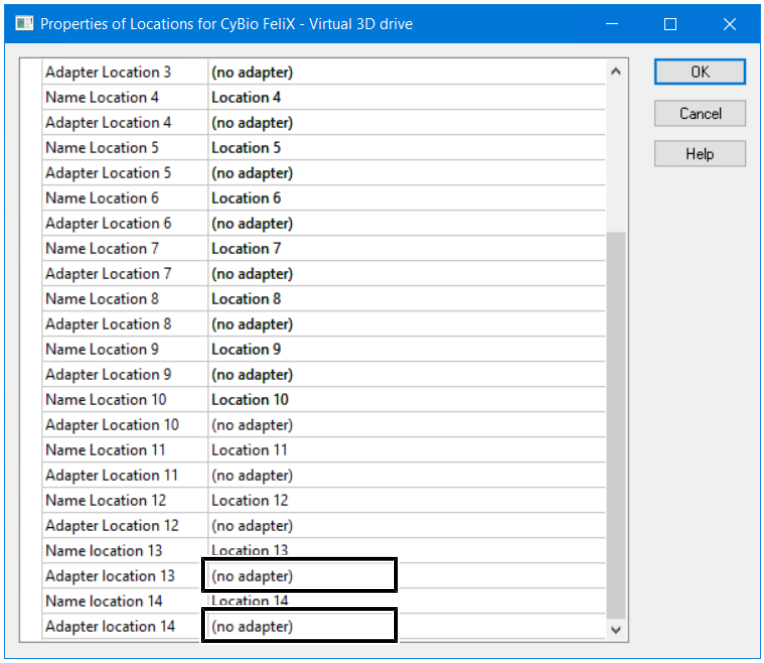


Fig. 14 Settings in the drop-down menus under Adapter location 13 and Adapter location 14

Setting up deck position 13

- Click **OK** to save the settings and close the **Properties of Adapter Management Service** window.
- Click **OK** to save the settings and close the **Properties of Locations for CyBio FeliX - Virtual 3D drive** window.
- In the **Service and device configuration** window, under **Services**, **CyBio FeliX** select | **CyBio FeliX**.
- Double-click on **CyBio FeliX** or click on **Properties**.
  - ✓ The **Properties of CyBio FeliX** window opens.
- Select the **Drive Model** | **Virtual 3D Drive** function and click on the down arrow icon .
- The **Properties of Virtual 3D Drive** window opens.
- Select the **Relative Positions** | **Add ...** function and click on the down arrow icon .
  - ✓ The **Properties of Position [x]** window opens. The settings for position 13 can be made.

You can make the settings for position 13 as follows:

Under **General Settings**, make the following settings:

- **Internal Name**: position_13
- **Display Name**: Position 13
- **Reference Position**: Position 1
- **Location**: position 13

- Under **Actuator Positions**, make the following settings:
  - **X [mm]**: 0.0
  - **Y [mm]**: -65.0
  - **Z [mm]**: 8.0
- Click **OK** to save the settings and close the **Properties of Position [x]** window.

✓ The **Properties of Virtual 3D Drive** window is open. The newly created "Position 13" is selected.

- Press the Enter key to confirm the new position.
  ✓ Deck position 13 has been set up.
  ✓ A new line with **Add ...** appears.

Setting up deck position 14

- Select the **Relative Positions** | **Add ...** function and click on the down arrow icon .
  ✓ The **Properties of Position [x]** window opens. The settings for position 14 can be made.
- Under **General Settings**, make the following settings:
  - **Internal Name**: position_14
  - **Display Name**: Position 14
  - **Reference Position**: Position 2
  - **Location**: position 14
- Under **Actuator Positions**, make the following settings:
  - **X [mm]**: 0.0
  - **Y [mm]**: -65.0
  - **Z [mm]**: 8.0
- Click **OK** to save the settings and close the **Properties of Position [x]** window.
  ✓ The **Properties of Virtual 3D Drive** window is open. The newly created position "Relative 14" is selected.
- Press the Enter key to confirm the new position.
- Click **OK** to save the settings and close the **Properties of Virtual 3D Drive** window.
  ✓ Deck position 14 has been set up.

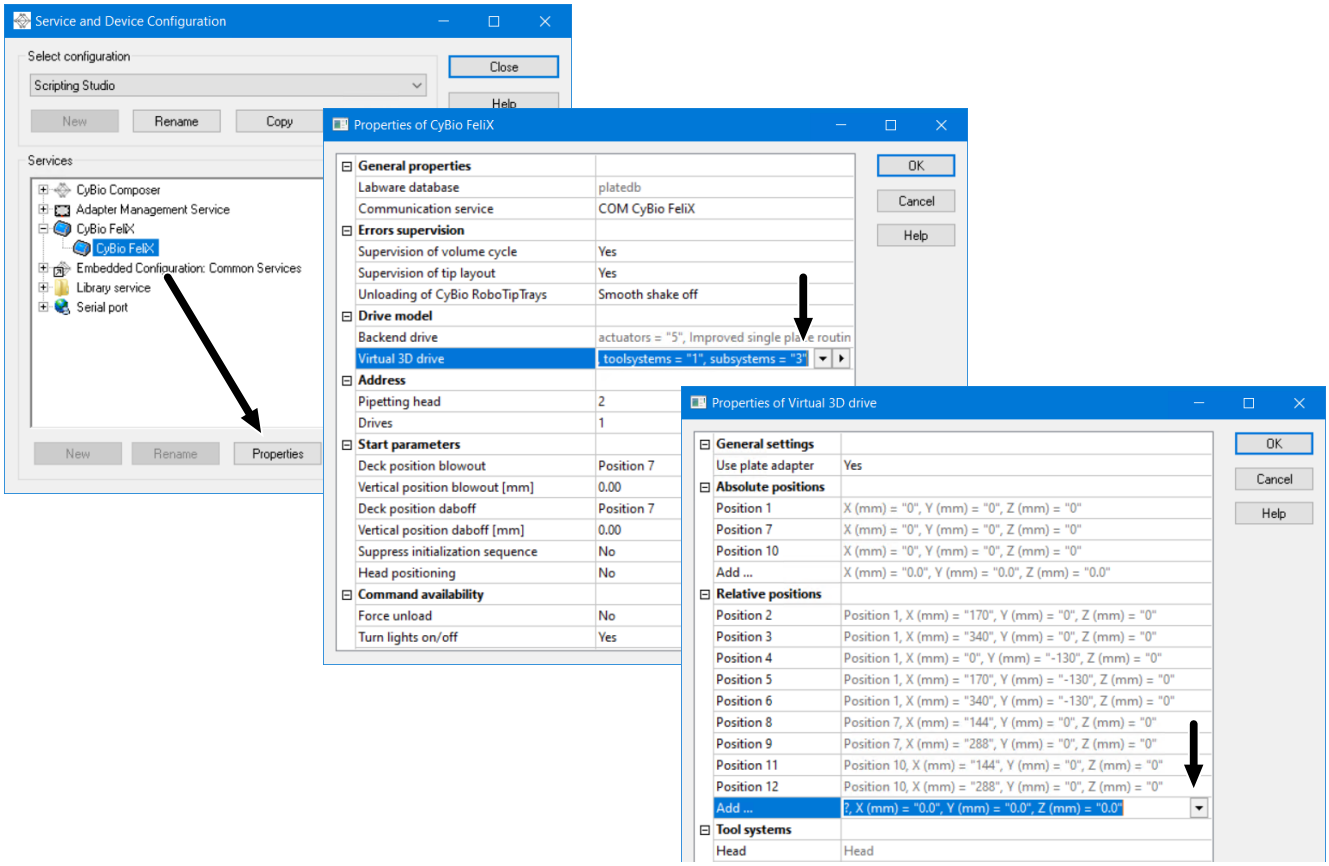


Fig. 15 Setting up deck positions 13 and 14

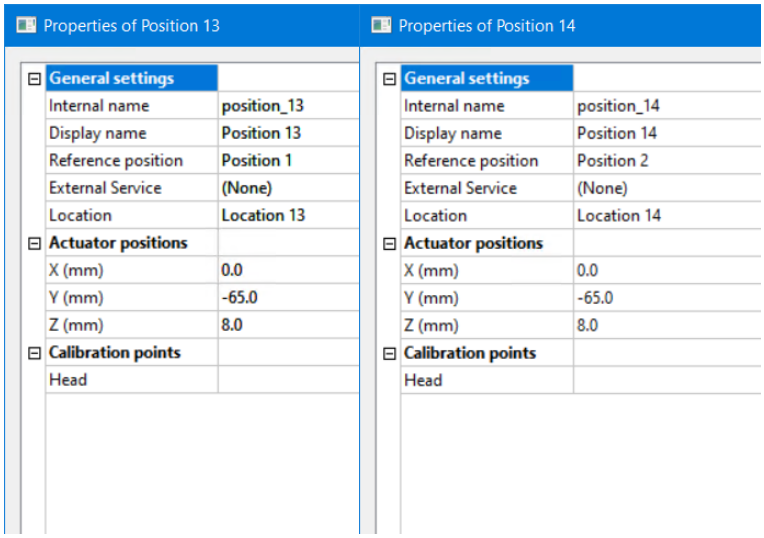


Fig. 16 Settings for deck positions 13 and 14

5.4.3 Optimizing travel paths

In addition to the movement of the head in the Z-direction, the CyBio FeliX SELECT Head pipetting head can also move the individual channels in the Z-direction. You can activate travel path optimization. By optimizing the travel paths, mechanically and energetically intensive movements of the head in the Z-direction can be reduced if the movement in the Z-direction can be achieved solely by lowering and raising the channels.

You can find the settings for optimizing the travel paths under the following path:

⇨ The CyBio Composer software is open.

- Select **Settings** | **Device Configuration**.
  - ✓ The **Service and device configuration** window opens.
- In the drop-down menu of the **Select configuration** selection field, select **Scripting Studio**.
- Under **Services**, **CyBio FeliX** select | **CyBio FeliX**.
- Double-click on **CyBio FeliX** or click on **Properties**.
  - ✓ The **Properties of CyBio FeliX** window opens.
- Select the **Drive Model** | **Backend Drive** function and click on the down arrow icon .
  - ✓ The **Properties of Backend Drive** window opens.

You can activate or deactivate travel path optimization in the drop-down menu under the **Routing Strategy** | **Improved Single Place Routing** function.

If you activate the function with **Yes**, enter the value "13" under the Safety Height function in the new item **Labware Crossing Offset [mm]**.

Then click on **OK** to save the settings and close the window.

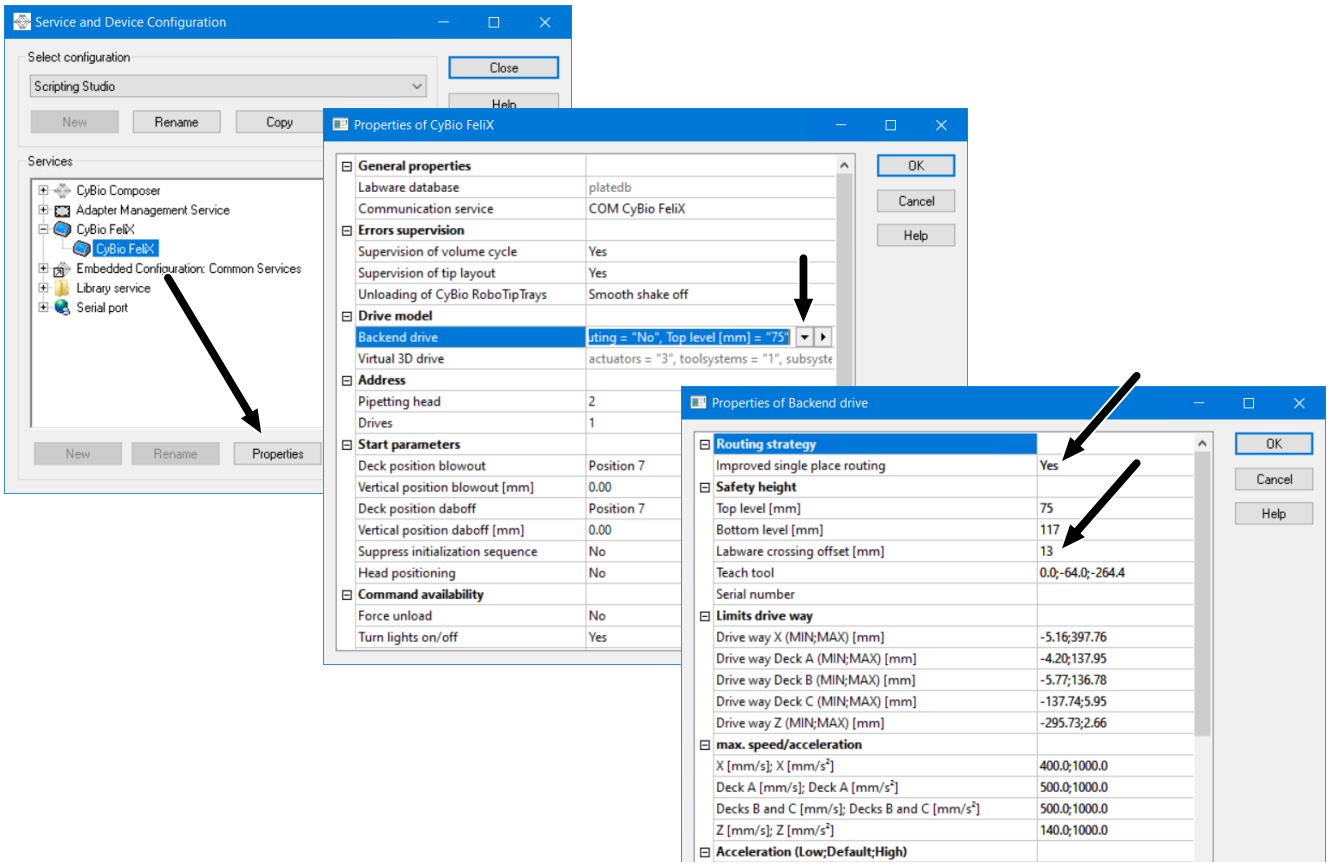


Fig. 17 Optimizing travel paths

5.4.4 Adjusting accelerations

The finer movements of the pipetting head can be better implemented by slowing down the travel paths. You can slow down the travel paths by reducing the preconfigured accelerations of the axis movements.

You can find the settings for adapting the accelerations under the following path:

⇨ The CyBio Composer software is open.

- Select **Settings** | **Device Configuration**.
  - ✓ The **Service and device configuration** window opens.
- In the drop-down menu of the **Select configuration** selection field, select **Scripting Studio**.
- Under **Services**, **CyBio FeliX** select | **CyBio FeliX**.
- Double-click on **CyBio FeliX** or click on **Properties**.
  - ✓ The **Properties of CyBio FeliX** window opens.
- Select the **Drive Model** | **Backend Drive** function and click on the down arrow icon .
  - ✓ The **Backend Drive** window opens.

You can set the acceleration under **Acceleration (Low;Default;High)**. If you want to reduce the acceleration, make the following settings:

- **X [mm/s²]**: 200.0;350.0;700.0
- **Deck A [mm/s²]**: 150.0;350.0;500.0
- **Deck B und C [mm/s²]**: 150.0;350.0;500.0
- **Z [mm/s²]**: 100.0;350.0;500.0

Then click on **OK** to save the settings and close the window.

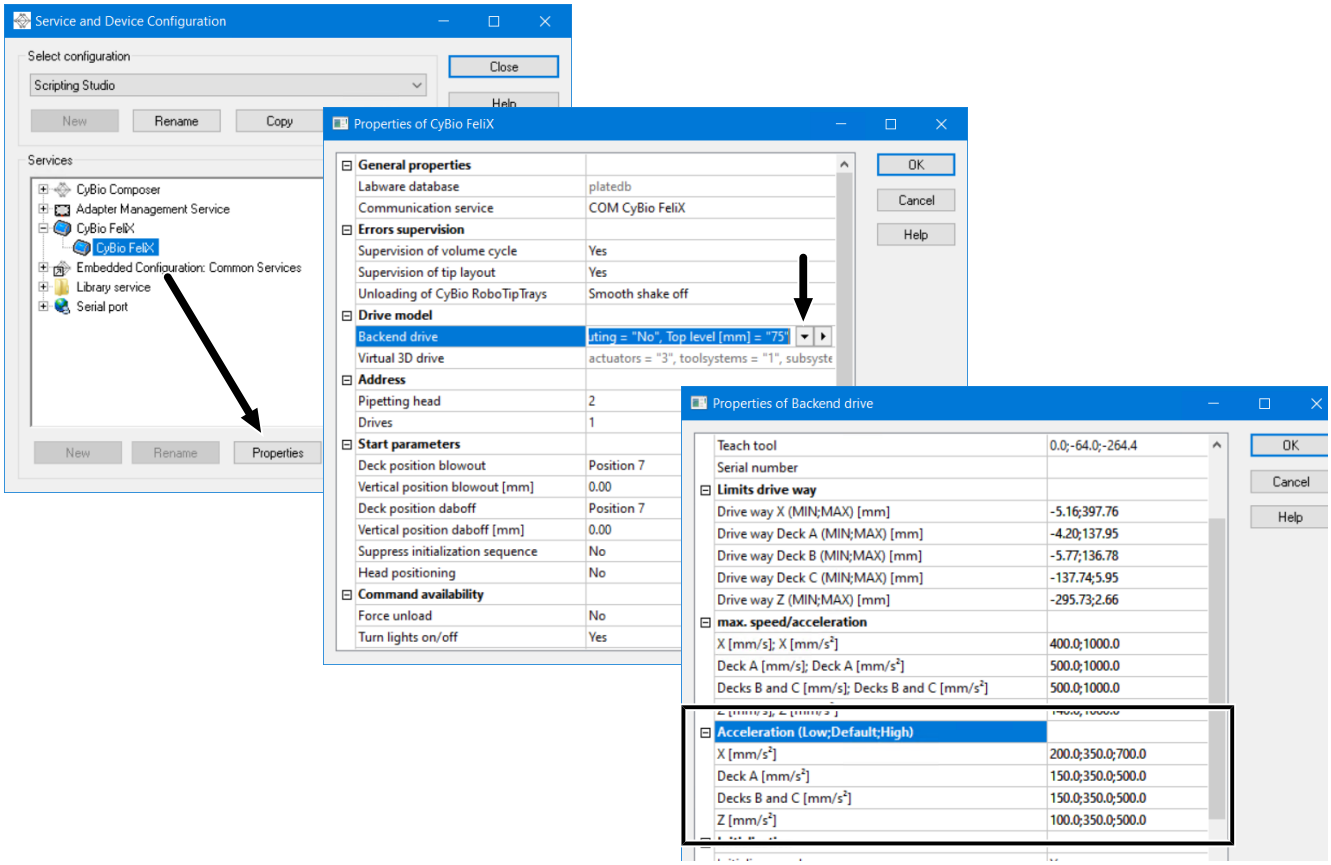


Fig. 18 Reducing accelerations

5.4.5 Showing commands for the Channel settings function on the user interface

You can update the commands in the Scripting Studio user interface to use the commands activated with the SELECT Head function.

You can find the update for the commands under the following path:

⇨ The main window of CyBio Composer is open.

- Right-click in the **Commands** area to open the context menu.
- In the context menu, activate the **Edit Commands** mode by clicking on it.
  - ✓ The command windows are outlined in orange. The **Edit Commands** mode has been activated.
- Open the context menu again by right-clicking.
- In the context menu, click **Reset all**.
  - ✓ The software resets the commands displayed in the **Commands** area and adds the newly added commands for the **Channel settings** function.
- Right-click to open the context menu and deactivate the **Edit Commands** mode by clicking.
  - ✓ The following commands appear if the SELECT Head function is activated under **Commands** | **CyBio FeliX**: **Select channels**, **Move channels** and **Change speed**

You can click on the individual commands and obtain more information on the respective command in the **Dynamic Help** viewlet under **Further assistance on this topic ...**.

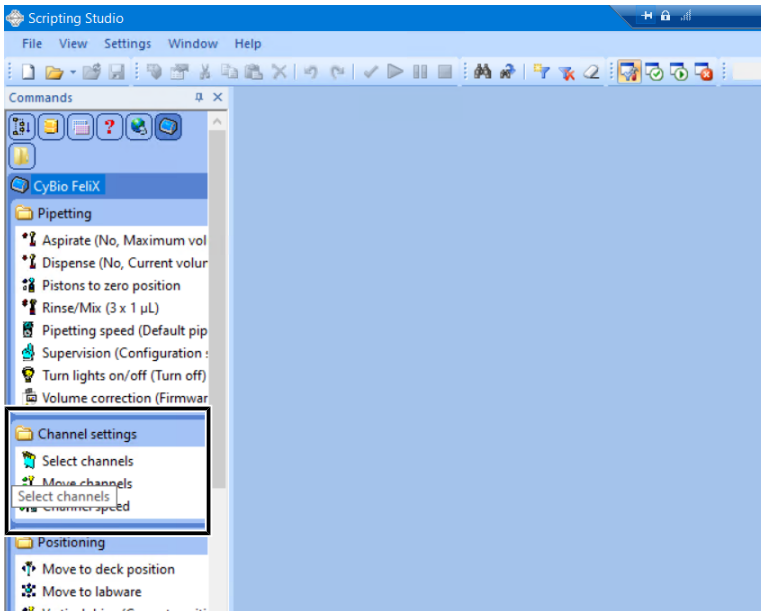


Fig. 19 Commands for Channel settings on the user interface

6 General operating information

Observe the following information when operating the pipetting head:

Energy-saving mode of the control computer

Make sure that the control computer does not switch to energy-saving mode while the pipetting platform is being operated with the pipetting head.

Calculation of the sample volumes

Depending on the well geometry and the set height of the pipette tips above the bottom of the well, a dead volume results during aspiration. Consider this dead volume when calculating the required sample volumes.

7 Maintenance and care

7.1 Maintenance intervals

Maintenance	Interval
Cleaning the pipetting head	If necessary
Perform an impermeability test	If necessary

7.2 Cleaning the pipetting head

NOTICE

Aggressive detergents, flammable liquids, caustic alkaline solutions or solvents such as thinners may cause damage to device components. Do not use these agents for cleaning! Please also note the information on the chemical resistance of the device.

The housing of the pipetting head can be cleaned if it becomes dirty. To do this, proceed as follows:

- Remove the pipetting head from the pipetting platform. For the removal, observe the instructions in the corresponding chapter.
- Place the pipetting into the head rest on a secure surface or have a second person hold it.
- Carry out cleaning or disinfection. Observe the following instructions.

Observe the following instructions during cleaning and disinfection:

General notes

- Use the head rest of the pipetting head to store the pipetting head upright during cleaning and disinfection.
- For cleaning the bottom: You can lay the pipetting head down briefly to clean the bottom. Then place the pipetting head back in the head rest. Do not store the pipetting head in a lying position!
- Prevent any liquid from entering the inside of the pipetting head! Only moisten cleaning cloths and do not use dripping cloths!

Cleaning

- Clean the housing with a soft, damp cloth.

Disinfection

- If the housing is contaminated, disinfect it with commercially available disinfectant wipes or a soft cloth moistened disinfectant solution (e.g., Incidin Liquid, manufacturer ECOLAB).
- Do not use disinfectant sprays and other spray cans for cleaning or disinfection. The gases contained are flammable and can cause personal injury or damage to the device if ignited.

7.3 Leak test

You can perform the impermeability test to ensure that the pipetting head has no liquid leaks. You check the cones, the pipette tips, and the O-rings with the test.

Materials and reagents for the impermeability test:

- Reservoir
- Deionized water or dye solution
- Spirt level
- Flashlight, magnifying glass
- Marker pen, ruler

Aspirate a certain volume of liquid.

You can use distilled water as the liquid for this test. You can further improve visibility by using a dye solution instead of water.

Observe if the liquid level in the pipette tips remains constant over a period of 30 minutes.

Course of events

- ▶ Use a spirit level to check that the device is level. If necessary, realign the device.
- ▶ If necessary, eject any tips that are still on the device.
- ▶ Check the O-rings thoroughly for cracks or deposits using a light source such as a flashlight or a magnifying glass. If there are visible cracks or signs of wear on the O-rings, contact, contact the Analytik Jena service and have the O-rings replaced by the service team.
- ▶ Pick up new tips.
- ▶ Place the reagent reservoir containing the distilled water or dye solution in the designated position on the decks.
- ▶ Move the pipetting head to the reagent reservoir. The pipette tips should be immersed in the solution to a depth of 3 mm from the bottom.
- ▶ Before the actual pipetting process of the test volume, moisten the pipette tips and system with the test solution (prewetting) by aspirating and dispensing the maximum tip volume at least twice. Create a routine with the following properties for prewetting in the CyBio Composer software:
  - Procedure of a complete pipetting cycle: Aspirate, dispense, blowout, return the plungers to the zero position
  - Aspirated volume: maximum tip volume
  - Target cavity: Dispense the dispensing volume and blowout volume back into the reservoir
  - Repetitions: Run the routine and thus the pipetting cycle at least twice
- ▶ Absorb 50% of the maximum tip volume of dye solution. Leave the tips in the solution.
- ▶ Mark the water level at the foremost and rearmost tips, if required. The marking makes it easier to read later.
- ▶ After 30 minutes, move the tips out of the solution.
- ▶ Check the liquid levels of all pipette tips. A ruler for visual connection of the level point on the foremost and rearmost pipette makes reading easier.
- ▶ Document all tips whose level has changed.

  ✓ The impermeability test has been carried out.

Result of leak testing

The fill level of all pipette tips must not change by more than 2 mm. A drop in level in a pipette tip indicates a possible leak. Repeat this test with new pipette tips. If the leak is found to occur in the same place, you should contact the customer service department of Analytik Jena or your service partner.

8 Transport and storage

8.1 Preparing the device for sending it in and for storing it

CAUTION

Danger due to heavy pipetting head

The pipetting head is heavy. Be careful when removing and inserting the pipetting head.

NOTICE

Risk of device damage due to unsuitable packaging material

- Only transport the device and its components in the original packaging.
- Empty the device completely and attach all transport locks before transporting the device.
- Add a suitable desiccant to the packaging to prevent damage from moisture.

▶ Empty, loosen and remove the pipette tips.

⚠ CAUTION! Do not remove the pipette tips manually! There is a risk of fingers being crushed. Remove the pipette tips only via the corresponding command in the software.

▶ Place the protective caps on the cones.

▶ Remove the pipetting head from the pipetting platform.

▶ Insert the pipetting head upright into the transport locks in the original packaging. Then also insert the head rest into the transport lock.

▶ Close the packaging.

✓ The pipetting head is packed for return and storage.

8.2 Returning the product

WARNING

Risk of damage to health due to improper decontamination

- Decontaminate the device professionally and document the cleaning measures before returning the device to Analytik Jena.
- The customer service department will send you the decontamination declaration when you register the return.

NOTICE

Risk of device damage due to unsuitable packaging material

- Only transport the device and its components in the original packaging.
- Empty the device completely and attach all transport locks before transporting the device.
- Add a suitable desiccant to the packaging to prevent damage from moisture.

Contact the Analytik Jena service or your local service partner or dealer if you have a device error or require other assistance.

Please have the following information ready:
- Name of the company
- Device name of the affected device (to be found on the type plate)
- Serial number of the affected device (to be found on the type plate)
- Detailed error description: Which error occurs? Under what circumstances and in what situation?

If you are asked by the Analytik Jena service or your local service partner or dealer to return the affected device, please observe the following instructions:
- Please clean all device components from biologically hazardous, chemical and radioactive contamination.
- Only use the original packaging for shipment and insert the transport lock. If you do not have the original packaging anymore, please contact the Analytik Jena service or your local dealer.
- When registering the return, you will receive a decontamination declaration from the customer service. Attach the completed and signed decontamination declaration in a **weatherproof** manner to the **outside of the shipment**.
- Attach the following warning notice: "CAUTION! SENSITIVE ELECTRONIC DEVICE!" to the outside of the shipment.
- Please observe all further information on returns that you receive from the service department.

8.3 Storage

NOTICE

Risk of device damage due to environmental conditions

Environmental influences and condensation can destroy individual components of the device.

- Only store the device in air-conditioned rooms.
- Ensure that the atmosphere is free of dust and corrosive vapors.

If the device is not installed immediately after delivery or not required for longer periods, it should be stored in its original packaging. A suitable desiccant should be added to the equipment to prevent damage from moisture.

The requirements for the climatic conditions of the storage location can be found in the specifications.

9 Disposal

At the end of its service life, the device and its electronic components must be disposed of as electronic waste in accordance with the applicable regulations.

The operator is responsible for correct disposal of biological samples in accordance with statutory regulations.

Dispose of consumables that are contaminated with hazardous substances in accordance with the applicable national and international regulations on safety and environment.

10 Specifications

10.1 Technical data

General information

Product description	CyBio FeliX SELECT Head
Models	CyBio FeliX SELECT Head 8/50 µL CyBio FeliX SELECT Head 8/250 µL CyBio FeliX SELECT Head 8/1000 µL
Software	CyBio Composer, from version 02.72.01.00
Dimensions (HxWxD) ■ With retracted channels ■ With extended channels	 ■ 30.0 cm x 16.5 cm x 12.8 cm ■ 35.0 cm x 16.5 cm x 12.8 cm
Travel path of the channels, in Z-direction	50 mm
Mass	4.7 kg
Interface	Proprietary connector
Noise emissions	< 70 db (A)

Available models

Properties	CyBio FeliX SELECT Head 8/50 µL		CyBio FeliX SELECT Head 8/250 µL	
Volume range	1 to 50 µL		10 to 250 µL	
Specified volume range Precision*	3 to 5 µL > 5 to 50 µL	< 3 % < 2 %	10 to 25 µL > 25 to 250 µL	< 3 % ≤ 2 %
Unspecified volume range Precision**	1 to < 3 µL	CV ≤ 10 %	5 to < 10 µL	CV ≤ 10 %
Channels	8			
Formats	■ 96-well and 384-well microplates ■ Reservoirs ■ Tubes Cavities with a diameter ≥ 3 mm			

Properties	CyBio FeliX SELECT Head 8/1000 µL	
Volume range	25 to 1000 µL	
Specified volume range Precision*	25 to 100 µL > 100 to 1000 µL	≤ 3 % ≤ 2 %
Unspecified volume range Precision*	10 to < 25 µL	CV ≤ 10 %
Channels	8	
Formats	■ 96-well and 384-well microplates ■ Reservoirs ■ Tubes Cavities with a diameter ≥ 3 mm	

*All precision specifications are based on the standard absorbance measurement method as described in the pipetting head manual, and depend on the selected pipetting head and tip type. For further details, please also refer to ISO 23783.

**Probable working range with CV ≤ 10%, not guaranteed.

CyBio SELECT Adapter

Name	CyBio SELECT Adapter
Dimensions (HxWxD)	1.2 cm x 16.2 cm x 21.6 cm
Mass	0.65 kg
Offset to deck position	6.5 cm

Electrical variables

Voltage	24 V DC, via proprietary interface

10.2 Ambient conditions

Temperature during operation	+ 15 to + 37 °C
Maximum humidity during operation (at 30 °C)	≤ 85 %
Minimum humidity during operation (at 30 °C)	≥ 40 %
Temperature during storage	- 10 to + 50 °C
Humidity during storage (at + 30 °C)	≤ 75 %

10.3 Standards and directives

Device safety

The device complies with the following safety standards
- 2006/42 EC
- EN ISO 12100
- EN 61010-1 + A1
- EN IEC 63000

EMC compatibility

The device meets the requirements for interference and interference immunity in accordance with EN IEC 61326-1.

Guidelines for China

The device contains substances subject to regulation (according to regulation GB/T 39560). Analytik Jena guarantees that, if the device is used as intended, these substances will not leak within the next 25 years and therefore will not pose a threat to the environment or health within this time period.

EU directives

The device meets the requirements of Directive 2011/65/EU including (EU) 2015/863.

The device is designed and tested in accordance with standards meeting the requirements of EU Directive 2014/30/EU. In accordance with annex I no. 1.5.1. of the Machinery Directive 2006/42/EC, the protection objectives of the Low Voltage Directive 2014/35/EU have also been complied with.

11 Revision overview

Version	Effective date	Changes
A	02/2025	First version

List of figures