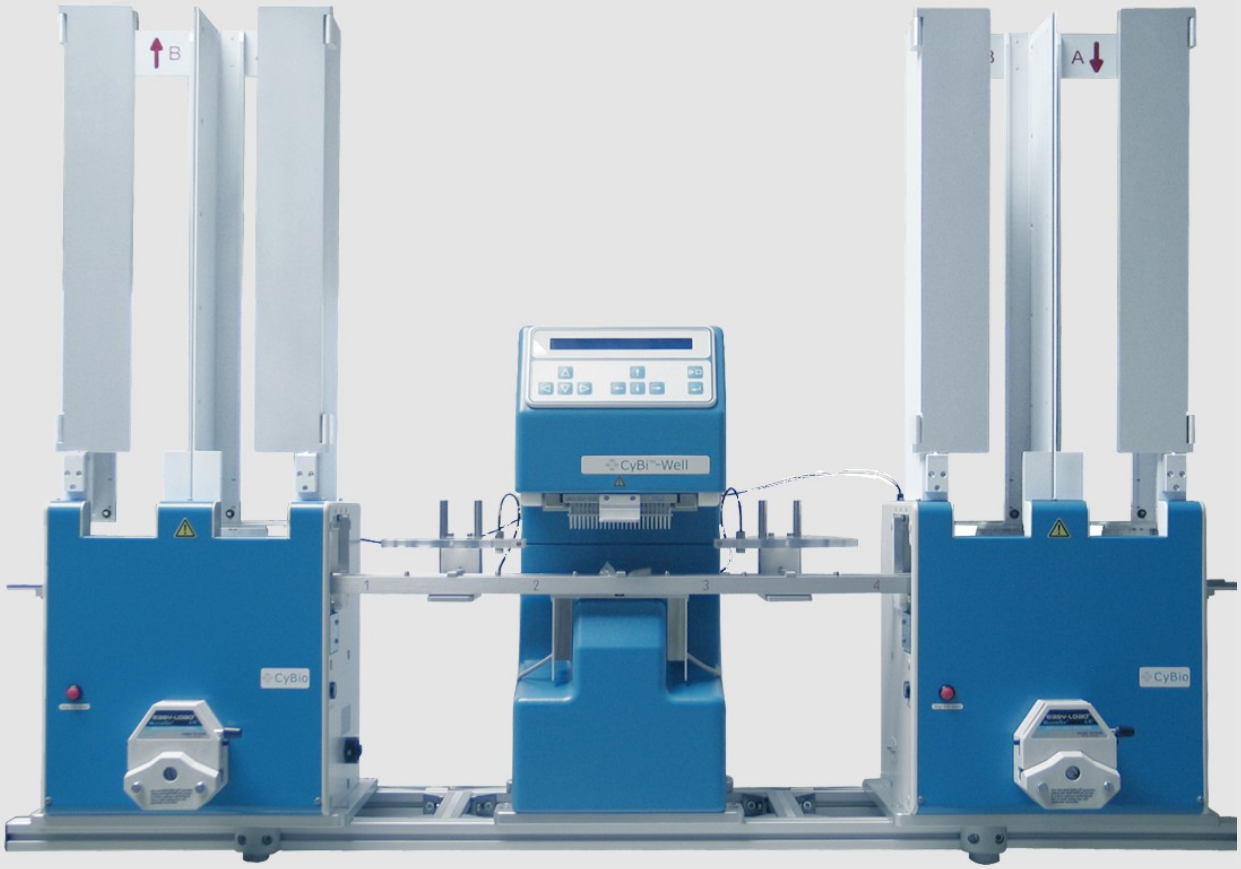
CyBio

CyBi®-Well



User Manual

your solutions

Publisher

CyBio

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Der Unterzeichner, der den nachstehenden Hersteller vertritt,
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erklärt hiermit, dass bei der Entwicklung/Änderung des Produktes
hereby declares that during development/modification of product

CyBi®-Well

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Vorstand der CyBio AG
Executive Board of CyBio AG

ppa.
Leiter Produktion und Service
Head of Production and Service

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Seite 1 von 1

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1 General Information

1.1 General User Manual Advice

This User Manual informs about the setup and function of CyBi®-Well systems. It also provides qualified operating personnel with knowledge required for the safe handling of the system and its components.

Furthermore, this User Manual includes advice on system maintenance and care action, providing references to sources of potential faults or malfunction with related proposals for removal of faults.

This User Manual must be readily available to operating and maintenance personnel at all times!

NOTE
The information contained herein reflects the latest state of knowledge at the moment of going to press. CyBio AG reserves its right to make changes if deemed necessary in the interest of technical progress.

Conventions

Work instructions involving a timed sequence are numbered, merged to action units and specify related results.

Enumerations without a timed sequence are shown as bullet-style listings, sub-enumerations as dash-style listings.

Safety notes are marked with pictograms and a signal word (meaning of selected pictograms and signal words siehe Kapitel "Safety Notes"). They specify the type, source and consequences of a hazard, giving advice for accident prevention. A safety note always **precedes** a work instruction.

Control and evaluation software elements are labeled as follows:

Control buttons, menus, description fields, checker boxes and **option fields** are shown in bold lettering enclosed in brackets (for example, **[OK]** button, [**Devices**]) menu.

Menu and option sequences are separated by arrow
(e. g. Menu **[File]** => **[Open]**).

- ❑ References to windows are shown in italics (e.g. *Measurement* window).
- ❑ Field, frame and tab names are shown in bold lettering (for example, **Software** tab, **Position** frame).

Cross references (internal) are marked with an arrow and shown in italics.

1.2 Intended Purpose

The CyBi®-Well provides a simultaneous pipetting tool for automated processing of 96-well, 384-well or 1536-well capacity microplates in accordance with SBS standard requirements. Its basic functions are dosing, pipetting, dispensing, diluting, rinsing, tip change, transportation and stacking of microplates. Optional supplementary capabilities are e. g. the stockpiling of microplates (in stackers) and a reservoir filling station.

The CyBi®-Well pipettor is intended for laboratories doing research and development in the fields of pharmacy, biochemistry, clinical chemistry, combinatorial chemistry, molecular biology, molecular genetics and cell biology, as well as such laboratories where pipetting operations have to be carried out in a highly parallel, rapid and precise manner.

Users are prohibited from operating this system in any way or mode other than described or specified in this User Manual. Practical pipettor operation is restricted by the functional scope of available software and firmware and by the scope of delivery.

1.3 Conforming Use

The term "conforming use" of the CyBi®-Well pipettor includes 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.

NOTE
Non-conforming use of the CyBi®-Well pipettor will void any claim for warranty or liability by CyBio AG in the event of material damage or personal injury!

The term non-conforming use, typically, includes:

- ❑ operating the system in medical laboratories
- ❑ working with explosive substances
- ❑ working in a potentially explosive atmosphere

NOTE
CyBi®-Well system operation with involvement of dangerous substances will be the sole responsibility of the user!

This implies the need to observe all safety requirements in force regarding the protection of persons and objects where radioactive, infectious, poisonous, corrosive, combustible and other hazardous substances are handled. It will the user's responsibility to comply with all requirements on laboratory equipment and installations and the con-

duct of personnel in respect of maintaining cleanness, sterilization, environmental protection and disposal of waste.

For operation with involvement of hazardous substances, the user is recommended to issue internal work instructions. Accordingly, this User Manual contains no safety notes to protect from personal injury or material damage caused by substances under examination.

Process control relies on integral CyBio AG control software. Changes in or damage to software may result in faulty processing sequences or damage the system or its hardware components. Software protection is the sole responsibility of the user.

1.4 Warranty & Liability

The period of warranty and scope of liabilities will be as stipulated under binding law and provided for in the General Terms of Business of CyBio AG.

Warranty will be limited to repair services or replacement of damaged parts. It will exclude consequential damage of any kind. Damage to wear parts and cases of glass breakage will not be covered by this 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.

In the event of personal injury or material damage, claims for warranty or liability will be refused, unless the CyBi®-Well can be shown to have been operated in accordance with section → *1.3* (→ *"Conforming Use"*).

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.

1.5 Scope of Delivery

CyBi®-Well system delivery includes:

- ❑ CyBi®-Well
- ❑ Transporting system (linear type or circular type)
- ❑ CyBio® Composer software
- ❑ User Manual
- ❑ Optional accessories

2 Technical Data

2.1 General Data

General characteristics	
Designation/Type	CyBi®-Well
Number of pipette tips	96 (8x12 matrix) or 384 (16x24 matrix)
Dosable volumes	
1...250µL	Randomly selectable in steps of 0.1 µL
0.1...25µL	Randomly selectable in steps of 0.01 µL
Precision (variation coefficient CV)	
CyBi®-Well 96 250µL dosing head	
Precision for volume range of 10...25µL	Variation coefficient ≤ 2%
Precision for volume range of 25...250µL	Variation coefficient ≤ 1%
CyBi®-Well 96 25µL dosing head	
Precision for volume range of 5...10µL	Variation coefficient ≤ 2%
Precision for volume range of 10...25µL	Variation coefficient ≤ 1%
CyBi®-Well 384 25 µL dosing head	
Precision for volume range 2...5µL	Variation coefficient ≤ 2%
Precision for volume range of 5...10µL	Variation coefficient ≤ 1%
Lifter	
Servo lifter	Horizontal motion in X- and Y-coordinate direction (16 positions on microplate)

Table 1: General data

NOTE
For the variation values quoted above, strict adherence to the procedure described in section → *"Precision Test"* is a compulsory prerequisite.

Pipetting tips	
Single-use tips	250 DW, 250 SW 60µL, 25µL, 10µL polypropylene (PP) single-use tips in standard version, sterile PCR-certified or APR-compatible quality version
Channels	96 or 384
Microplate specifications	
Formats (SBS standard)	96-, 384-, 1536-shallow-well microplates 96-, 384-, 1536-deep-well microplates
Plate positions – Linear position – Positions at rotary table	 3, 4, 5 10

Table 2: Pipetting tips & microplates

Dimensional & weight details	
Width x height x depth (shallow well; without transporting system)	(220 x 501.5 x 260) mm
Width x height x depth (deep well; without transporting system)	(220 x 542.5 x 260) mm
Width x height x depth (with 3-place linear transporting system)	(960 x 501.5(542.5) x 260) mm
Width x height x depth (with 4-place linear transporting system)	(1300 x 501.5(542.5) x 260) mm
Width x height x depth (with 5-place linear transporting system)	(1650 x 501.5(542.5) x 260) mm
Width x height x depth (with 10-place circular transporting system)	(700 x 501.5(542.5) x 856) mm
Weight: – Basic unit – Basic unit with rotary table	 About 20kg About 50kg

Table 3: Dimensional and weight details

Operating data	
Utility class	Bench-top device, closed room facilities in clean condition
Protection class	I
Protection type	IP 31
Interference suppression	EN 55011 (DIN VDE 0875, Part 11) Limit value Class A
Interference immunity	DIN EN 61000-6-2
Operating voltage	230 V ± 10%, 50/60 Hz 115 V ± 10%, 50/60 Hz
Inlet fusing	230V: T1,6A 115V: T3,15A
Power consumption	≤ 200 VA
Airborne sound emission	< 75dB (A)
Interface	RS 232 C, Sub-D 9-pin
Storage & operating requirements	
Storage & transportation: – Allowable ambient temperature – Allowable relative air humidity	 -10 °C to +50 °C ≤ 85% at 30 °C
Operation: – Allowable ambient temperature – Allowable relative air humidity	 +15 °C to +35 °C ≤ 75% at 30°C, no formation of condensate
Condition of floor base	Stable, horizontal, dry, free from vibration

Table 4: Operating data

3 Safety Notes

3.1 General

NOTE

For your own safety and to ensure failsafe and reliable CyBi®-Well system operation, you should carefully read this chapter before proceeding with any kind of start-up work!

You are advised to follow all safety notes that precede a description of required action in the various chapters of this User Manual, and any messages or advisory notes which are output by control and evaluation software for displaying on the monitor screen.

3.2 Standards & Guidelines

The CyBi®-Well has been built to meet currently valid rules of technology and generally established requirements on safety engineering.

The system and its components have been designed in accordance with basic safety and health requirements in applicable laws, standards and guideline regulations. CE-labelling and a declaration of conformity (→ *refer to page IV*) are included to document the safety of the system and its components.

All statements on safety are derived from currently valid regulations of the European Union. Other specific national laws and regulations must be observed.

In addition to the safety notes in this Manual and local safety practices as may be applicable to system operation from case to case, generally established accident prevention, industrial labour protection and environmental protection rules must be considered and duly followed.

Notices concerning potential hazards do not replace industrial health and safety regulations that must be observed under binding legislation.

3.3 NRTL Certification

The CyBi®-Well has been tested for functional and safety features by an officially approved certification institute. Based on this test, it qualifies for marking with a certification sign.

3.4 Symbols & Signal Words Used Throughout This Manual

To alert to potentially dangerous situations or provide useful advice, this User Manual uses the following symbols and signal words. A safety note always precedes the description of an action.

WARNING
Indicates a potentially hazardous situation
that may result in death or severe physical injury (crippling) if not avoided.

CAUTION
Indicates a potentially hazardous situation
that may result in light or minor injuries or material damage if not avoided.

NOTE
Provides operator advice and other particularly useful information for situations involving no danger or harm.

ENVIRONMENTAL PROTECTION
Provides operator advice and information that may prove helpful for the proper disposal and handling of selected substances and materials.

3.5 Safety Labelling Provided at the System

NOTE
Affixed warning notes and safety symbols are an integral part of the system and its components and must be followed under any circumstances!

Check warning labels and safety symbols for intactness and completeness before you begin any kind of start-up action. Do not proceed with start-up action if you have identified a missing or damaged warning note or safety symbol!

Damaged or missing warnings or safety symbols may lead to maloperation or faulty action with personal injury or material damage as a consequence! Warnings or safety symbols must not be removed! Replace damaged warning labels and safety symbols immediately!

Affixed on the system and its components are the following safety symbols:

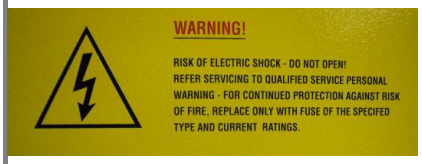
Safety symbol	Meaning	Comment
	Warns of a danger point	Warns of mechanical hazard due to moving system parts
	Warns of dangerous electrical voltage	
	Warns of laser radiation (only for systems with a barcode reader)	Serious potential eye damage by exposure to laser light – do not look into the laser beam!
Warning note	**Meaning**	**Comment**
 	Warns of dangerous electrical voltage	Do not remove system shielding or cover parts! Allow repairs to be carried out only by qualified expert personnel! Replace defective fusing with a fuse of specified type in all cases!
werkseitig230 V eingestellt Factory set: 230 V or werkseitig115 V eingestellt Factory set: 115 V	Factory setting for permitted supply voltage	Operation at a different supply voltage may lead to destruction of electrical or electronic components! Claims for warranty or liability will be null and void in such cases!

Table 5: Safety symbols

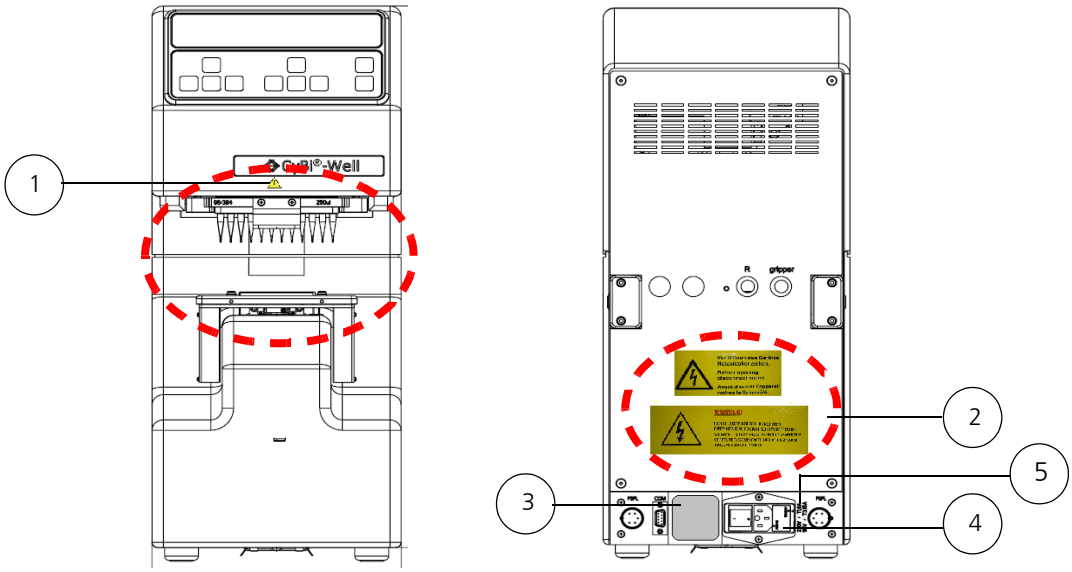


Fig. 1: Warning notes and safety devices at the system

1 "Mechanical hazard" warning note (system front)
– magazine plate tip mounting device
– XY-stage
2 "Dangerous electrical voltage" warning note (rear side of device)
3 Nameplate
4 Fuse
5 Fuse type details

3.6 Mechanical Hazards

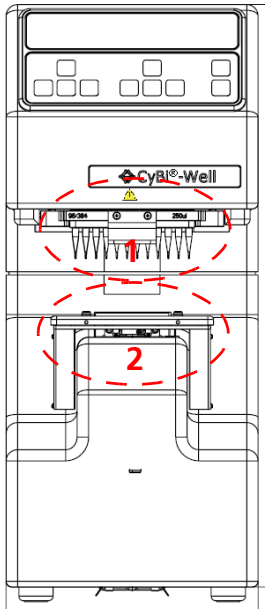


Fig. 2: Hazardous area of pipetting unit

1 Tightening device for the magazin plate
2 Lifter

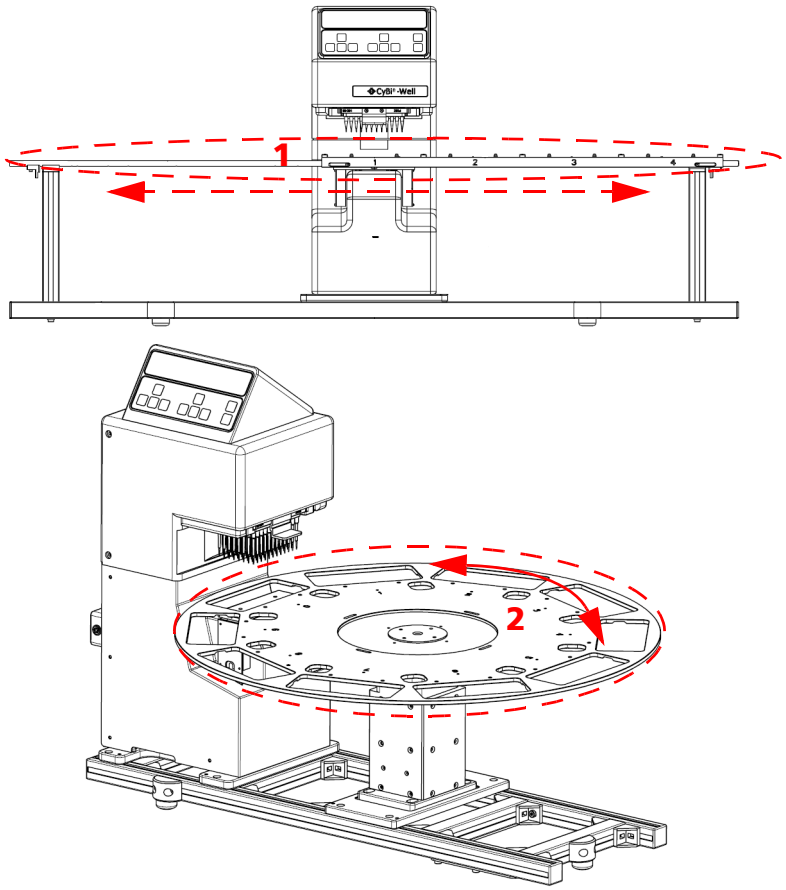


Fig. 3: Hazardous area of transport system

1 Hazardous area transport rails with carriage
2 Hazardous area rotary table

The movements of the components of the CyBi®-Well (or stacker) may present a hazard to operating personnel. Failure to observe these precautions may result in injury to hands and fingers. Any reaching into the device while it is in operation may result in demage to the equipment or to samples.

- ❑ Never reach into the moving mechanism of the device while it is in operation and do not insert other objects inside. These potentially hazardous areas are:
  - Thightening device for the magazine plate (→ *see fig. 2*)
  - Lifter (→ *see fig. 2*)
  - carriage ore rotary table (→ *see fig. 3*)
- ❑ Failer to follow these precautions may result in damage to the equipment.
- ❑ Improper operation or handling may cause damage to the equipment or personal injury. Use the software to correct any improper operation or movement and test the control programs with the appropiriate software function.
- ❑ The program can be cancelled by pressing the Cancel key (→ *refer to page 37*).
- ❑ Loading of a tip magazine without pipette tips may result in damage to the dosing flask. Never load in an empty tip magazine.
- ❑ Do not move the vertical drive for the lifter against the tips.
- ❑ Run the vertical drive to the zero position before any horizontal movement.
- ❑ Do not reach into the area for movement of carriage at a stacker.

3.7 General Safety Notes

Follow these general safety rules:

- ❑ Do not analyze or use aggressive substances of a type that may compromise the stable performance of the system or its components! (→ *refer to page 17*)
- ❑ Do not make changes in system engineering design, unless by prior agreement with CyBio AG!
- ❑ Do not manipulate or damage software or software configuration settings!
- ❑ 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 system only at a line voltage that complies with nameplate specifications!
- ❑ Comply with scheduled maintenance intervals (→ *refer to page 60*)!
- ❑ Use only accessory items, consumable materials and spare parts specified in this User Manual or provided or recommened by CyBio AG!
- ❑ Service and repair work and procedures for starting up or shutting down for transportation may not be performed by anyone other than authorized service personnel!
- ❑ Refrain from any kind of unauthorized rearrangement or changes in system setup, notably, such impacting the safety of personnel or the environment.

3.8 Requirements On Operating Personnel

- ❑ The CyBi®-Well system may not be started up, operated or maintained other than by duly trained expert personnel having received instructions on operational safety. Such training also includes an introduction into the contents of this Manual and manuals of related system components or additional equipment units as may be appropriate from case to case.
- ❑ The system must not be operated by minors or persons under the influence of alcohol, drugs or medication
- ❑ A security schedule must be in place to ensure than only authorized personnel can work at the system.
- ❑ Operating personnel must be aware of the potential dangers that emanate from substances being analyzed. Appropriate personal protective equipment should be applied if necessary.
- ❑ Before a break in work or after work is finished, appropriate measures for skin cleaning and skin protection must be taken as may be appropriate on a case by case basis.
- ❑ You are prohibited from eating, drinking, smoking or using open fire at or near the system installation site!

3.9 Safety Requirements for Transportation & Installation

The system must be installed by service personnel or duly trained andCyBio AG authorized expert personnel in all cases. Unauthorized assembly and installation work is prohibited. Faulty installation may imply considerable danger.

Rules to be observed:

- There is danger of injury by parts that are secured in a nonconforming manner! For transportation, system components must be secured as prescribed in the relevant transporting equipment manuals or in this User Manual.
- Use original product packing for transportation! Make sure that all shipping retainers are installed and system components completely empty as necessary to meet transporting requirements.
- In order to prevent damage to people's health, relocation (lifting and carrying) of system components within a laboratory complex must be done with due consideration and observation of currently binding benchmark specifications and limit values applicable to the lifting and carrying of loads without the use of aids.

3.10 Safety Notes for Operation

3.10.1 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. Notably, this applies after a change in, an extension to or a repair of the system.
- Do not operate the system, unless all protective devices (fuses) are in place, properly installed and fully functional.
- Protection and safety devices must not be removed, modified or defeated while the system is operating.
- 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, ventilation slits, etc. may cause breaks in operation or damage the system.
- 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

3.10.2 Explosion Proofness, Fire Prevention

- The CyBi®-Well must not be operated in an explosive environment or using explosive substances.
- You are prohibited from smoking and using open fire in the system's operating room!
- Operating personnel must be duly informed about the locations and the proper handling of fire-extinguishing equipment in the operating room.

3.10.3 Electrical

- ❑ Work on electrical and electronic parts of the system and its components may only be carried out by an electrician suitably qualified according to latest binding electrical regulations.
- ❑ Do not power the system up if cabling is damaged (e.g. cuts in a cable, worn or chafed places)!
- ❑ Observe prescribed maintenance intervals (→ *refer to page 60*).
- ❑ The main power plug includes a ground contact that may only be connected to a to a socket with grounding (PE) contact. The PE conductor may not be interrupted (e.g. using a voltage regulating transformer). Do not use extension cabling without a PE conductor!
- ❑ Power cabling must be installed in a workmanlike manner!
- ❑ To detach a cable from the mains socket, always hold it by the plug.
- ❑ Do not contact line power plugs when your hands are wet.
- ❑ 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 system's line inlet fuse prevents danger of fire from electrical overload situations. This fuse must not be short-circuited. Also make sure that only a fuse of the type specified on the rear panel is used for replacement.

3.10.4 Maintenance & Care

- ❑ CyBi®-Well system maintenance may not be carried out by anyone other than service personnel of CyBio AG or duly authorized and properly trained expert technicians.
- ❑ Unauthorized maintenance work may cause damage to the system. For this reason, operating personnel are not allowed to carry out work of any kind other than described in this "→ *"Maintenance & Care"*" chapter.
- ❑ Always turn system power off before you perform work for maintenance or cleaning of the system. Pull the main power plug from the power socket at first.
- ❑ Use a slightly moistened (not dripping-wet) piece of cloth to clean exterior surfaces.
- ❑ Do not use solvents (thinners), aggressive detergents, flammable liquids or etching leaches for cleaning. This may damage parts of shielding or casing or the operation control panel.
- ❑ Use only original accessories and original spare parts or such accessories and spare parts as are recommended for use by CyBio AG (→ *"Accessories&Spare Parts" on page 67*). Follow all advisory notes in chapter → *"Maintenance & Care"*.

3.10.5 Handling of Dangerous Substances

The system owner is solely responsible for compliance with all safety requirements that are in place for the protection of persons and material goods during work involving radioactive, infectious, toxic, etching, combustible and other dangerous substances.

For system operation involving dangerous substances, users are recommended to issue their own internal operating instructions. This User Manual includes no safety notes aimed at preventing personal injury or material damage as a result of substances being examined.

3.10.6 Chemical Resistance

CyBio AG will refuse any responsibility for examination of aggressive substances that may deteriorate the stability of the system or its components.

- ❑ Particular caution should be used when handling leaches, acids or organic solvents, because these may reduce the system's lifetime.
- ❑ Use only substances that are compatible with the materials quoted hereafter.

Components in direct physical contact with substances being processed:

Component	Material
Pipetting tips	PP
Piston seals[1]	PE-HD
Reagent vessels	PMMA or PTFE
Tubes	Silicon
Washing troughs	PEAK, steel

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

The components mentioned above are not resistant to any of the following substances:

Substances*
Hydrofluoric acid (HF)
Highly concentrated acids
Cleaning powder
Paint thinners
Naphtha (raw gasoline)
Gasoline
Acetone
Cleaning spray
Ozone

Table 6: Substances

*This table is not exhaustive

Do not use solvents (thinners), aggressive detergents, flammable liquids or etching leaches for cleaning. Disregarding this advice may cause damage to system shielding or the operation control panel.

NOTE
Consult with CyBio AG in case of any doubt.

3.11 Rules of Conduct in Case of Emergency

- ❑ In the event of a situation involving potential danger or danger of an accident, system power supply must be turned off at once, using the main power switch or the emergency pushbutton and/or by detaching the mains plug from the line socket!

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

- Operating personnel must be aware of the locations and the proper handling of safety devices, accident and hazard alarms, as well as first-aid kits and emergency/rescue equipment.
- The system owner/operator will be responsible to provide adequate training to designated operating personnel.
- All first-aid equipment (first-aid box, eyewash bottles, stretchers etc.) as well as firefighting equipment (fire extinguishers) are to be kept within easy reach and readily accessible at all times. All equipment must be in, and inspected for, a fault-free condition on a regular basis.

4 Technical Description

4.1 General

The CyBi®-Well is of modular setup to allow for different configurations and adaptation to a variety of custom applications. Designed for high precision, including in the submicro liter volume range, and versatility in performance, the CyBi®-Well covers a large range of applications. By adaptation of its positioning system in XY-direction, all basic functions which are available for 96-channel simultaneous operation can also be used to handle 384-well microplates in four steps or 1536-well microplates in sixteen steps. A 384-channel simultaneously working system requires only four steps to process one 1536X microplate. If one or two stackers are added, up to fifty microplates can be processed in a fully automated sequence per stacker.

User-friendly CyBio® Composer software facilitates easy and express editing of specific laboratory routines.

Two different transporting systems are available for operation:

- ❑ CyBi®-Well with linear transporting system
- ❑ CyBi®-Well with circular transporting system

Linear transporting system:

The linear transporting system is intended for moving a 3-, 4- or 5-place carriage in one plane. A carriage place is able to transport a microplate, reservoir or a washing trough.

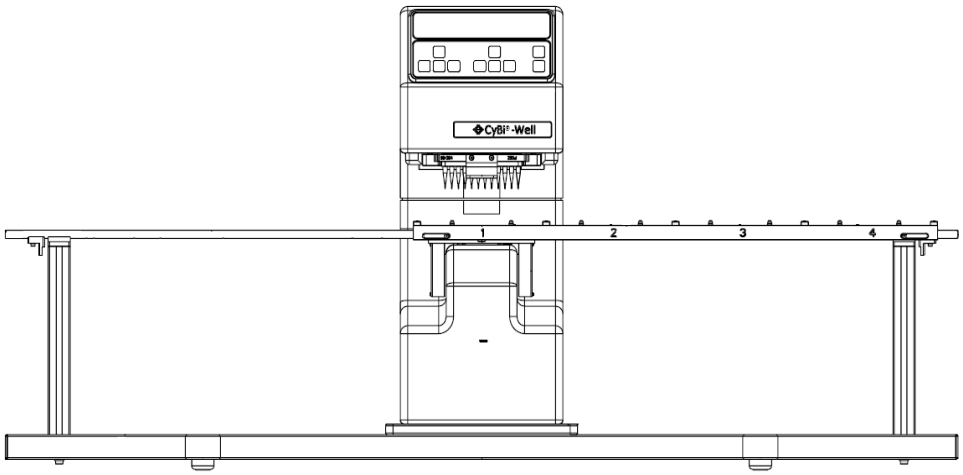


Fig. 4: CyBi®-Well with linear transporting system

Circular transporting system:

This system uses a rotary table with ten placement positions to transport microplates, reservoirs and washing troughs in one plane. For greater operating convenience, the serving unit is rotated by 90°.

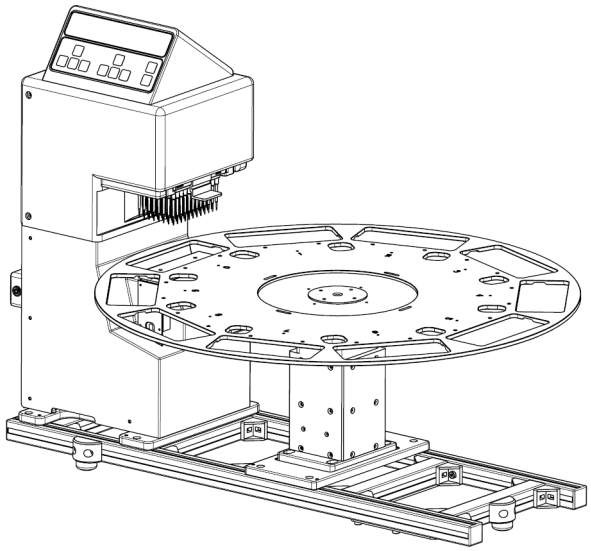


Fig. 5: CyBi®-Well with circular transporting system

4.1.1 System Setup With Operation Control Elements

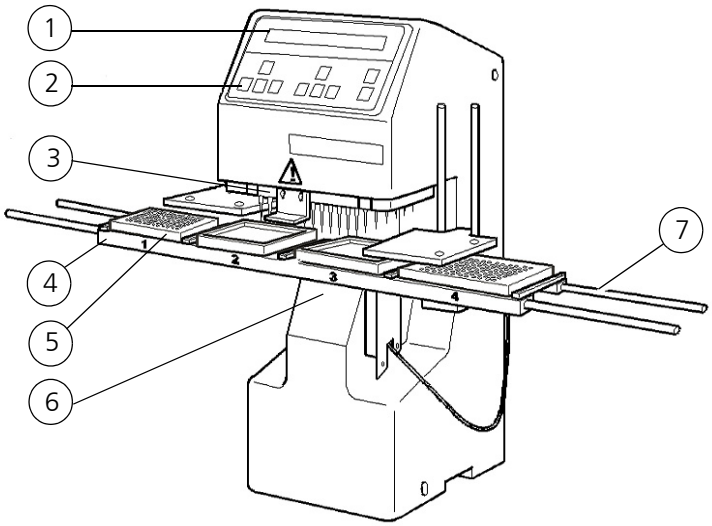


Fig. 6: Basic CyBi®-Well Setup & Controls

1 LCD display
2 Keyboard
3 Tip magazine
4 Carriage
5 Microplate
6 Lifter
7 Transport rails

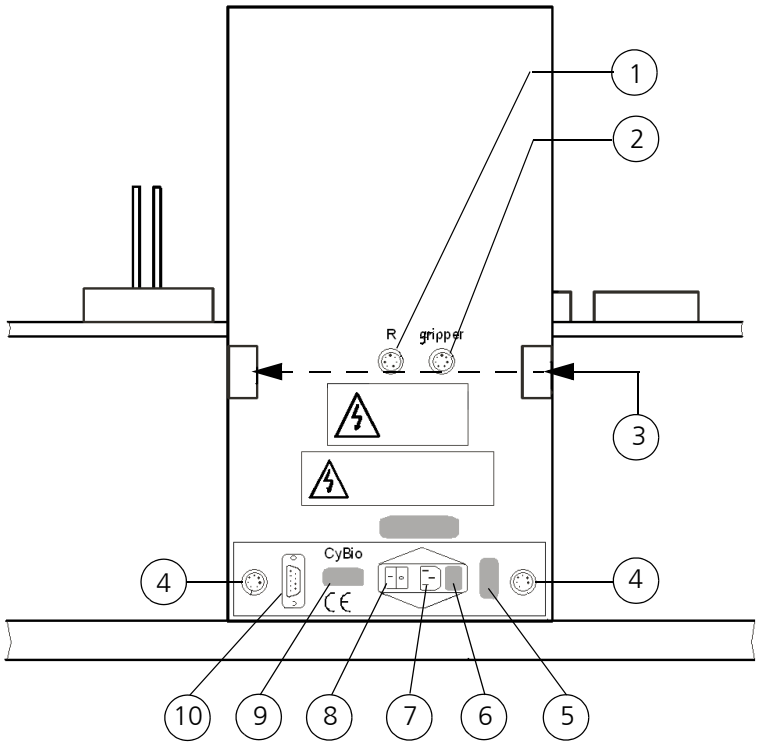


Fig. 7: CyBi®-Well rearside view with terminals

1 Reserve jack for:
– drip-catcher at CyBi®-Well with rotary table
– Encoder Interface 485 for operation with CyBi®-Drop
– Automated tip change (in preparation)

2 Terminal for plate transfer unit

3 Terminal for xy-table

4 PSPL voltage supply jack, for connection of external components

5 Fusing specifications

6 Fuses

7 Line power connector
115 V/230 V voltage supply (convertbile via line-side fuse)

8 On/Off switch (main power switch)

9 Nameplate with electric power supply specifications

10 COM - RS 232 port (Sub D-jack, 9-pole)

4.1.2 Product Versions

CyBi®-Well 96

The CyBi®-Well 96 has a pipetting head with 96 simultaneously working tips. It is able to process 96-well microplates in a single step or also 384-well microplates. 384-well microplates are positioned in XY-direction and processed in four steps. 1536-well microplates take sixteen positioning steps to process.

CyBi®-Well 384

The CyBi®-Well 384 has a pipetting head with 384 simultaneously working tips. It is able to process 384-well plate formats in a single and 1536-well formats in four steps.

4.1.3 CyBi®-Well Pipetting Unit

Motorized motion for pipetting relies on four motors:

- ❑ Piston drive
- ❑ Microplate lifter
- ❑ Horizontal table motion
- ❑ Clamping and releasing of magazine holder

All motors are controlled and monitored by integrated software.

4.1.4 Pipetting Head

CyBi®-Well 96:

250µL-pipetting head

- ❑ 250 µL maximal volume per piston
- ❑ Dosable in steps of 1 µl

25µL-pipetting head

- ❑ 25 µL maximal volume per piston
- ❑ Dosable in steps of 0.01 µl

CyBi®-Well 384

25-µl pipetting head

- ❑ 25 µL maximal volume per piston
- ❑ Dosable in steps of 0.01 µl

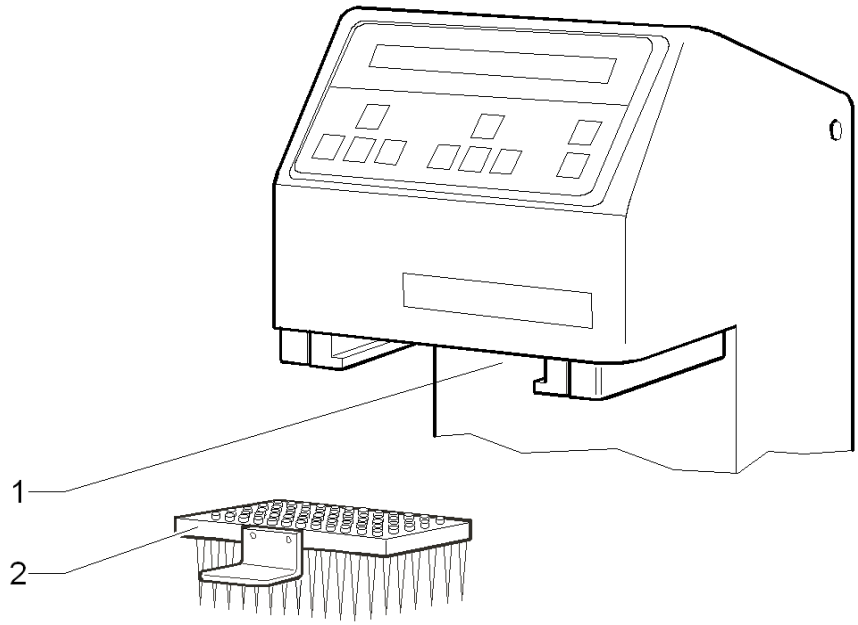


Fig. 8: Pipetting head and CyBi®-TipTray

1 Sensor
2 Tip magazine (CyBi®-TipTray)

4.1.5 CyBi®-TipTray

The tip magazine (CyBi®-TipTray) holds a set of 96 or 384 pipette tips respectively. Once inserted and clamped in the magazine frame, it presses the pipette tips against a sealing plate, in order to maintain airtight sealing conditions while a pipetting process lasts. When removed from the pipetting, the CyBi®-TipTray should be kept in its designated transporting box.

4.1.6 Pipetting Piston

The CyBi®-Well operates on the principle of air displacement, i.e. 96 or 384 pistons which are mechanically connected with a common drive perform motion inside of 96 or 384 air spaces respectively. Each of these spaces is formed by a pipette tip and an internal seal. Piston motion occurs with a sensitivity of one tenth or one hundredth of a micro liter.

4.1.7 LCD Display

A two-line LCD screen of 40 characters length shows commands, input prompts and messages.

4.1.8 3-, 4- or 5-Place Carriage (Linear Transporting System)

The carriage holds 3, 4 or 5 microplates (or reservoirs or wash troughs respectively) and moves them along the transport rails in one plane. Motion is accomplished via a toothed rack that is mounted to the back of the rails for force transmission from the pipetting unit drive. Two light-barriers are integrated for correct microplate carriage positioning as part of initialization.

Transport rails

The transport rails provide guided carriage motion along a horizontal track, in order to transfer a microplate into its designated position below the pipetting head or inside the stacker.

4.1.9 Rotary Table (Circular Transporting System)

The rotary table has 10 positions for temporary placement of microplates, washing troughs and reservoirs. It provides motion of a microplate, etc. in horizontal direction. Zero position of the rotary table is correctly established as part of system initialization.

4.1.10 Drop Protector (Circular Transporting System)

The drop protector is designed to prevent accidental dripping of liquid from the pipetting head while a transportation process lasts. For a pipetting sequence, the drop protector will swing away, thus releasing the pipetting head.

4.1.11 Lifter With Table

The lifter raises the table with a microplate into position under the pipetting head. Having completed this, its moves back into initial position, placing the microplate down onto the microplate carriage. With the help of a servo drive any position on a microplate of 96-, 384- or 1536-well further can be established (indexing).

4.1.12 Keyboard

Using the membrane sealed keyboard, operators can:

- ❑ Trigger horizontal and vertical microplate motion
- ❑ Select menu functions
- ❑ Enter pipetting volumes

4.2 Function

The CyBi®-Well multi-channel pipettor provides a simultaneously working 96-channel or 384-channel dosing system for automated processing of microplates (SBS standard) in chemical, biological and physical research laboratories.

The system relies on six basic functions which, on aggregate, offer a diversity of application options (→ *see section 7.4*).

Basic functions	Explanation
Dosing	– Aspirate predefined volume of liquid from trough. – Discharge previously aspirated liquid with additional stroke, e.g. into a microplate.
Pipetting	– Aspirate slightly more than predefined volume of liquid from trough (with additional stroke volume). – Discharge predefined volume, leaving residual volume in pipette tip (differential pipetting). – Discharge residual volume, e.g. into a trough.
Dispensing	– Aspirate a total volume as aggregate of predefined sub-volumes. – Discharge a predefined number of subvolumes in a corresponding number of steps.
Diluting	– Aspirate great predefined volume. – Aspirate air bubble. – Aspirate small predefined volume according to specified mixing ratio. – Discharge total content of tips with additional stroke.
Rinsing	– Aspirate and discharge predefined volume of rinsing liquid, performing predefined number of rinsing cycles.
Tip change	– Perform electro-motoric release of 96-tip or 384-tip magazine plate. – Remove magazine plate from system. – Remove used pipette tips from magazine plate. – Fill new set of tips into magazine plate. – Insert filled magazine plate. – Perform electro-motoric clamping and sealing of magazine plate.

Table 7: System functions

5 Transportation & Storage

5.1 Transportation

CAUTION

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 shocks or formation of condensed water during transportation or shipment! Intermediate storage in outdoor locations is not permitted!

CAUTION

Direct contact of the tip magazine and the pistons may damage the pistons.

Do not install a magazine without pipette tips for system transportation. Failure to comply will void your warranty claims.

CAUTION

Inexpert packaging is likely to cause damage to the system!

Use only original packing for transportation and shipment of the system and its accessories.

To prepare the system for transportation, proceed as follows:

1. Install a tip magazine into the system if required.
2. Perform system shutdown (→ *refer to chapter 10*).
3. Use only original packaging for transportation. Request original packaging materials from your responsible service partner if necessary!
4. Secure all movable parts using cable ties or adhesive tape.
5. Provide padding for system components by inserting shock-absorbing PE material.

For transportation, observe the following notes:

- ❑ Use utmost caution when handling the system for transportation. This is necessary to prevent damage as a result of force impacts or negligence in loading or unloading procedures
- ❑ During transportation, major temperature variations which are likely to cause condensed water, mechanical shocks and vibration, should be prevented.

5.2 Storage

If the CyBi®-Well 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.

Climatic requirements on room facilities for system storage are as follows:

- Temperature range: -10°C to +50°C
- Permissible relative air humidity: ≤ 85% at 30 °C, non-condensing

6 Initial Start-Up & Routine Start-Up Procedure

6.1 Site Requirements

6.1.1 Installation Requirements

The room which is selected for installation of the CyBi®-Well pipetting machine must meet the following environmental requirements:

- Temperature range: +15°C to +35°C
- Permissible relative air humidity: ≤ 75% at 35 °C, non-condensing

The atmosphere inside the installation room should be dust-free to a maximum possible degree, free from drafts and free from etching vapors. Smoking in the installation room is prohibited.

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

- The installation room must have a stable, horizontal, dry and vibration-free floor.
- Do not install the system directly beside doors or windows and not in the vicinity of electro-magnetic sources of interferences.
- Prevent direct exposure of the system to sunlight and radiation emitted by heaters. Make sure the room is air conditioned if found necessary for normal operation.
- Provide easy accessibility of all pipettor parts at all times and do not obstruct ventilation slots by other equipment parts or fixtures placed on or before such inlet/outlet positions.

6.1.2 Footprint Requirements

Footprint requirements follow from the dimensional details and the type of selected transporting system (→ *Refer to "Technical Data" on page 5.*). You should also provide adequate space for the PC, monitor, printer and other required supplementary units.

6.1.3 Energy Supplies

WARNING

In the event of a break in protective conductor wiring, there is life-threatening danger due to electrical shock!

Insert the mains plug of the pipettor only into a mains socket with a PE contact! Make sure that the PE function is not rendered ineffective by extension cables without a PE conductor or the use of a voltage regulating transformer!

CAUTION

Operation at a line voltage or line frequency at variance with nameplate specifications may destroy the system or system parts!

Make sure that power supply specifications in the installation room agree with nameplate details! Refrain from start-up action of any kind if power supply data are found to be inconsistent!

The CyBi®-Well requires single-phase AC mains power for operation. The system comes factory-set to 230V or 115V voltage supply and a line frequency of 50/60Hz. Make absolutely certain that nameplate specifications are actually met and power is supplied with values as indicated on the nameplate.

6.2 Configuration & Start-Up

In view of the system's complexity and in order to secure failsafe operation, work for installation and initial start-up of the CyBi®-Well system on your premises is solely performed by CyBio AG Customer service personnel or duly authorized expert technicians.

Initial start-up essentially includes:

- ❑ Installation and adjustment of system components
- ❑ Making cable connections and connection of power supply cabling
- ❑ Software installation (factory-made) and configuration
- ❑ On the job training

Check shipment for integrity, completeness and agreement with included packing list when unpacking the various system units.

Once the system is installed, Customer service personnel will test proper function and document the results of testing. (→ *Refer to "Function Tests" on page 31.*)

Specified function tests (→ *chapter 6.3*) must also be performed as part of system restart procedures following major down-times or after relocation of the system to another site.

6.3 Function Tests

6.3.1 Precision Test

Testing for variation coefficient (CV = percentage standard deviation) is performed using a 96-well or 384-well tranparent flat-bottom microplate and dye solution. 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.

Material & preparation:

- ❑ 96-well or 384-well transparent flat-bottom microplate prefilled with 0.1 N NaOH volumes as follows:

	CyBi®-Well 96 / 250µL	CyBi®-Well 96 / 25µL	CyBi®-Well 384 / 25µL
Diluens	150µL	150µL	50µL

Table 8: Prefill volumes

NOTE

The result of measurement can be adversely influenced by a certain inhomogeneous evaporation over the microplate.

For this reason, the microplates should be taped immediately after diluens has been prefilled and the test volume been pipetted, as well as before the shaking process. Do not use washed microplates. This may cause excessively great variation in measured values.

- ❑ Always use new tips for precision measurement. Rinse new tips before measurement with p-nitrophenol working solution and settings as follows:
  - Piston speed: 100rpm
  - Number of rinsing cycles: 20
  - Rinsing volume:10µl
- ❑ Testing is performed at the CyBi®-Well, working in manual mode with an aspiration volume of 20µL or 10µL (→ *Table 9 on page 32*) and a test volume of 10µL or 2µL (→ *Table 9 on page 32*) respectively.
- ❑ Dispense the test volume into the microplate with prefilled NaOH solution (→ *Table 8 on page 31*). Make sure that the pipetting tips submerge into the preplaced NaOH solution by 1 mm (approximately) as you discharge the test volume. Dispense the remaining volume into the storage reservoir.

	CyBi®-Well 96 / 250µL	CyBi®-Well 96 / 25µL	CyBi®-Well 384 / 25µL
Aspiration volume	20µL	10µL	10µL
Standard test volume*	10µL	2µL	2µL
p-nitrophenol dye solution	125mg/L in 0.1 N NaOH	600mg/L in 0.1 N NaOH	200mg/L in 0.1 N NaOH

*Select a dye concentration so extinction is between 0.4 and 1.2 OD at 405nm.

Table 9: Aspiration and test volumes

- ❑ Tape the microplates after pipetting of the test volume and before shaking.
- ❑ Use an orbital shaker for mixing of substances.

	96-well microplate	384-well microplate
Orbital shaker of 700rpm	Shake for 15 min	x
Orbital shaker of 1000rpm	x	Shake for 10 min Allow to rest for 30-45 min Shake for 10 min

Table 10: Mixing times

- ❑ Measure extinction in vertical photometer.
- ❑ Evaluate measured data as a preparatory stage for determination of CV value.
- ❑ Compare obtained CV result with CV values in chapter → *"Technical Data"*.

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 predefined (target) volume.

Material & preparation:

- ❑ Laboratory balance with 1mg minimum resolution.
- ❑ The selected laboratory balance must be subject to regular calibration (check for calibration mark).
- ❑ Lidded 96-well or 384-well flat-bottom microplate.

WICHTIG

Since new microplates, typically, are vacuum-packed, a selected microplate must be unpacked at least one week before testing (the weight of a new microplate may decrease or increase as a result of evaporation and absorption respectively).

- ❑ Accuracy testing is performed with de-ionized water (1bar and 998g/cm³).

Test sequence

- ❑ Mount a reservoir with deionized water in a place of the carriage or the rotary table.
- ❑ Mount a microplate adapter in another place of the carriage or the rotary table.
- ❑ Moisten tips using a rinsing procedure as follows:
  number of cycles – 20, volume – 25µL
- ❑ The pipetting head is tested for accuracy in manual 'Pipetting' mode. The appropriate volume is aspirated with an additional stroke of 0.5µL.
- ❑ Weigh the microplate in empty and lidded state.
- ❑ Unlid the plate and place it onto the adapter.
- ❑ Dispense the desired volume into the microplate immediately thereafter.
- ❑ Lid the microplate again.
- ❑ Weigh the microplate in filled state.
- ❑ Make sure that the time interval between weighing of the microplate in empty state and filled state is not greater than 15 seconds.
- ❑ Evaluate the measured results for variances of actual volume against nominal volume.
- ❑ At least three readings should be taken for each volume.

6.3.3 Leak Test

Leak testing is required, in order to make sure that the pipetting head is free from points of leakage. Subject to testing are the pistons, the pipette tips and the silicon membrane. Leak testing is performed by aspiration of a certain volume of dye solution into the pipette tips and watching the liquid level over a time of two hours (CyBi®-Well 96/25µL; 96/250µL) or following another procedure described further below for the CyBi®-Well 384/25µL.

Test sequence

- ❑ Make sure the system is in a horizontal position. Carefully place a spirit level onto the sliding rails to check for horizontal adjustment. Use setting screws for horizontal adjustment as necessary.
- ❑ Remove old tips.
- ❑ Thoroughly inspect silicon membrane for cracks or sedimentation. Use a suitable light source for this purpose. Carefully clean the silicon membrane using a dust-free, slightly moistened piece of cloth. Exert only moderate pressure, in order to prevent accidental shifting of the membrane. Use caution to prevent sedimentation in the membrane openings as you wipe the membrane clean. Allow the membrane to dry.
- ❑ Install tip magazine with new tips and tighten tips.
- ❑ Bring the reagent reservoir into position under the tips.
- ❑ Raise the reagent reservoir to tips level — the pipetting tips should submerge by at least 2mm below the surface of the test solution.
- ❑ Moisten the pipetting tips on the inside by performing five rinse cycles.
- ❑ Aspirate 50% (of end volume) of dye solution.

NOTE
Keep the pipetting tips submerged during leak testing, in order to prevent formation of droplets at their ends, because these may falsify the result of testing.

- ❑ Inspect liquid level of all pipetting tips after two hours. Document all tips with a varying liquid level.
- ❑ In the case of a CyBi®-Well 384/25µL, visual testing is difficult to perform. Follow a procedure similar to that of → *"Precision Test"* in this case: Dispense the nominal volume completely into a 384-well transparent flat-bottom microplate with prefilled buffer solution on expiry of the test time described above and measure extinction in a vertical photometer. The volume which is dispensed per pipetting tip should not deviate from the mean value by more than 20%.

Result of leak testing

CyBi®-Well 96/250µL and CyBi®-Well 96/25µL:

There must be no perceivable difference in the filling height of the various pipetting tips on completion of testing.

CyBi®-Well 384/25µL:

There must be no individual variances >-20% on completion of testing.

A drop in the fill level of a tip suggests a potential leak in this tip. Repeat this test with new pipetting tips. If the leak is found to occur in the same place, you should contact the manufacturer or your service partner.

7 Manual Operation

NOTE
For normal CyBi®-Well operation, control actions are triggered at the control PC. Manual operation is restricted to exceptional situations.

7.1 Operating Modes

Manual control (via touch-screen keypad)

→ *see section 7.4 on page 38*

PC control (via RS-232)

Refer to manual on CyBio® Composer control software.

7.2 Operation Control Elements

- ❑ LCD display
- ❑ Touch-screen keypad consisting of:
  - – Triangle keys ▲▼◀ ▶
  - – Arrow keys ←↑→↓,
  - – Enter key ↵and ESC key ▶■

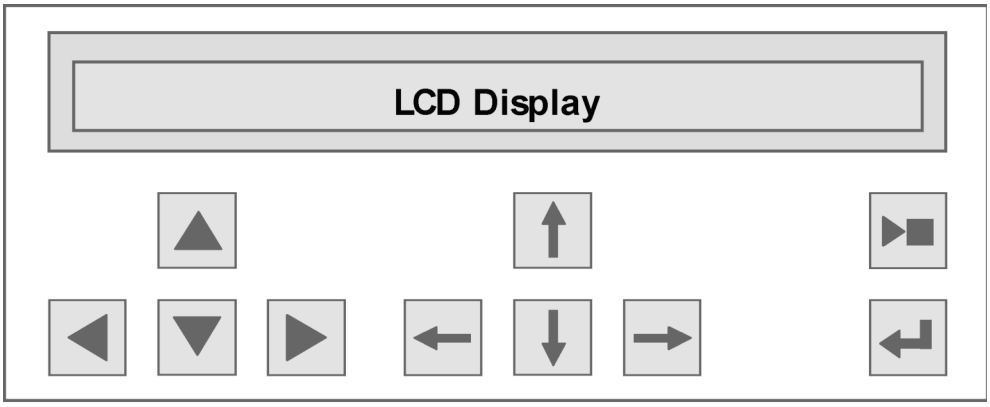
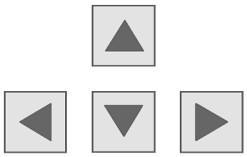
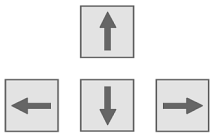
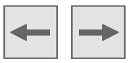


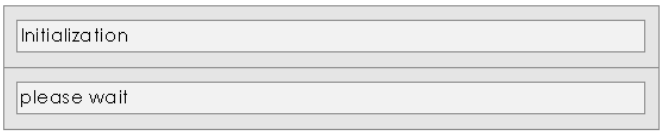
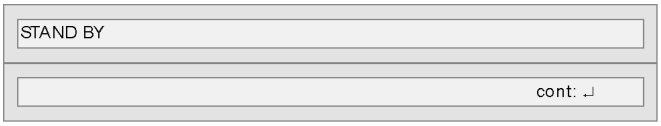
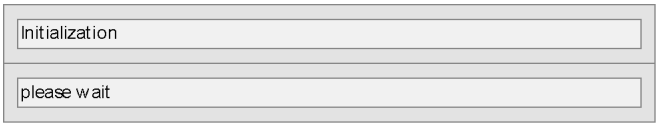
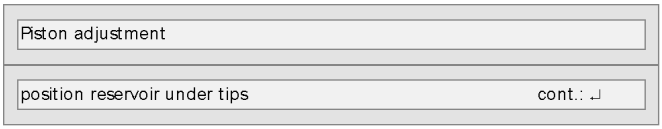
Fig. 9: LCD display and control elements

Triangular keys	
	Trigger lifter or carriage motion (with repeat function)
	Trigger down-motion or up-motion of lifter. *Pressing both keys for a short time*: Lifter moves into zero-position or the transfer position for setting the correct well position (X/Y-positioning).
	*Function depends on lifter position* **Lifter in lower limit position** Pressing this key: moves carriage by one place (to the left or the right). **Lifter not in lower limit position** Activates X/Y-positioning of lifter and moves microplate into one of the following positions: A1 / A2 / B1 / B2
Arrow keys	
	For navigation through the menu or selection of parameters (with repeat function)
	Navigates within a given menu level or selects parameters
	For changes in parameter settings
Confirmation	
	"Enter" key Confirms an input or a current process, saves selected parameters

Cancellation	
	"Cancel" key *Function depends on system status* **During operation:** Aborts a running motion, aspiration, dipsensing or tip change (tip mounting) program. On actuation of the "Enter" key, the carriage slowly moves place 1 into position below the pipetting head in initialization mode. **In programming mode:** Aborts inputs, leaving selections unsaved **Prompt for input during program run:** Operator inputs can be integrated into PC control programs (e.g. cancel)

7.3 Start

When power supply becomes available, the system performs an initialization routine:

	
	Confirm with ↵
	Carriage moves place 1 into the position for pipetting.
	Moves collector trough into pipetting position (use keys ◀,▶) Confirm with ↵

Once initialization is complete, the system is ready for action. It can then be operated via manual inputs or in computer control mode.

7.4 Manual Operation Control

7.4.1 General

For manual control, the system provides three function groups:

- Manual mode
- Configuration
- Statistics

A desired function group can be selected via the main menu:

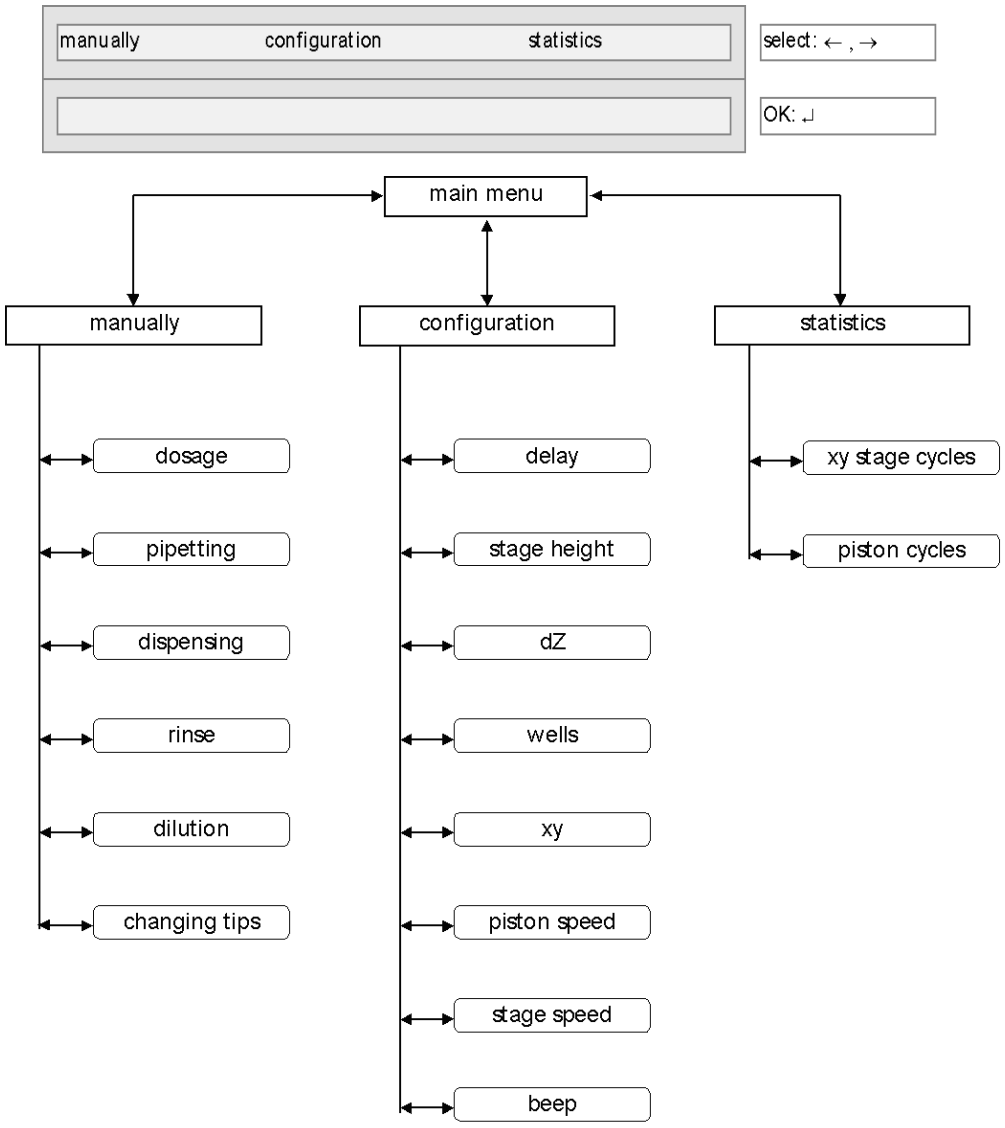


Fig. 10: Menu structure

NOTE

The system software will retain the latest menu position after power was turned off and restored.

7.4.2 Special Functions

CAUTION

Essential system parameter settings may get lost if special functions are accidentally activated. You should only use this function if you understand the function and consequences of selected settings beyond any doubt. Consult your service partner in any case of doubt!

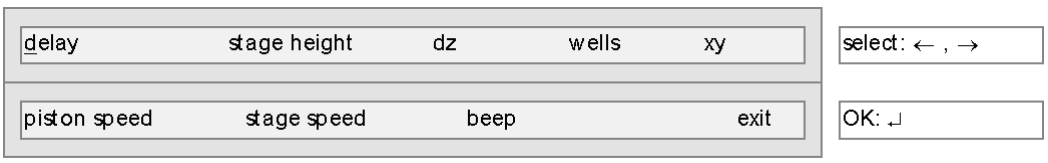
Special functions may be called while powering up. This can be achieved by pressing certain keys while a powering on routine runs:

Key ↵	
Options: English or German	Selects language via keys ← and → respectively Confirm selection by pressing key ↵
Reset drive parameters (key ▶■)	
Resets all drive parameters of CyBi®-Well to factory settings	Drive parameters –Starting r.p.m. –End r.p.m. –Number of steps to reach end r.p.m.
Reset system parameters and drive parameters (key ▲)	
Resets all system parameters and drive parameters to their factory settings.	System parameters for powering the motors of pump (piston drive), round table and lifter –Waiting time in manual operation mode –Max. lifting height –Acoustic acknowledgement of actuation of a key –Lifter height compensation dZ –Parameter of servo lifter

7.4.3 System Configuration

To adapt the system to specific user or application features, a configuration menu is provided. Menu structure→ *see fig. 10*

Selection options in configuration menu:



Waiting time	
Because of the small opening of tips and the resulting resistance they offer to the flow of liquid, a reasonable time setting should be added to allow for pressure compensation during aspiration or dispensing cycles. Too small settings for waiting time may reduce the level of (→ *see section 7.5.2* and → *section 7.5.4*). **Note:** This setting will only be effective in manual mode.	Range: 0 – 10 s Selection: arrow keys ↑,↓ Confirmation: input key ↵ Cancel: ESC key ▶■
Table motion path	
The maximum lifter height (upper table position) can be defined here. It limits the lifter motion path at the top end, thus preventing accidental collision of the reservoir and the tips. It facilitates different applications, for example, picking up liquid from a cell lawn or pipetting onto the bottom of a microplate from a preselected distance. This setting will only be effective in manual mode.	Before calling up this function: Use triangle keys to move the lifter to a desired height level Confirmation: input key ↵ Cancel: ESC key ▶■
Click	
Turns sound for acknowledgement of actuation of a key on or off.	Options: yes/no Selection: arrow keys ←,→ Confirmation: input key ↵
dZ	
System constant for calibration of lifter height, manufacturer-specified (lift bottom side). The new value must be entered following a replacement of the lifter.	Range: -0.5 mm – +0.5 mm Selection: arrow keys ↑,↓ Confirmation: input key ↵ Cancel: ESC key ▶■
Wells (only for 96-channel systems)	
Selects plate type For CyBi®-Well 96/384/1536 systems, this option allows you to select a mode for manual motion, i.e. motion to the position of an MP 384 or an MP 1536. In the case of a CyBi®-Well 384/1536, no selection is possible at this point (a system of this type is only capable of motion to the four quadrants of an MP 1536). This menu item has no assigned function.	Options: yes/no Selection: arrow keys ←,→ Confirmation: input key ↵

XY	
System constant for calibration of lifter X/Y-position, manufacturer-specified (lifter bottom side). The new value must be entered following a replacement of the lifter. On selection of a coordinate, the servo-lifter will move into the required position so a given setting can easily be checked by visual control. For adjustment of the servo-lifter, we recommend using a microplate 384 from Nunc or a GREINER MP1536 of transparent material.	Parameter: arrow keys ←,→ Value: arrow keys ↑,↓ Confirmation: input key ↵ Cancel: ESC key ▶■
Piston speed:	
Indicates piston speed as the motor's rpm value. A rotation speed of 300 rpm corresponds to an approximate discharge rate of 123 µl/s. **Note:** This setting will only be effective in manual mode.	Range: 5 – 500 rpm Selection: arrow keys ↑,↓ Confirmation: input key ↵ Cancel: ESC key ▶■
Table speed	
Indicates lifter speed as the motor's rpm **Note:** This setting will only be effective in manual mode. **Note:** In manual mode, lifter motion is limited to a maximum speed of 17 mm/s (60 rpm). This is necessary to enable a more precise height setting. The limit value in program-controlled and computer-controlled mode is 40 mm/s (140 rpm) approximately. End values must be entered for pump speed and table speed. Software tools are available for defining an end speed or a starting and end speed value and a speed characteristic.	Range: 10 – 250 rpm Selection: arrow keys ↑,↓ Confirmation: input key ↵ Cancel: ESC key ▶■

7.4.4 Manual Mode

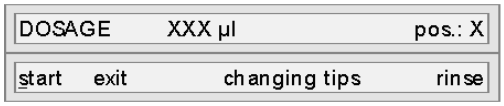
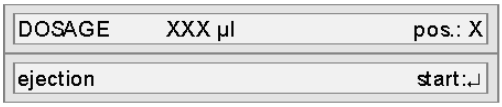
In manual mode, each action requires the intervention or confirmation by an operator. On the other hand, simple operations can thus be performed in an expedited manner, which allows for smooth workflows where small lots have to be handled.

Required operations can be triggered with the following positioning commands (at the touch-screen keypad):

Positioning of carriage	
Precondition: lifter in lower limit position	
◀	Move next place (smaller number) into position below pipettor
▶	Move next place (greater number) into position below pipettor
Lifter: vertical position	
▲	Raise
▼	Lower
Lifter XY-position	
Precondition: lifter raised (not in lower limit position)	
◀ ▶	CyBi®-Well 96/384: positions A1, A2, B1, B2 of a microplate 384.
	CyBi®-Well 96/384/1536: positions A1 - A4, B1 - B4, C1 - C4 and D1 - D4 of a microplate 1536.
	CyBi®-Well 384/1536: positions A1, A2, B1 and B2 of a microplate 1536.

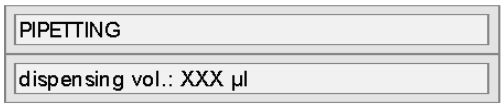
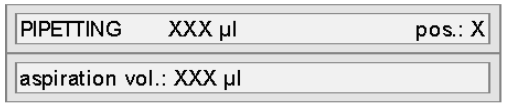
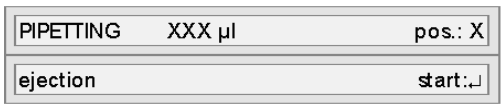
Dosing

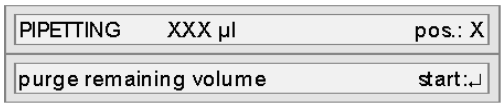
Draw in specified volume of liquid and dispense liquid with additional stroke

Select dosing volume	
	Value: arrow keys ↑,↓ Confirmation: input key ↵ Cancel: ESC key ▶■
Move reservoir into position for aspiration	
❑ Lower lifter ❑ Move carriage ❑ Raise lifter ❑ Select XY-position ❑ Raise lifter: move reservoir into position for aspiration	Refer to "Positioning commands" at the beginning of this section
Aspirate	
Select "Start" menu item	Selection: arrow keys ←,→ Confirmation: input key ↵
Preselected volume is aspirated. Lifter and carriage control is disabled while aspiration lasts.	
Move reservoir into dispensing position	
❑ Lower lifter ❑ Move carriage ❑ Raise lifter ❑ Select XY-position ❑ Raise lifter: move reservoir into dispensing position	Refer to "Positioning commands" at the beginning of this section
Dispensing	
	Confirmation: input key ↵
After a preset waiting time, the lifter will move down and the system makes a break for dabbing.	
Dabbing pause	
Carriage or lifter motion in order to facilitate dabbing	Keys ◀, ▶, ▲ and▼
Terminate dabbing pause	Confirmation: input key ↵
Pistons move into zero-position	

Pipetting

Liquid is aspirated in a greater volume than is discharged subsequently. Residual volume is finally discharged.

Select discharge volume	
	Value: arrow keys ↑,↓ Confirmation: input key ↵ Cancel: ESC key ▶■
Select aspiration volume	
	Value: arrow keys ↑,↓ Confirmation: input key ↵ Cancel: ESC key ▶■
Move reservoir into position for aspiration	
❑ Lower lifter ❑ Move carriage ❑ Raise lifter ❑ Select XY-position ❑ Raise lifter: move reservoir into position for aspiration	Refer to "Positioning commands" at the beginning of this section
Aspirate	
Select "Start" menu item	Selection: arrow keys ←,→ Confirmation: input key ↵
Preselected volume is aspirated. Lifter and carriage control remains disabled while aspiration lasts.	
Move reservoir into dispensing position	
❑ Lower lifter ❑ Move carriage ❑ Raise lifter ❑ Select XY-position ❑ Raise lifter: move reservoir dispensing position	Refer to "Positioning commands" at the beginning of this section
Dispensing	
	Confirmation: input key ↵
Preset volume is dispensed	
Preset waiting time is observed	

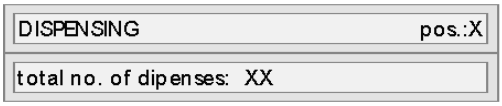
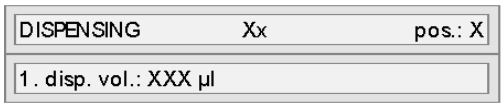
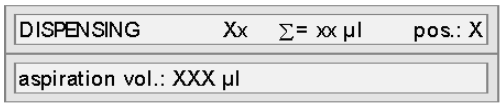
Move vessel into dispensing position for residual discharge	
❑ Lower lifter ❑ Move carriage ❑ Raise lifter ❑ Select XY-position ❑ Raise lifter: move reservoir into dispensing position	Refer to "Positioning commands" at the beginning of this section
Trigger residual discharge	
	Confirmation: input key ↵
Differential amount of discharged volume and aspirated volume is discharged	
The lifter moves down and the system makes a break for dabbing.	
Dabbing pause	
Carriage of lifter motion in order to facilitate dabbing	Keys ◀, ▶, ▲ and▼
Terminate dabbing pause	Confirmation: input key ↵
Pistons move into zero-position	

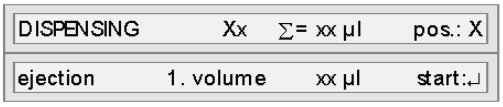
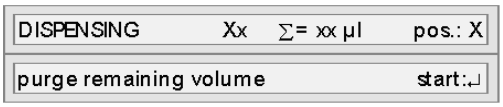
Dispensing

Aspirate total volume (sum of predefined subvolumes), then dispense predefined subvolumes.

NOTE

The sum of subvolumes must not be greater than the nominal tip volume of the pipetting head, i.e. 25µL or 250µL. The sum of subvolumes is shown on the display (Σ= xx µl).

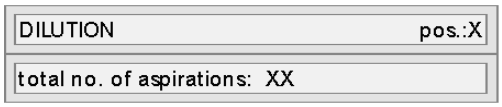
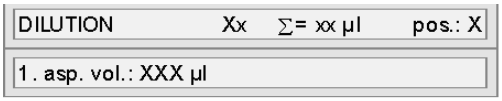
Select number of subvolumes	
	Range: 1 – 24 Value: arrow keys ↑,↓ Confirmation: input key ↵ Cancel: ESC key ▶■
Select dispensing volume per dispense stroke	
	Value: arrow keys ↑,↓ Confirmation: input key ↵ Cancel: ESC key ▶■
This entry must be repeated until all subvolumes have been specified.	
Select aspiration volume	
 By default, the aspiration volume is defined as the sum of subvolumes + 2 µl. This value can be modified if necessary.	Value: arrow keys ↑,↓ Confirmation: input key ↵ Cancel: ESC key ▶■
Move reservoir into position for aspiration	
❑ Lower lifter ❑ Move carriage ❑ Raise lifter ❑ Select XY-position ❑ Raise lifter: move reservoir into position for aspiration	Refer to "Positioning commands" at the beginning of this section
Aspirate	
Select "Start" menu item	Selection: arrow keys ←,→ Confirmation: input key ↵
Preselected volume is aspirated. Lifter and carriage control remains disabled while aspiration lasts.	

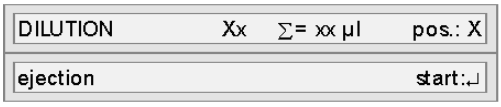
Move reservoir into dispensing position	
❑ Lower lifter ❑ Move carriage ❑ Raise lifter ❑ Select XY-position ❑ Raise lifter: move reservoir into dispensing position	Refer to "Positioning commands" at the beginning of this section
Dispensing	
	Confirmation: input key ↵
Preset volume is dispensed	
Preset waiting time is observed	
Note: Dispensing sequence (including sequence for positioning of vessel) is performed for each subvolume.	
Move reservoir into dispensing position for residual discharge	
❑ Lower lifter ❑ Move carriage ❑ Raise lifter ❑ Select XY-position	Refer to "Positioning commands" at the beginning of this section
Trigger residual discharge	
	Confirmation: input key ↵
The differential amount of the sum of dispensing volume and aspirated volume is discharged	
The lifter moves down and the system makes a break for dabbing.	
Dabbing pause	
Carriage or lifter motion in order to facilitate dabbing	Keys ◀, ▶, ▲ and ▼
Terminate dabbing pause	Confirmation: input key ↵
Pistons move into zero-position	

Diluting

Aspirates two volumes separated by an air bubble in a required mix ratio and dispense volumes with additional stroke

NOTE
The sum of subvolumes must not be greater than the nominal tip volume of the pipetting head, i.e. 25µL or 250µL.

Select number of subvolumes	
	Range: 1 – 24 Value: arrow keys ↑,↓ Confirmation: input key ↵ Cancel: ESC key ▶■
Select subvolumes	
	Value: arrow keys ↑,↓ Confirmation: input key ↵ Cancel: ESC key ▶■
This entry must be repeated until all subvolumes have been specified.	
Move reservoir into position for aspiration	
❑ Lower lifter ❑ Move carriage ❑ Raise lifter ❑ Select XY-position ❑ Raise lifter: move reservoir into position for aspiration	Refer to "Positioning commands" at the beginning of this section
Aspirate	
Select "Start" menu item	Selection: arrow keys ←,→ Confirmation: input key ↵
Preselected volume is aspirated. Lifter and carriage control remains disabled while aspiration lasts.	
Note: The "Move reservoir into aspiration position/aspirate subvolumes" sequence must be repeated as necessary to account for the number of required subvolumes.	

Move reservoir into dispensing position	
❑ Lower lifter ❑ Move carriage ❑ Raise lifter ❑ Select XY-position ❑ Raise lifter: move reservoir into dispensing position	Refer to "Positioning commands" at the beginning of this section
Dispensing	
	Confirmation: input key ↵
– Preset volume is dispensed – Preset waiting time is observed – The lifter moves down and the system makes a break for dabbing.	
Dabbing pause	
Carriage or lifter motion in order to facilitate dabbing	Keys ◀, ▶, ▲ and▼
Terminate dabbing pause	Confirmation: input key ↵
Pistons move into zero-position	

Tip change

A tip magazine is released and fixed by electro-motoric power.

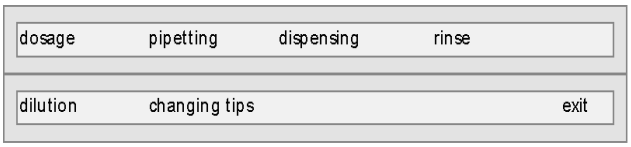
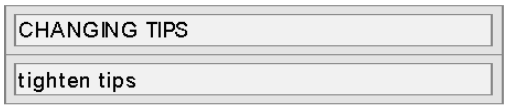
CAUTION

There is danger of crushing or pinching!
For tip changing, a magazine plate must be inserted until mechanical stop position.
Hold the tip magazine only at its handle while the magazine is being fixed.

Danger of piston damage!
Install and clamp only magazines which are filled with tips.

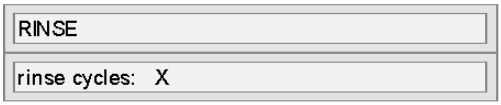
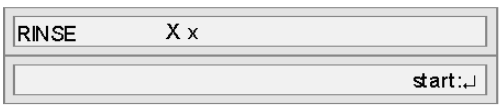
Risk of material damage!
Motion for inserting a magazine with tips is monitored by a micro-switch at the back of the magazine frame inside the CyBi®-Well. If a magazine is found to be wrongly inserted, an "Insert tip magazine correctly" prompt will appear. In the event of a micro-switch failure, there is danger of damage to the system, notably, its pistons.

Request system repair work in any such case.

Trigger tip change	
	Select "Tip change" Selection: arrow keys ←,→ Confirmation: input key ↵
Change tip magazine	
	– Remove tip magazine – Push magazine plate with tips in until you perceive mechanical stop position. Make sure that magazine is uniformly seated on frame. The subsystem will detect a magazine of conforming type and placement position.
Fix tip magazine	
	Confirmation: input key ↵

Rinsing

Aspirate and dispense rinsing liquid in a defined volume and a defined number of rinsing cycles.

Number of rinsing cycles	
	Range: 1 – 20 Value: arrow keys ↑,↓ Confirmation: input key ↵ Cancel: ESC key ▶■
Define rinsing volume	
	Value: arrow keys ↑,↓ Confirmation: input key ↵ Cancel: ESC key ▶■
Move washing trough into position below pipettor	
❑ Lower lifter ❑ Carriage: move wash trough to pipettor ❑ Raise lifter until tips are submerged	Refer to "Positioning commands" at the beginning of this section
Trigger rinsing cycle	
	Confirmation: input key ↵

Rinsing cycles (aspiration and discharge) are repeated in accordance with the predefined cycle number setting and the current cycle number and action are output on the display.	
The lifter moves down and the system makes a break for dabbing.	
Dabbing pause	
Carriage or lifter motion in order to facilitate dabbing	Keys ◀, ▶, ▲ and▼
Terminate dabbing pause	Confirmation: input key ↵
Pistons move into zero-position	

7.5 Specific Pipettor Features

Liquid volumes are aspirated and discharged by piston motion. The piston suspension point has a mechanical freeplay (slackness). This means: after each reversal in piston motion direction, the piston drive will cover a certain motion length without actually moving the piston and aspirating or discharging a volume of liquid. This motion length corresponds to the freeplay.

In order to prevent dosing errors, a volume cycle is organized in such a way that the piston reversal point lies outside of the actual pipetting range (motion into zero-position, aspiration with additional stroke) or is corrected by suitable compensator motion (dispense with additional stroke).

Aspirate with additional stroke

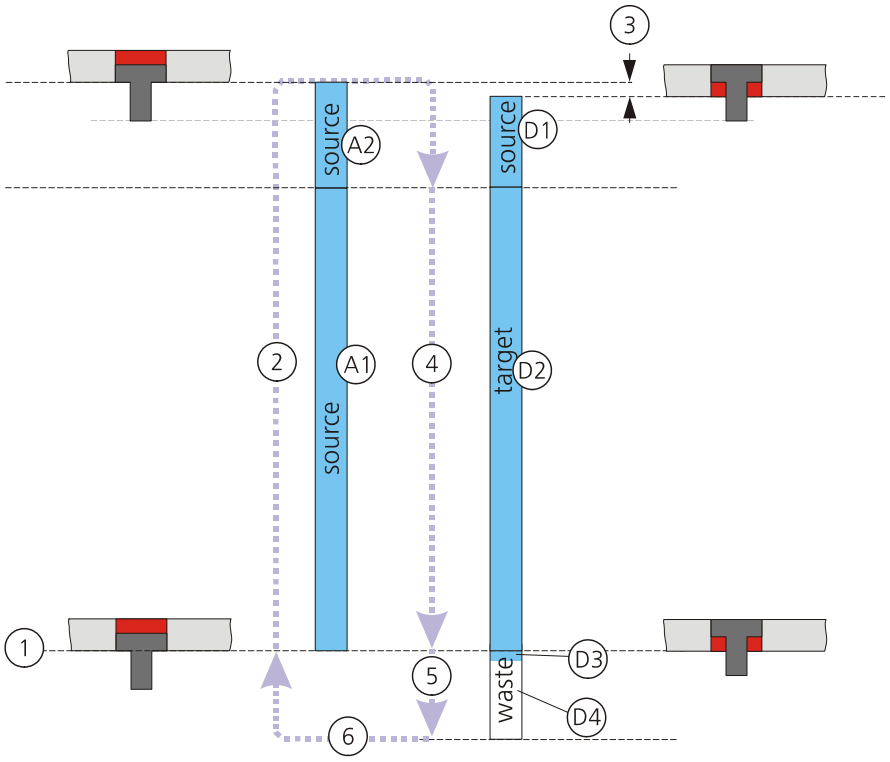


Fig. 11: Aspirate with additional stroke

1 Zero-position
2 Aspirate volume with additional stroke and piston reversal
3 Upper freeplay
4 Dispense exact volume (single volume or subvolume)
5 Residual dispensing
6 Move to zero-position

A1 = D2: nominal pipetting volume
A2: additional aspiration volume
D1: additional volume dispensed < A2 (additional stroke)
D2: nominal pipetting volume
D3: residual volume (proportional to freeplay)
D4: air

This is the recommended standard procedure for precise pipetting.

Piston motion starts in zero-position (1) and continues beyond the position that corresponds to nominal pipetting volume. The pistons are then lowered back into this position (2). The amount of freeplay (3) is excluded by this procedure. During direction

reversal, an additional volume (D1) is dispensed. Due to piston reversal, this volume is smaller than the aspirated additional volume (A2). The tip retains the nominal pipetting volume (D2) and a residual volume (D3).

Exact volumes can be dispensed in the next step (4) (in a single step or a multi-step sequence). After the nominal pipetting volume was dispensed, the pipetting tip will contain the residual volume (D3) resulting from upper direction reversal. This volume is dispensed with additional stroke (5) into a waste box or the reservoir. Since the stroke length is greater than actually required for the residual volume(D3), the residual volume is completely dispensed. Finally, the amount of air is dispensed (D4). A volume cycle is completed by "Motion into zero-position".

A "Move pistons into zero-position" command (6) triggers upward motion of pistons into their initial positions, thus excluding the lower freeplay.

This process must be triggered with no liquid present, i.e. the lifter must be in such a position that the tips cannot make contact with liquid. If liquid is aspirated in the process, this may result in dosing errors or contamination of pistons.

Aspirate without additional stroke

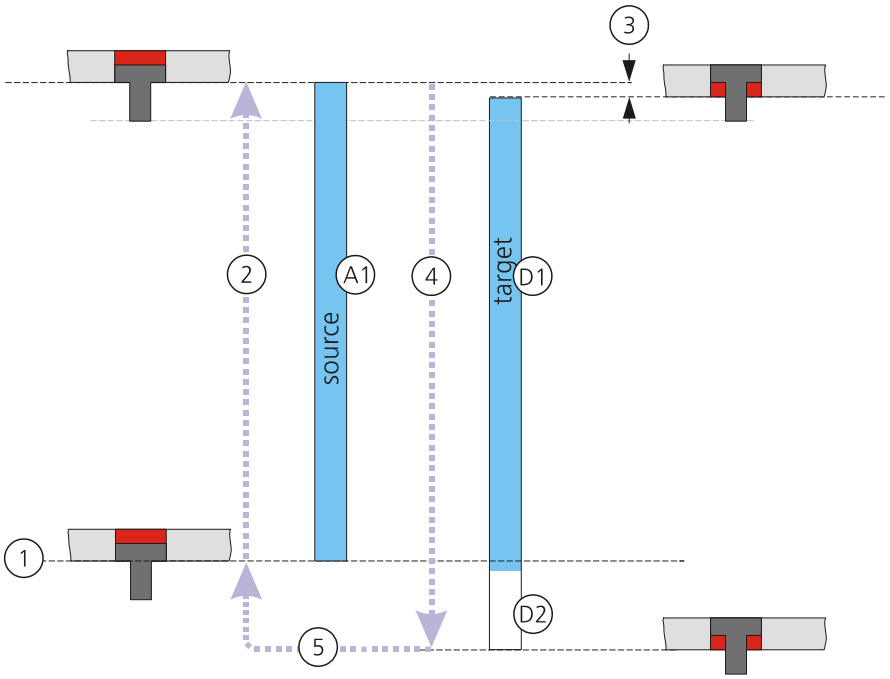


Fig. 12: Aspirate without additional stroke

1 Zero-position
2 Aspirate
3 Upper freeplay
4 Dispense with additional stroke
5 Move to zero-position

A1=D1: nominal pipetting volume
D2: air

Liquid aspirated without additional stroke must be dispensed in a single step in order to obtain precise results. As a necessary precondition, the path length for dispensing (4) must be greater than the path length for aspiration (2). Since the reversal points of piston motion lie within the motion range for dispensing, no volume is dispensed on trav-

elling through the upper amount of freeplay (3). If dispensing involves a greater path length that the nominal volume would require, the entire previously aspirated volume will be dispensed from the pipetting tip; this is followed by the amount of air (D2).

A "Move pistons into zero-position" command (5) will move the pistons into their upper initial positions thus excluding the amount of lower freeplay.

This process must be triggered with no liquid present, i.e. the lifter must be in such a position the tips cannot make contact with liquid. If liquid is aspirated in the process, this may result in dosing errors or contamination of pistons.

7.5.1 Volume Cycle

Standard cycle:

- ❑ Aspirate with additional stroke
- ❑ Dispense (single volumes or subvolumes)
- ❑ Residual dispensing
- ❑ Move to zero-position

Simplified cycle (only dispensing of single volumes):

- ❑ Aspirate with additional stroke
- ❑ Dispense with additional stroke
- ❑ Move to zero-position

7.5.2 Waiting Time

Piston motion performed for aspiration or dispensing will always create some underpressure or overpressure, respectively. In order to maintain the specified system precision, pressure equalization in the tips must be allowed to finish. This is supported by a specific "Interruption" software command. A waiting time of two seconds proves long enough with most watery solutions. The greater the viscosity of a liquid, the greater the setting for delay must be.

7.5.3 Precision Performance

The CyBi®-Well operates on the principle of air displacement, i.e. 96 or 384 pistons which are mechanically connected with a common drive perform motion inside of 96 or 384 air spaces respectively. Each of these spaces is formed by a pipetting tip and an internal seal. The sensitivity of piston motion corresponds to one tenth, one hundredth or one thousandth of a micro liter.

The achievable degree of precision is limited and influenced by:

- ❑ the wettability of tips,
- ❑ the dimensional stability of the outlet opening,
- ❑ the way the system and involved liquids are handled.

7.5.4 Further Useful Operating Advice

- Liquid is aspirated or dispensed by underpressure or overpressure resulting from piston motion. A work operation of either kind s completed on reaching pressure balance. The time required to reach this state depends - among other factors - on the properties of the liquid being handled. For this reason, adequate pause times should be included with all operating sequences as necessary.
- When working with dry tips, pressure equalization of a different kind will occur after filling. I takes a longer to finish, because an air vapor pressure will build up in the air cushion inside the tip above liquid level, Liquid will emerge from the tips as a result (formation of droplets).
  This can be prevented by triggering a few initial rinse program cycles, until the air inside the tip is saturated with vapor. Even after a longer downtime with tips in filled state, no liquid will emerge on completion of preventive rinsing.
- By wetting a tip with liquid, you may influence the achievable level of precision and accuracy. As a matter of importance, tips should therefore be submerged into the liquid volume just as much as necessary for a particular process. In addition, the depth of submergence should always be the same in multi-cycle mode. This can be achieved by maintaining a constant reservoir filling level with the help of the sensor-controlled reservoir pump.
- For precise work results, you are advised to use a non-shedding slightly moistened scrubbing towel to dab the tips. You may place the towel onto a standard microplate (for example).

8 Fault Removal

Malfunction or faults during operation will be displayed on the working screen. Where a fault situation was clearly caused by operator action, operation can be resumed, once the fault has been removed (turn power off and on again for greater safety).

Check all potential fault sources on occurrence of a fault. Where a problem persists after this check or on identification of an undescribed fault, you should notify the CyBio AG Jena customer service or their authorized service partner.

The following fault messages may be displayed by CyBio® Composer software:

Error/Error code	Cause	Action for removal
3	RAM fault	Inform service partner.
5	Tip magazine of older make, back-end corners are not rounded off.	Replace tip magazine or have magazine reworked by distributor/service personnel.
	Tip magazine edges or corners deformed resulting from drop impact.	Replace tip magazine or have deformation removed.
7	System error	Inform service partner.
8	Failure to find internal zero-position of pump system.	Tip replacement may be able to remove this error. Otherwise, repair work is required!
9	Parameter error - host computer has transferred wrong parameters to pipettor.	Check command action and trigger another transfer.
10	Host computer has sent command that is not available in system.	Check that system is correctly configured in computer program (control software).
11	Pump drive has reached upper limit position.	Tip replacement may be able to remove this error. Otherwise, repair work is required!
12	Pump drive has reached lower limit position.	Tip replacement may be able to remove this error. Otherwise, repair work is required!
13	Lifter has reached upper limit position.	Motion into lower position automatically triggers calibration.
14	Lifter has reached lower limit position although this should not happen as part of command execution.	Motion into lower position automatically triggers calibration.

Error/Error code	Cause	Action for removal
15	Lifter failed to find its lower internal zero-position.	Motion into lower position will automatically trigger calibration. Repair work is required if this error occurs repeatedly!
16	Host computer has requested a program memory location that is not free.	Select other program number.
17	Host computer has selected a program that is not available in memory.	Program must be re-edited or re-loaded.
18	Host computer has sent command that requires more parameters.	Check command in computer program.
19	Illegal commands were used on loading of a program.	Check that system is correctly configured in computer program (control software).
20	Program run was aborted by operator.	
21	Error on calculating motor characteristic.	Parameter entries cannot be carried out. Select new parameters.
22	Error on microplate carriage motion.	Clean microplate carriage Clean microplate carriage and sliding rails or remove obstacles in the way of the microplate carriage motion path.
	Error on rotary table motion	Remove obstacles from motion path of rotary table. Inform your service partner.
23	Host mode currently unavailable.	Return to main menu and trigger system initialization again.
24	Command cannot be executed at this moment.	Wait for preceding command to finish.
25	No connection or faulty connection with servo-lifter.	Inform your service partner.

Table 11: Error code table

9 Maintenance & Care

9.1 Safety Notes

WARNING

Please 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 with any kind of maintenance or care! Make sure that the system is protected from accidental restoration of power!

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

CAUTION

Penetrating liquid may cause material damage to electrical and electronic components!

Make sure that no liquid can penetrate into the inner space during any kind of maintenance or care. You are also referred to specifications on → *"Chemical Resistance" on page 17*.

NOTE

Intervention into mechanical or electronic parts in the inner CyBi®-Well space may not be performed by anyone other than CyBio customer service personnel or specially authorized expert technicians.

To ensure that your CyBi®-Well preserves optimal adjustment condition and will faultlessly function over a longer period of time, we recommend the conclusion of a service/maintenance contract with CyBio AG in Jena.

Perform scheduled work items for preventive maintenance and care in accordance with specified intervals (→ *see section 9.2.1*), observing the following general rules:

- ❑ Never use cleaning powder, dye thinners or solvents like petrol or acetone to clean the system! Substances of this type will attack the surface of enclosures.
- ❑ Use a soft piece of cloth slightly moistened with mild soap or disinfectant solution to clean subsystem enclosures.
- ❑ Contamination or natural wear of assemblies result in higher system strain levels and, hence, increased probability of system failure. Check for signs of wear and tear on assemblies under mechanical strain and initiate necessary replacements promptly on identifying wear and tear.
- ❑ Spraying the device with a disinfectant aerosol or similar is dangerous and therefore not permitted. Spray contains gases that can ignite.

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

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

9.2 Maintenance Work

9.2.1 Overview

Required work items of scheduled maintenance and care are listed in the following table together with related intervals.

Maintenance action	Maintenance interval		
	Weekly	Monthly	Half-yearly
Clean transport rails with carriage or rotary table	x		
Use mild cleaning agent or disinfectant to clean the tip washing trough	x		
Wash tubes	x		
Replace used tips	x		
Clean tip magazine and perform autoclaving if necessary	x		
Clean all liquid-holding vessels and the outside of tubes with disinfectant		x	
Clean tubes with disinfectant or autoclave tubes		x	
Inspect sealing plate for cleanness		x	
Inspect carriage or rotary table for visible damage and clean as necessary – Remove tip magazine – Turn power off – Remove microplates or reservoirs Only linear transporting system – Remove carriage and clean carriage using mild detergents or disinfectants – Mount carriage again			x
Inspect lifter for damage and clean if necessary			x

Maintenance action	Maintenance interval		
	Weekly	Monthly	Half-yearly
Perform precision test (→ *refer to page 31*)			x
Perform leak test (→ *refer to page 33*)			x
Check electrical components and cabling, test PE conductor (only qualified electrician!)			x

Table 12: Maintenance intervals

Especially the piston sealing components are subject to wear and tear, depending on the number of motion cycles completed. Typically, their service life exceeds 250 000 cycles. For this specification, it is assumed that pistons and seals are free from contamination.

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

9.2.2 Lubricate the transport rails (linear transporting system)

1. Remove carriage
2. Grease rails with ultra-thin layer of silicon lubricant
3. Wipe redundant lubricant off
4. Mount carriage

9.2.3 Clean Lifter

NOTE
XY-motion of the lifter must not be obstructed by objects in the motion range. Otherwise, the lifter's lifetime may be considerably reduced.

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 signs of wear and tear.

Check lifter for dirt at regular intervals. Clean if necessary.

9.2.4 Tip Magazine

CAUTION

Direct contact of the tip magazine and the pistons may damage the pistons.

Never install a tip magazine without tips into the pipettor! The insertion of a tip magazine with no tips installed will void any warranty claims!

NOTE

Before shutting the system for some hours or some days, the tips should be unfixed. The tip magazine must remain installed in any such case.

Operating the CyBi®-Well in manual or automatic mode, you should carefully watch for and remove residual air bubbles from tips. Otherwise, the liquid in affected tips will reach an excessively high fill level. There is danger of pistons coming into contact with liquid and suffering contamination as a result. This may happen if liquid is drawn from vessels with insufficient filling level or if tips are not submerged deep enough.

Make sure that pistons cannot come into contact with liquid during motion into zero-position. Repeated faulty operation may lead to excessively high fill levels and a situation of the kind as described above.

9.2.5 Clean Carriage (Linear Transporting System)

NOTE
Carriage performance depends on the current state of the transport rails. Remove pockets of dirt, contamination or damage of transport rails immediately.

To clean the carriage, proceed as follows:

1. Turn CyBi®-Well power off at the main power switch, then disconnect the power plug from the socket.
2. Remove tip magazine from pipetting head for safety reasons (→ *Table 12 on page 61*).
3. Remove all microplates, reservoirs and wash troughs.
4. Remove the carriage from the transport rails by raising it at the front and the back end by equal amounts simultaneously. Proceed with due care, in order to prevent damage.
5. Use a mild detergent or disinfectant to clean the carriage and the transport rails.
6. Carefully place the carriage back onto the transport rails.
7. Carefully push tip magazine back into the holder section at the pipetting head. Make sure that tip magazine is correctly placed as you do this (→ *Table 12 on page 61*).
8. Reconnect power plug to mains socket and turn CyBi®-Well power on at the main switch.
   ✓ **The system will be re-initialized and restored to operating condition.**

9.2.6 Clean Rotary Table

To clean the rotary table, proceed as follows:

1. Turn CyBi®-Well power off at the main power switch, then disconnect the power plug from the socket.
2. Remove tip magazine from pipetting head for safety reasons (→ *Table 12 on page 61*).
3. Remove microplates, reservoirs and wash troughs
4. Use a mild detergent or disinfectant to clean the rotary table.
5. Carefully push tip magazine back into its holder section at the pipetting head. Make sure that tip magazine is correctly placed as you do this (→ *Table 12 on page 61*).
6. Reconnect power plug to mains socket and turn CyBi®-Well power on at the main switch.
   ✓ **The system will be re-initialized and is restored to operating condition.**

9.2.7 Sealing Plate

NOTE
Where pipetting tips are changed with greater frequency, fine fluff-ball stock or dust may settle on the sealing plate, impairing the efficiency of sealing.

Please observe the following rules:

1. Do not used dusted pipetting tips.
2. Check sealing plate for cleanness once in a month.
3. Trigger a tip changing cycle and remove the tip magazine for inspection and cleaning. The sealing plate can now be accessed from below. Use a non-shedding slightly moistened cloth for cleaning.
4. Proceed with utmost caution in order to prevent unwanted positional shifts of the sealing plate. Otherwise, there is danger of plate openings getting clogged with fluff balls.
5. Do not remount the tips, until the sealing mat has fully dried.

10 Shutting Down

CAUTION

There is danger of injury or potential system damage if cables are removed in energized state!

Never remove cabling as long as voltage is supplied! Make absolutely certain that power supply is turned off before you remove a cable!

To shut the CyBi®-Well down for a longer period of time, proceed as follows:

1. Remove tip tray and place it into the special tip tray package.
2. Transfer the power switch into position "0".
3. Turn general system voltage supply off (using main power switch or socket bar for this purpose).
4. Disconnect all line power cables from the socket bar or from their power sockets.
5. Remove all microplates.
6. Clean and disinfect the system in accordance with instructions for handling of most recently used materials and substances.
7. Protect the system from sedimentation of dust.

   ✓ **The system is shut down now.**

NOTE

A given sub-menu you had been working in when power supply was shut down will be restored when power becomes available again.

11 Accessories&Spare Parts

11.1 Pipetting tips

NOTE

The system, including its accessory items and consumable materials, are matched to each other as part of manufacturing. Use only accessories and consumables which are recommended by the Manufacturer!

No liability will be accepted by the Manufacturer in the event of damage or malfunction due to the use of any other accessory items or consumable materials (notably, pipetting tips).

You are requested to use our latest accessories and tips catalogs for this purpose.

NOTE

For more detailed information about available pipetting tips and magazines, you should consult our latest catalog or visit us on the Internet at www.cybio-ag.com.

11.2 Further Accessories

Available accessories for CyBi®-Well operation are:

- ❑ Stacker
- ❑ Microplate adapter
- ❑ Tip wash station
- ❑ Barcode reader
- ❑ Peristaltic pumps
- ❑ Plate transfer unit
- ❑ Tip changer
- ❑ Reservoirs
- ❑ etc.

NOTE

Detailed information about available accessories can directly be ontained from CyBio AG or visiting us on the Internet at www.cybio-ag.com.

12 Waste Disposal

12.1 Reagents

NOTE

Consumable materials must be disposed in compliance with binding safety and environmental regulations.

- ❑ Biological samples must be treated in accordance with binding local regulations for the handling of infectious material.
- ❑ Hazardous substances and related containers must not be disposed as domestic waste or allowed to drain into the sewer or the soil. The appropriate rules and practices must be closely followed for disposal.

12.2 System & Accessories

NOTE

For reshipment of system components or the system as a whole, a certificate of no objection must be enclosed (→ *refer to page 73*).

System components or units reshipped without a declaration of no objection will not be accepted by CyBio AG Jena or the responsible customer service provider!

Your CyBi®-Well will be taken back and disposed by CyBio AG Jena. For disposal, you are requested to contact the appropriate Customer service operation.

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A 1 Declaration of Safeness

Hereby I/we certify that the insides and outsides of the device described below (inclusive of all supplementary equipment and accessories) have been cleaned and disinfected and are free of any infectious, radioactive or otherwise hazardous or toxic substances, and that no risk or danger is involved in servicing the device.

Name/Description: _____

Serial number: ☐☐☐☐ ☐ ☐☐☐☐

_____ _____

Place, date Signature, name and company

Person responsible for operating the above device:

_____

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