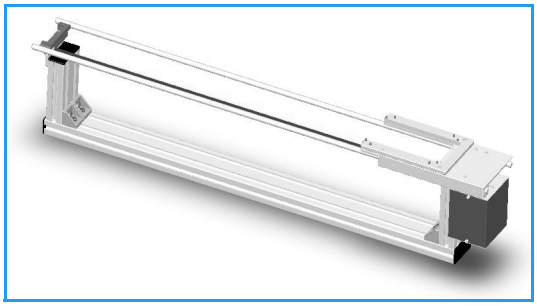
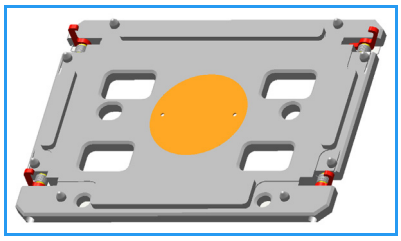
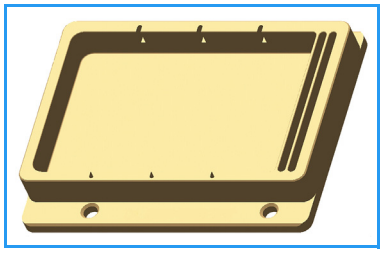
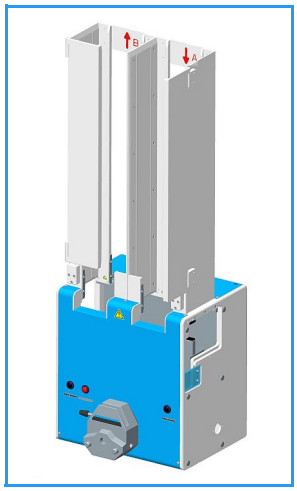
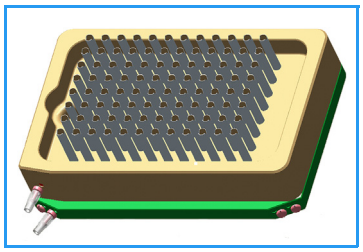
CyBio Accessories











User Manual

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EG Konformitätserklärung
EC Declaration of Conformity

Name und Anschrift des Herstellers:
Name and address of the manufacturer:

CyBio AG

Göschwitzer Straße 40
D-07745 Jena

Hiermit erklären wir, dass das nachstehend beschriebene Produkt
Herewith we declare, that the product described below

<CyBio Produktzubehör>

allen einschlägigen Bestimmungen der Richtlinie über elektrische Betriebsmittel 2006/95/EG entspricht. Das Produkt entspricht zusätzlich den Bestimmungen der europäischen Richtlinien 2004/108/EG über elektromagnetische Verträglichkeit.

is complying with all essential requirements of the EC Directives 2006/95/EC relating to electrical equipment .
In addition the product is in conformity with the EC Directives 2004/108/EC relating to electromagnetic compatibility.

Angewandte harmonisierte Normen:
Harmonized Standards used:

EN 61010-1: 08/2002	Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte, Teil 1: Allgemeine Anforderungen	*Safety requirements for electrical equipment for measurement, control and laboratory use Part 1: General requirements*
EN 61000-6-2: 03/2006	EMV - Fachgrundnorm: Störfestigkeit Industriebereiche	*EMC - Generic standards: Immunity for industrial environments*
EN 61000-6-4: 09/2007	EMV - Fachgrundnorm: Störaussendung Industriebereiche	*EMC - Generic standards: Emission for industrial environments*

Bevollmächtigter für die Zusammenstellung der relevanten technischen Unterlagen:
The person authorized to compile the relevant technical documentation:

Jochen Eckardt, Göschwitzer Str. 40, D-07745 Jena

Jena, 4. 11. 2011

Table of content

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1 General Information

1.1 General User Manual Advice

This User Manual informs about the setup and function of CyBio Accessories. It also provides qualified operating personnel with knowledge required for the safe handling of each accessorie. This Document is part of the product. It must be kept within easy reach to be ready for use during the entire lifetime.

Furthermore, this User Manual contains advice regarding action for maintenance or care and provides references to potential error causes and options for removal.

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

NOTE

All data and information provided herein reflect the latest state of knowledge at the moment of publishing. CyBio AG reserves the right to make changes if deemed necessary and appropriate in the interest of technical change.

1.2 Target Group

This User Manual addresses:

- ❑ Expert personnel trained and qualified to operate and provide maintenance for, the particular module (→ *refer to chapter 2.2*)
- ❑ Personnel responsible for the planning of procedural sequences, maintenance and cleaning work, safety precautions, etc.

1.3 Conventions

1.3.1 Warning Notes & Signs

This document contains warning notes & signs as follows.

DANGER

Dangerous situation - e. g. due to hazardous electric voltage!

Potential consequences: heavy or lethal physical injuries, material damage.

WARNING

Indicates a potentially hazardous situation.

May lead to death or serious physical injuries (crippling) if disregarded.

CAUTION
Dangerous situation!

Potential consequences: light or moderate physical injury.

NOTICE
Dangerous situation!

Potential consequences: material damage

1.3.2 Important Information

NOTE
Useful operator advice, involves no hazardous situation.

NOTE
Notes regarding environmental protection

1.4 Conforming Use

The owner/operator will be responsible for conforming use of a given accessory module.

Accessory modules represent add-on units designed and allowed for exclusive use in combination with products or systems from CyBio AG or with products from third-party manufacturers, which have been adapted by CyBio AG to precisely fit a given accessory module described herein. All modules have been developed and built for use in chemical and biological laboratories. In medical or diagnostic environments, their range of capabilities is limited to R & D.

- ❑ Accessory modules may not be operated by anyone other than trained and qualified expert personnel (→ *refer to chapter 2.2*).
- ❑ Accessory modules must always be operated in accordance with this User Manual. In the first place, this applies to electric power supply values, operating conditions and explanatory notes regarding system maintenance, service, transportation and disposal.
- ❑ Safety notes in this User Manual must be followed as a compulsory rule.

Your are not allowed to:

- ❑ operate accessory modules in a medical laboratory
- ❑ use explosive substances in any of these accessory modules
- ❑ operate accessory modules in an explosive environment
- ❑ smoke or ignite an open fire at the installation site.

As regards the safe handling of dangerous substances (radioactive, infectious, toxic, etching, combustible and other hazardous substances), the owner/operator will be responsible as stipulated by statutory law and guideline policies.

The same applies to the compliance with environmental rules and practices (e.g. where reagents or consumable materials have to be disposed).

1.5 Standards & Guidelines

Each accessorie has been designed and built to meet the latest standards in engineering technology and established safety rules.

Its engineering design is in line with fundamental requirements on the safety and health of persons as applicable under laws, standards and guidelines, which fact is confirmed by CE labeling and a declaration of conformity (→ *refer to page IV*).

All statements on safety are derived from currently valid regulations of the European Union. For other countries, relevant national laws and regulations must be observed.

1.6 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.

2 General Safety Notes

2.1 General

NOTE
For your own safety and to ensure failsafe and reliable operation of a given accessorie, you should carefully read this chapter before you proceed to any kind of start-up work! You are also advised to follow special safety notes in all relevant chapters.

In addition to the safety notes in this Manual and local safety practices regarding the proper operation of accessory modules from case to case, generally established accident prevention, industrial labour protection and environmental protection rules must be considered and duly followed.

2.2 Requirements On Operating Personnel

- ❑ Accessory modules may not be operated by anyone other than trained expert personnel who have received instructions on operational safety. Operating personnel must have read and understood this User Manual.
- ❑ Personal protection equipment must be put on for operation or performance of maintenance work on an accessory module.
- ❑ You are not permitted to operate or perform work for maintenance of an accessory module, when under the influence of alcohol, drugs or medication.
- ❑ Operating personnel must be aware of the potential dangers that may emanate from substances being processed.

2.3 Specific Safety Notes

- ❑ The system must be installed by service personnel of, or expert personnel duly trained and authorized by CyBio AG in all cases.
- ❑ Do not use aggressive substances of a kind that are likely to impact the stable system performance (→ *refer to "Chemical Resistance" on page 7*).
- ❑ Operate the system only at a line voltage that complies with nameplate specifications!
- ❑ Observe specified maintenance intervals!
- ❑ Use only accessory items, consumable materials and spare parts specified in this User Manual or provided or recommend by CyBio AG!

2.3.1 Operation

- ❑ Operating personnel are obliged to convince themselves of the proper technical condition of a given accessorie, including any safety devices, before they may proceed to action for powering up. This especially applies after work for conversion, extension or repair.

- ❑ Do not operate a given accessorie, unless all safety devices are in place, properly installed and fully functional.
- ❑ Protection and safety devices must never be removed, modified or defeated while the system is operating.
- ❑ Ensure easy access to the main power switch and any emergency shutdown or locking point at any time during system operation.
- ❑ Make sure that the accessories built-in ventilation devices are always fully operational. Obstructed ventilation grids, ventilation slits, etc. may cause operating trouble or damage to accessory modules.
- ❑ Operating personnel are required to immediately notify the owner of any change identified in the accessorie and likely or known to impact the level of safety.
- ❑ Accessories may, where there is a reference to this point, only be connected to a power socket with PE-conductor. The PE conductor must not be interrupted (e. g. with a voltage regulating transformer). Use extension cables with PE conductor in all cases!
- ❑ Do not insert objects into an opening and make sure that no liquid can penetrate through openings or joints into the inner system space of an accessory module.
- ❑ No short-circuiting of inlet fuses! Use only fuses of a type specified in this User Manual for replacement. Follow relevant specifications in chapters "Technical Data".

2.3.2 Transportation

- ❑ Accessory modules may not be transported by anyone other than service personnel of CyBio AG or a duly authorized contractor. Make sure that:
  - the given accessory module is always transported in its original packing!
  - all shipping brackets/retainers are in place
  - all components are completely drained, clean and decontaminated
  - the → *"Declaration of Safeness"* is properly completed

2.3.3 Maintenance & Care

- ❑ Service and repair work, including action for starting an accessory module up or shutting it down for pre-shipment procedures may not be performed by anyone other than authorized service personnel!
- ❑ Operating personnel may not perform action other than described in the relevant "Maintenance & Care" chapters.
- ❑ Always shut power down before you begin work for maintenance or care. Pull the main power plug from the line power socket before starting work for maintenance, repair or cleaning.

2.4 Additional Safety Notes

2.4.1 Handling of Dangerous Substances

There is danger to people's health when dangerous substances are handled even in the case of conforming use. The owner/operator will be 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.

- ❑ Adequate rules for the handling of dangerous substances should be established in accordance with the security level of the laboratory in question, the specifications in relevant safety data sheets for a given substance, manufacturer's instructions on use and other relevant national and international provisions of law (WHO, "Laboratory Biosafety Manual").
- ❑ Put on personal protection equipment for work on an accessory module.
- ❑ Follow all notes as regards the cleaning and decontamination of accessory modules.

2.4.2 Chemical Resistance

Aggressive → *"Substances"* may cause damage. Although design materials (→ *Table on page 7*) have been selected to be resistant to the majority of typically used substances, material damage as a consequence of aggressive substances cannot be completely ruled out.

- ❑ You should check that working materials which will be in direct contact with an aggressive substance (e. g. leaches, acids or organic solutions) are actually resistant before you introduce the particular substance.
- ❑ Use only substances that are compatible with the materials quoted herein.
- ❑ In case of doubt, you should contact CyBio AG (→ *refer to page III*).

Component	**Material**
Reagent vessels	PMMA, PTFE, PP
Reservoirs	PTFE, PMMA, stainless steel, PP
Washing troughs	PTFE, PMMA, stainless steel, PP

Substances[1]
Hydrofluoric acid
Highly concentrated acids
Cleaning powder
Paint thinners
Naphtha (crude petroleum)
Petrol

Substances[1]
Acetone
Cleaning spray
Ozone

1 This table does not purport to be complete

Do not use solvents (thinners), aggressive detergents, flammable liquids or etching leaches for cleaning. Disregarding this advice may cause damage to parts of shielding or enclosures.

2.5 Rules of Conduct in a Case of Emergency

- In the event of a situation involving potential danger or danger of an accident, 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!

3 Transportation & Storage

3.1 Transportation

NOTICE

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

Take adequate precautions to protect accessory modules from environmental influences, mechanical impacts and formation of condensed water during transportation! Intermediate storage of accessories on open ground is not permitted!

NOTICE

Inexpert packaging is likely to cause mechanical damage!

For transportation and shipment of accessories, only original packing may be used!

To prepare accessories for transportation, proceed as follows:

- ❑ Shut accessorie down in defined order.
- ❑ Remove all cables and tubes from the accessorie.
- ❑ Secure all moving parts with cable straps or adhesive tape.
- ❑ Use only original packaging for transportation. Request original packaging materials from your responsible service contractor if necessary!
- ❑ Use shock-absorbing PE material to pad the accessorie in its packing case.

You should also observe the following rules for transportation:

- ❑ Use utmost caution when handling a accessorie for transportation. This is necessary to prevent damage as a result of force impacts or negligence in loading or unloading procedures.
- ❑ Prevent formation of condensed water due to strong variations in temperature, as well as mechanical impacts and vibration during transportation.
- ❑ You are further request to include a fully completed → *"Declaration of Safeness"* with each product/accessory shipment to CyBio AG.

3.2 Storage

Where an accessorie is not installed immediately after arrival of product shipment or not required for a longer period of time, it should be stored in its original packing case.

The climatic requirements on facilities for accessorie storage are as follows:

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

4 Maintenance & Care

4.1 Safety Notes

NOTE

Any kind of invention into inner equipment spaces with mechanical or electric parts is the exclusive responsibility of Manufacturer's Customer Service personnel or specifically authorized expert technicians.

For accessory units to preserve their alignment state and proper functioning condition over a longer period of time, we recommend the conclusion of a Service/Maintenance Contract with CyBio AG.

WARNING

Physical contact with voltage-carrying parts may result in death, injury or material damage!

Remember to turn all equipment power switches off (including that of basic/host unit) before you begin any kind of work for maintenance or care. Detach all power cables from the power socket and the respective equipment terminals.

NOTICE

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

Make sure that no liquid is able to penetrate into an inner equipment space as you perform work for maintenance or care. You should also follow advice and specifications on → *"Chemical Resistance" on page 7*.

Work for maintenance or care must be performed on a regular basis and observing all of the following general rules:

- ❑ Never use cleaning powder, paint thinners or solvents like petrol or acetone to clean accessory equipment units. Substances of this type will attack the surface of enclosures or shielding.
- ❑ Use a soft piece of cloth moderately moistened with a mild soapy or disinfectant solution to clean the given unit.
- ❑ Spraying with a disinfectant aerosol or similar is classified as dangerous and prohibited for this reason. Spray contains gases that can ignite.

NOTE

Contamination, for example, dried-in liquid may give rise to increased wear and tear of components. Always maintain clean working conditions!

5 Waste Disposal

CAUTION

There is danger of physical injury or material damage by toxic chemical and biological substances!

Put on personal protection equipment for action to dispose of consumable materials, reagents or accessory module. Follow safety data sheets and notes on practical use issued by manufacturers regarding the handling of dangerous chemical and biological substances.

5.1 Consumables

NOTE

For disposal of consumables, you must comply with binding safety and environmental regulations.

- ❑ Always store and dispose contaminated consumable materials in lockable containers that are designated and specifically marked for this purpose.

5.2 Reagents

NOTE

To dispose reagents, proceed in accordance with binding national (e. g. Hazardous Materials Ordinance) and international regulations on safety and environmental protection (e. g. "Laboratory Safety Manual" of WHO).

- ❑ Take risk category of selected substances into proper account.
- ❑ Biological samples must be treated in accordance with locally binding 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 of such substances.

5.3 CyBio Accessories

CAUTION

There is danger of physical injury or material damage by toxic chemical and biological substances!

Accessory modules must be decontaminated before they can be disposed.

NOTE

Unless otherwise agreed, the CyBio Accessories system or components of it must be disposed in accordance with currently binding provisions of law at the end of its/their useful life. Respective action will be the sole responsibility of the CyBio Accessoriessystem owner.

The statutory bases for disposal are provided by the following EU Directives or their respective implementations into national law within the EU:

- ❑ EU Directive 2002/95/EC (RoHS)
- ❑ EU Directive 2002/96/EC (Waste Electrical and Electronic Equipment)

Short Overview

6 Stacker

Ordering number

- ❑ OL0027-100-27 (standard, DW, with doors)
- ❑ OL0027-107-27 (long, DW, with doors)
- ❑ OL0018-100-27 (for CyBi®-8plus1, CyBi®-WellFlex, CyBi®-DiluS*pro*)

6.1 General Description

6.1.1 Setup

The purpose of the stacker is to receive, store and output microplates. It consists of a basic body integrating electromechanical components and the two stacks for loading or unloading microplates/reservoirs into or from (→ *see fig. 1*). The lowermost microplate/reservoir rests on magnetic latches. In the event of maloperation (→ *see section 6.6*), these can be unlocked by pressing the corresponding "solenoid control" button, for example, in order to retrieve a jammed microplate. The stacking process is monitored by a sensor in each stack. Voltage is supplied from a host unit, e. g. a CyBi®-Well, operation control is accomplished via PC and CyBio control software.

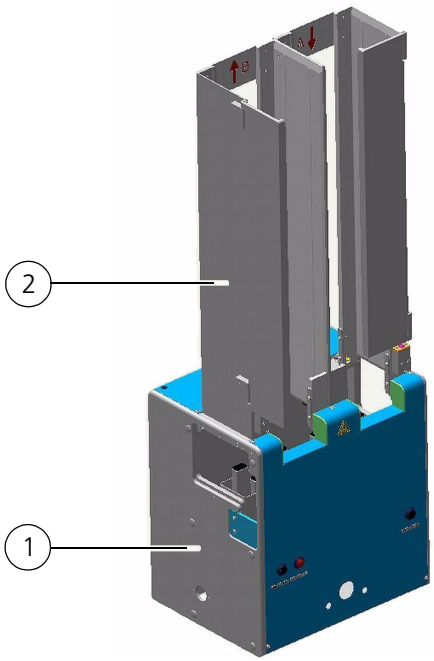


Fig. 1: Stacker - basic setup

1 Basic body
2 Stack unit with stacks A and B

6.1.2 Operation controls & terminals

Terminals and interface ports for stacker operation are located on the stacker's rear side (→ *see fig. 2*). Provided on the front side are a terminal point for connection of a peristaltic pump, the "solenoid control" button and the stop-and-down button (→ *see fig. 2*).

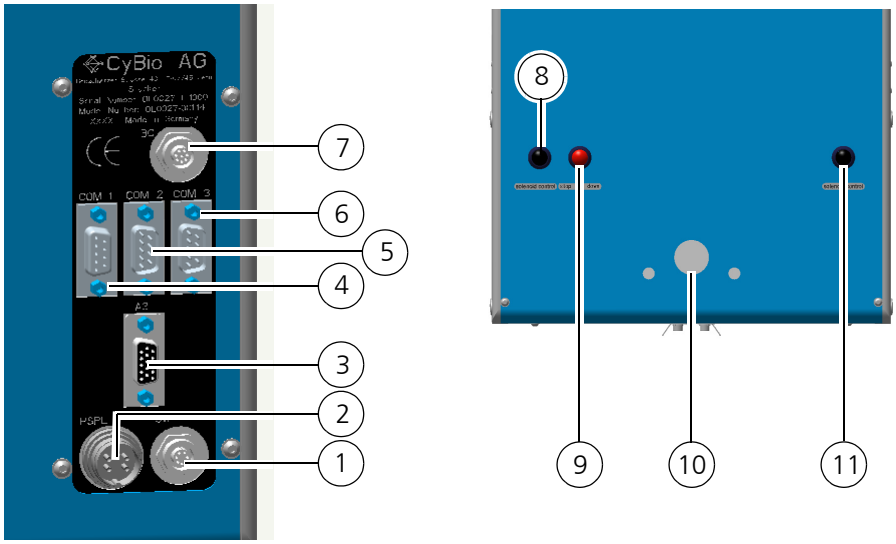


Fig. 2: Stacker operation controls and terminals

1		
1	SW	Switch output
2	PSPL	Power supply
3	A3	Point for connection of optional horizontal drive
4	COM 1	Host PC
5	COM 2	Point for optional connection of host unit (e. g. CyBi®-Well)
6	COM 3	Point for optional connection of further stacker
7	BC	Terminal for barcode reader (optional → *refer to chapter 17.6*)
8	Solenoid control for left stack (→ *see section 6.6*)	On pressing of this solenoid control button, the latches of the left stack will disengage mechanically. A jammed plate will thus be released and can be removed.
9	Stop-and-down button	This button will stop up-motion of the lifter if pressed. The lifter then moves into lower limit position.
10	Pump terminal	Connection terminal for optional peristaltic pump
11	Solenoid control for right stack (→ *see section 6.6*)	On pressing of this solenoid control button, the latches of the right stack will disengage mechanically A jammed plate will thus be released and can be removed.

6.1.3 Function

The stacks are intended to hold individual microplates, stacks of plates or reservoirs. It is important to ensure that the physical dimensions of microplates (ANSI/SBS standard) do match stack specifications.

The lifter below a stack moves up, the magnetic latches are retracted so a microplate can be retrieved from that stack to be placed down onto the carriage. The carriage then moves through the stacker on the linear transporting track. The stacking process is

monitored by a sensor.
Conversely, a microplate or reservoir which has been positioned exactly below the stack opening can be raised from the carriage and placed into the stack. Make sure that there is enough space inside the stack to load a microplate or a reservoir and that the lifter's permissible loading capacity will not be exceeded (→ *see section 6.2*).

6.1.4 Versions

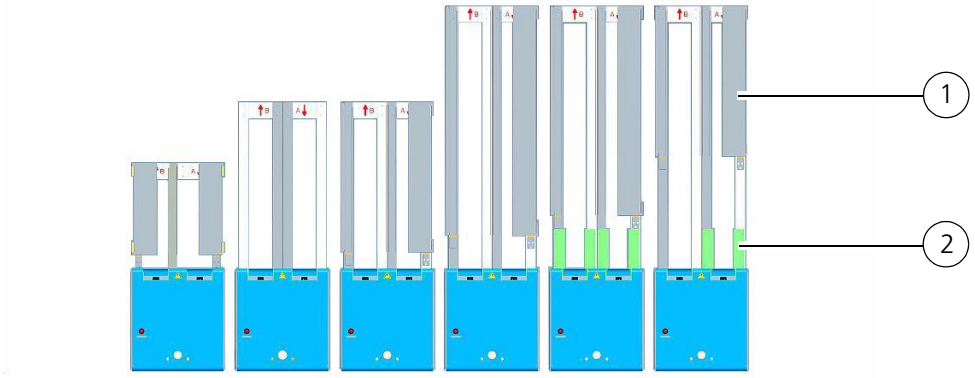


Fig. 3: Stackers with different stack length (without/with doors and/or plate separator)

1 Door
2 Plate separator (→ *see section 6.8*)

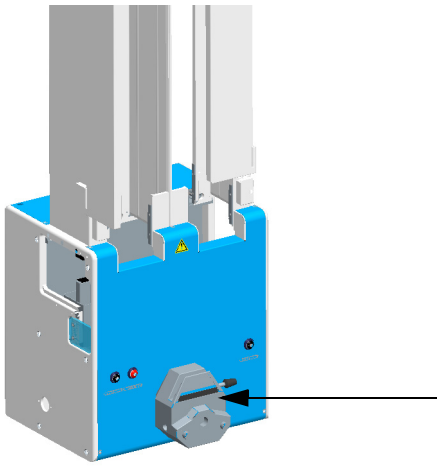


Fig. 4: Stacker with peristaltic pump

The following accessories can be used with a stacker:

- ❑ Peristaltic pump (→ *Fig. 4*)
- ❑ Fill level sensor
- ❑ Tip wash station
- ❑ Barcode reader
- ❑ Ink jet printer
- ❑ Extension module

6.2 Technical Data

General characteristics	
Name	Stacker
Type	– No stack (double lifter platform) – Short – Standard – Long
Version	– Open – With doors (long/short) – Rotated (through 180°) – With plate separator (without doors only)
Number of stacks to hold microplates	2
Max. lifting force	About 5 kg
Max. lifting force for 833 mm stack length (at reduced lifter speed)	About 7 - 8 kg

Dimensional & weight details	
Stack height:	Variable - as per Customer request (limited by maximum lifting force); Min.: 0 mm Max.: 833 mm Standard: 532 mm
Basic body (width x height x depth)	(307 x 331 x 242) mm
Weight	About 12.5 kg (without accessories)
Stack cross-sectional area (width x depth)	(128.6 x 86.6) mm (ANSI/SBS standard)

Operating data	
Utility class	Bench-top device, closed room facilities in clean condition
Protection class	III (SELV)
Internal protection standard	IP 20
Operating voltage	2 x 12VAC/± 12 VDC unstabilized

NOTE
The stacker is supplied with required voltages by its host equipment unit or a power supply module (→ *refer to chapter 16.2*) that also carries a line voltage label.

Power consumption	< 100 VA

Operating data	
Airborne sound emission	<< 70dB (A)
Interfacing	RS 232 C, Sub-D, 9-position
Interference suppression	EN 55011 (DIN VDE 0875, Part 11)Limit value class A
Interference immunity	EN 61000-6-2 (industrial area)
Accessories: Pump unit for reservoir filling station (→ *see section 6.7*)	Type Masterflex Easy-Load tube pump

Storage & operating requirements	
Storage & transportation: – Permissible ambient temperature – Permissible relative air humidity	 - 10 °C to + 50 °C £ 85% ατ 30⌋X
Operation – Permissible ambient temperature – Permissible relative air humidity	 + 15 °C to + 35 °C ≤ 75% at 30°C, no formation of condensate

6.3 Safety Notes

The safety notes contained in → *chapter 2* will be binding in all cases.

6.3.1 Safety Labeling & Inscriptions

NOTE

Affixed warning signs and safety symbols are integral parts of the stacker and must be followed!

Check warning labels and safety symbols for intactness and completeness before you begin any kind of start-up action. Do not proceed to start-up 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! A damaged warning note or safety symbol must be promptly replaced!

The following safety symbols are affixed at the stacker:

Safety symbol	Meaning	Comment
	Warns of a danger point	Warns of mechanical hazard due to mechanically moving parts: Lifter/ transporting unit

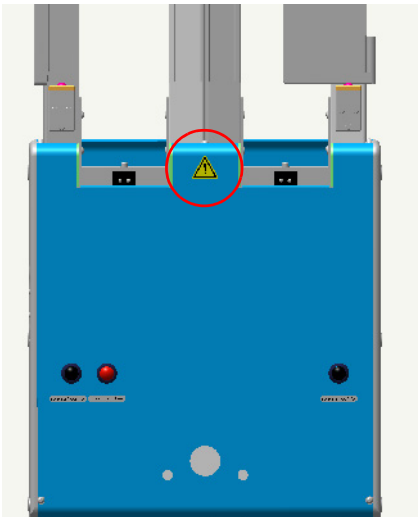


Fig. 5: Warning symbol at stacker

6.3.2 Danger Zones

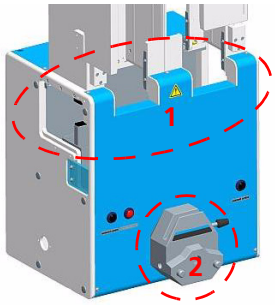


Fig. 6: Potential danger zones at stacker

1 Lifter and transporting unit
2 Peristaltic pump rollers

- ❑ Do not place your hands or fingers, including objects you are holding, into a mechanical motion path at any time during stacker operation Motion areas with potential danger are:
  - Stacker lifter (1;*Fig. 6*)
  - Peristaltic pump in open state (2;*Fig. 6*)
- ❑ Always use CyBio control software to correct faulty plate motion or turn power supply (of the equipment unit to which the stacker is connected) completely off before you proceed to any kind of intervention.

6.4 Operation

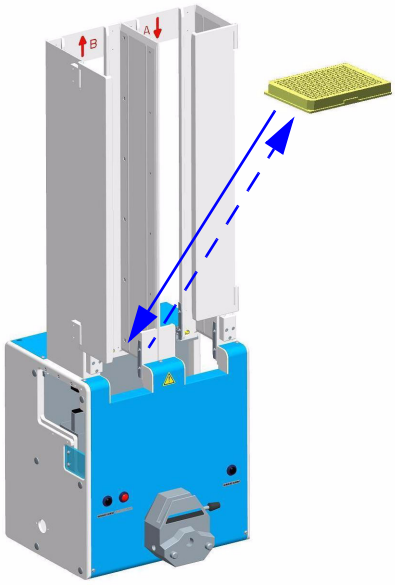


Fig. 7: Manual loading of microplates into the stacker

Operation control of the stacker is accomplished by CyBio control software. This software is designed to facilitate easy and express compilation of specific application routines.

Where microplates need to be placed into, or removed from, a stack manually, the particular stack of plates or individual microplate can be pushed into, or retrieved from, the given stack from the front (→ *see fig. 7*).

CAUTION

There is danger of crushing or pinching!

Danger of crushing or pinching! Do not remove or stack microplates, unless the stacker lifters have come to a standstill

A new microplate is placed onto the topmost microplate currently contained in the stacker or is placed onto the magnetic latches.

6.5 Requirements on Microplates

To be able to stockpile microplates in the stacker, the following preconditions must be met (→ *see fig. 8*):

- ❑ Microplates/reservoirs must not jam in the process of stacking. Format requirements must be met (ANSI/SBS standard)!
- ❑ Make sure that microplates/reservoirs are mechanically stable (no cover foil, frame, etc.)

NOTE

Under certain preconditions lidded microplates can be stacked. You should contact the Service Department of CyBio AG for this purpose.

6.5.1 Microplate Properties

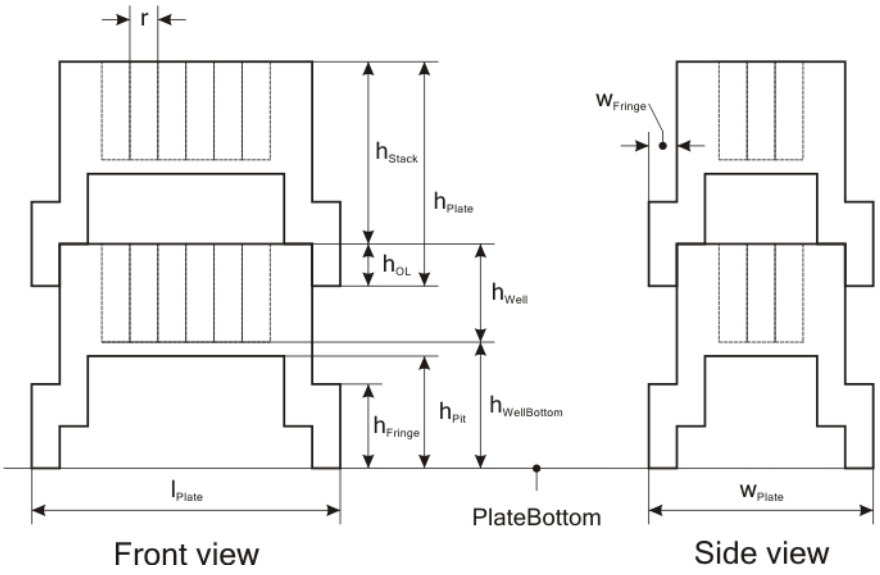


Fig. 8: Microplate properties

h_{Plate}	Plate height	**$h_{Well\ bottom}$**	Vertical distance of inner well bottom to plate bottom
h_{Stack}	Stack height	**l_{Platte}**	Plate length
h_E	Overlap height of stacked plates	**r**	Grid size
h_{Bottom}	Height of stacker finger contact face ("Bottom height")	**w_{Plate}**	Plate width
h_{Edge}	Edge height	**w_{Edge}**	Edge width
h_{Well}	Depth of wells		

6.6 Fault Removal

6.6.1 Unlocking of Stack

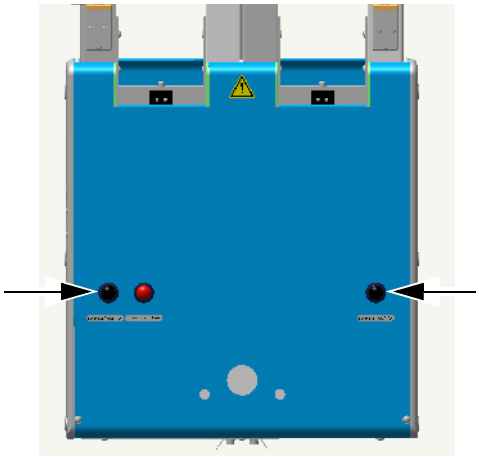


Fig. 9: "Solenoid control" button

NOTICE

There is potential danger from microplates falling off!

The stack unlocking device ("solenoid control") must not be actuated during normal operation.

The two pushbuttons are provided for unlocking the magnetic latches of their assigne plate stack. On pressing of this button, the corresponding latches will be released. In the case of a jammed lowermost microplate, the "solenoid control" button must be pressed together with the stop-and-down" button in order to achieve down-motion of the microplate and be able to retrieve it from the stack.

6.6.2 "Stop-and-down" Pushbutton

Fig. 10: "stop-and-down" pushbutton

Actuation of this pushbutton will stop upward motion of the given lifter, which will return into lower limit position.

6.7 Reservoir Filling Station (optional)

Ordering number

- ❑ OL0026-135-24 (for extension module)
- ❑ OL0027-135-24 (for stacker)

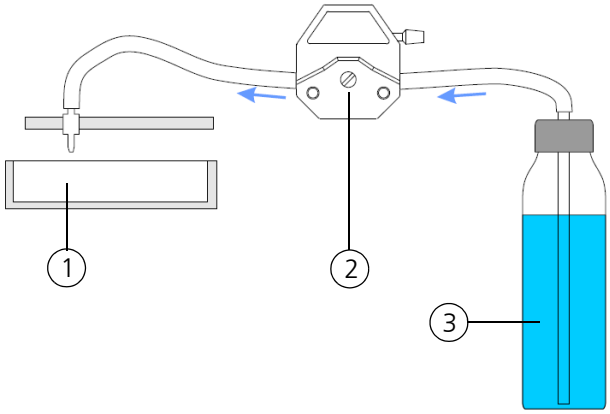


Fig. 11: Connection diagram

1 Reservoir
2 Peristaltic pump
3 Reagent vessel

The transporting unit of CyBio equipment units provides a tube/sensor holder for reservoir filling. A reservoir below this holder is automatically filled with liquid from a storage tank. A filling process is triggered, as soon as a reservoir is positioned exactly below the tube/sensor holder. Liquid is delivered through a tube which runs through a peristaltic pump at the stacker. A fill level sensor is equally connected to the stacker to report a defined fill level for the pump to turn off.

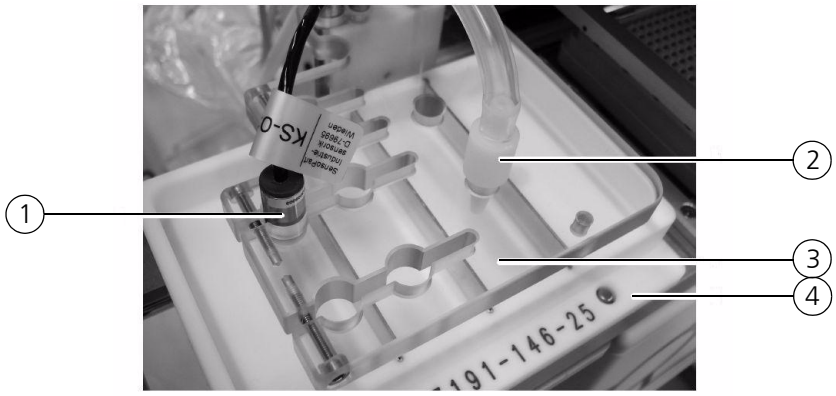


Fig. 12: Reservoir filling station

1 Fill level sensor
2 Filling tube
3 Sensor holder
4 Reservoir

6.7.1 Peristaltic Pump - Insertion of Tubes

The pump for reservoir filling is located at the stacker. The pump's direction of rotation determines which way liquid will be transported (→ *see fig. 13*).

The peristaltic pump's direction of rotation for reservoir filling depends on the stacker loaction. If the stacker is located on the left of the pipettor, the peristaltic pump will perform standard clockwise rotation; if the stacker is located on the right of the pipettor, it will rotate anticlockwise.

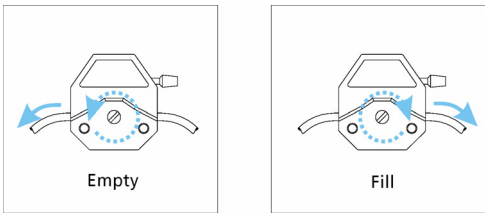


Fig. 13: Direction of rotation for stacker located on the left hand side of a pipettor

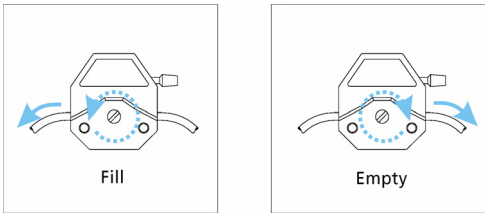


Fig. 14: Direction of rotation for stacker located on the right hand side of a pipettor

NOTE

The pump's direction of rotation can be individually set.

CAUTION

There is danger of crushing or pinching while the pump is in action. Terminate all currently running programs on the PC before you begin work at a peristaltic pump or turn power supply off.

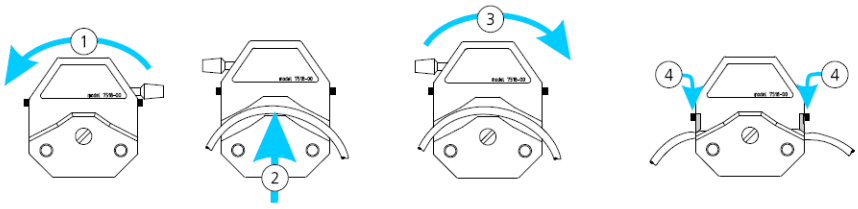


Fig. 15: Insert tube in peristaltic pump

1. Turn peristaltic pump lever to the left
   ✓ **Pump is open.**
2. Insert tube as appropriate for required direction of liquid feed
3. Return lever of peristaltic pump into rightmost position.
4. Let right and left tube fixator engage.
   ✓ **Pump is closed and ready for operation.**

6.8 Plate Separator (optional)

Ordering number

- ❑ OL3396-550-25

The plate separator (also referred to as squeegee) is intended to separate microplates sticking to each other (e. g. via residual adhesive tape). As a microplate is requested from a microplate stack of the stacker, a surge of compressed air is automatically triggered. The plate separator has air-pressure cylinders that press four claws onto the edge of the lowermost microplate. This microplate is thus separated from the stack of plates. The terminal for compressed air inlet is on the rear side of the stacker.

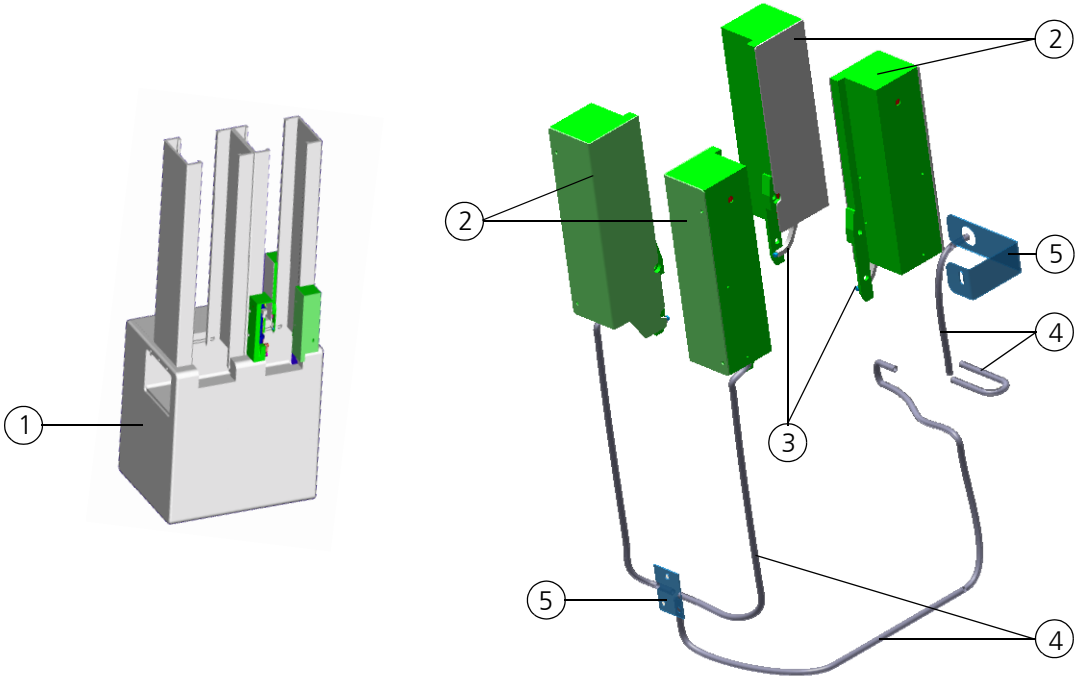


Fig. 16: Plate separator at stacker

1 Stacker with plate separator
2 Compressed air cylinder
3 Claw
4 Compressed air tube
5 Tube holder

A plate separator can be mounted onto or retrofitted to the following stacker types:

- ❑ OL0027-14-120
- ❑ OL0027-109-14
- ❑ OL0027-108-14

NOTE

You should also follow relevant notes regarding plate separator configuration in the "Plugin extension module" Manual.

7 Belt Stacker

Ordering number

- ❑ OL0028-001-27 (for microplates with lid)

7.1 General Description

7.1.1 Setup

The belt stacker is intended to receive, store and output microplates. It is able to hold microplates with a lid. It consists of a basic body with integrated electro-mechanical parts and sensors and of stacks to hold microplates or keep them available for retrieval (→ *see fig. 17*).

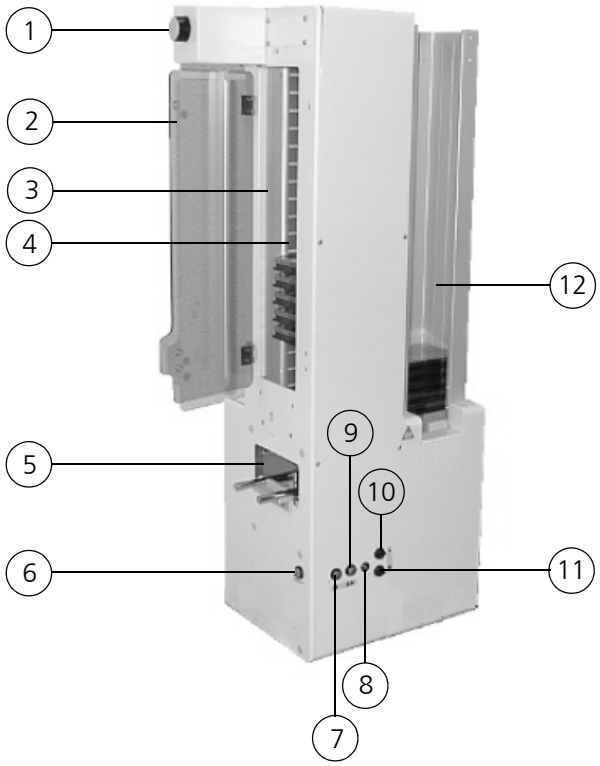


Fig. 17: Belt stacker – basic setup

1 Manual belt positioner
2 Door
3 Belt-drive stack
4 Belt
5 Transporting unit (rails), horizontal
6 "Solenoid control" button
7 "Stop-and-down" button
8 Operating state display
9 Disable/Enable key
10 UP key
11 DOWN key
12 Beltless stack

The left stack (belt stack) is able to receive or output unlidded and lidded microplates. In addition, microplates in this stack can be unlidded and lidded again.

The right stack (beltless stack) is able to receive and output unlidded microplates. Lid-sealed microplates can only be taken in. They cannot be output again.

Belt stacker operation control is accomplished by CyBio control software. This software facilitates easy and express compilation of specific application routines.

NOTICE

There is danger of microplates falling off.

The ("Solenoid control") stack release button must not be pressed as long as the belt stacker is active! Use it only in exceptional cases, for example, to release a jammed plate.

7.1.2 Function

A lifter below a stack may retrieve a microplate from that stack using electromagnetic latches and place it down onto the carriage that is able to move through the belt stacker space. Conversely, a microplate can be raised from the carriage to be inserted into a stack. Please note that there must be enough space available for insertion of a microplate into a stack and that the lifter's specified payload must not be exceeded (→ *see section 7.2*).

7.1.3 Terminals

The terminals and interface ports for stacker operation are located on the stacker's rear side (→ *see fig. 18*).

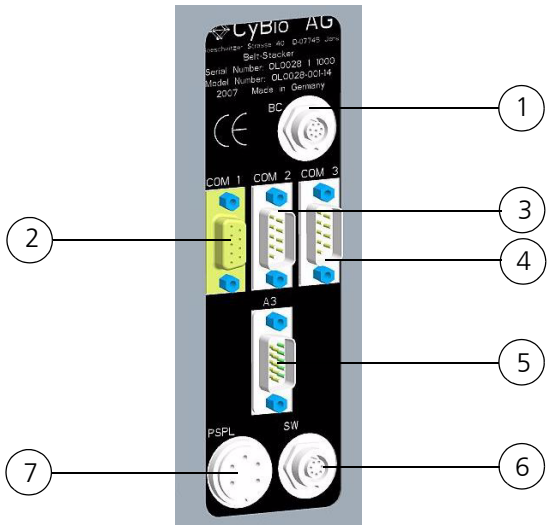


Fig. 18: Terminals at the belt stacker

1	BC	Terminal for connection of optional barcode reader
2	COM 1	Host PC
3	COM 2	Terminal for connection to a host equipment unit (e. g. CyBi®-Well)
4	COM 3	Next downline unit (e. g. stacker)
5	A3	Terminal for connection of optional horizontal drive
6	SW	Switch output
7	PSPL	Power supply

7.2 Technical Data

General		
Name	Belt stacker	
Number of stacks to hold microplates	2	
	Beltless stack	**Belt-drive stack**
Max. lifting force	About 5 kg	About 500 g
Manual fill opening	Front	On left-hand lateral side
Number of microplates	40 Shallow-Well MP	20 Shallow-Well MP with lid (max. 18 mm
Number of manually loaded microplates	40 Shallow-Well MP	17 Shallow-Well MP

Dimensional and weight details	
Basic body: (width x height x depth)	(414 x 866 x 248) mm
Stack cross-sectional area (width x depth)	(128.6 x 86.6) mm
Stack height	532 mm
Weight:	About 21kg (without accessories)

Operating data	
Utility class	Bench-top device, closed room facilities in clean condition
Protection class	III (SELV)
Protection type	IP 20
Operating voltage (power supply)	2 x 12VAC/± 12VDC unstabilized

NOTE
The stacker is supplied with required voltages from its host equipment unit or a power supply module that carries a line voltage label.

Power consumption	< 100 VA
Airborne sound emission	< 70 dB (A)
Interfacing	RS 232 C, Sub-D, 9-position

Operating data	
Interference suppression	EN 55011 (DIN VDE 0875, Part 11), limit value class A
Interference immunity	EN 61000-6-2 (industrial area)

Storage & operating conditions	
Storage & transportation: – Permissible ambient temperature – Permissible relative air humidity	 - 10 °C to + 50 °C ≤ 85% at 30°C
Operation – Permissible ambient temperature – Permissible relative air humidity	 + 15 °C to + 35 °C ≤ 75% at 30°C, no formation of condensate

7.3 Safety Notes

The general safety notes contained in → *chapter 2* will be binding without limitation.

7.3.1 Safety Labeling & Inscriptions

NOTE

Affixed warning signs and safety symbols are integral parts of the belt stacker and must be followed!

Check warning labels and safety symbols for intactness and completeness before you begin any kind of start-up action. Do not proceed to start-up 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! A damaged warning note or safety symbol must be promptly replaced!

Affixed on the belt stacker are the following safety symbols:

Safety symbol	Meaning	Comment
	Warns of a danger point	Warns of mechanical hazard due to mechanically moving parts Lifter/transporting unit

Fig. 19: Warning symbol at the belt stacker

7.3.2 Danger Zones

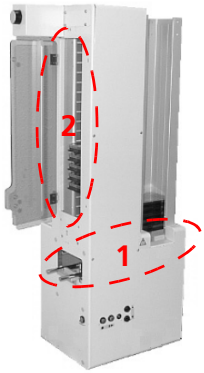


Fig. 20: Danger zones at the belt stacker

1 Lifter and transporting unit
2 Belt-drive stack

- ❑ Belt motion will stop if the door of the belt-drive stack is opened during operation.
- ❑ Do not place your hands or fingers, including objects you are holding, into a mechanical motion path at any time during stacker operation Danger zones are:
  - Lift of belt stacker
  - Belt-drive stack
- ❑ Always use CyBio control software commands to correct faulty microplate motion or turn power supply off (to the equipment unit to which the belt stacker is connected) before you begin any kind of intervention.

7.4 Operation

In normal operating mode, belt stacker operation control is accomplished by the host PC.

Operator actions are restricted to loading microplates into or retrieving them from, a given stack. To do this, open the belt-drive stack door and close it again, once the microplates have been placed or removed (*Fig. 21*).

In top left position of the belt stacker there is a setting knob (1; *Fig. 21*). This knob may be turned for horizontal manual adjustment of the belt.

NOTICE

Danger of material damage!

Do not turn the manual height setting knob in PC mode. This may cause faulty program sequences. Follow operating state indicators. The manual height positioner (setting knob) may not be rotated unless the "Green" indicator lamp lights (→ *"Operating State Displays"*).

NOTICE

Danger of material damage!

Manual belt motion in power-off state is prohibited, because this may destroy the driving mechanism.

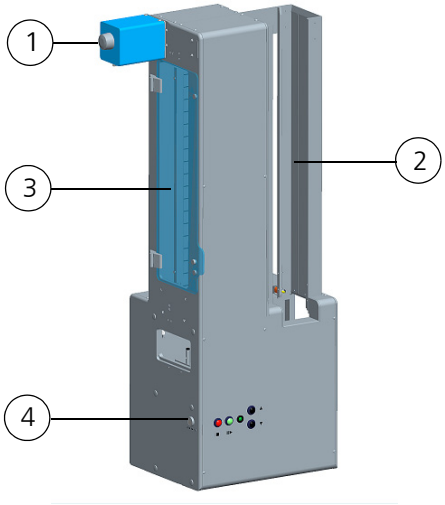


Fig. 21: Belt stacker - operator action points

1	Manual belt positioner	3	Door of belt-drive stack
2	Beltless stack	4	"Solenoid control" button

7.4.1 Operating State Displays

Manual mode

Host mode

Operating trouble or "Disable/Enable" button has been actuated (→ *refer to page 37*)

7.4.2 Operation controls

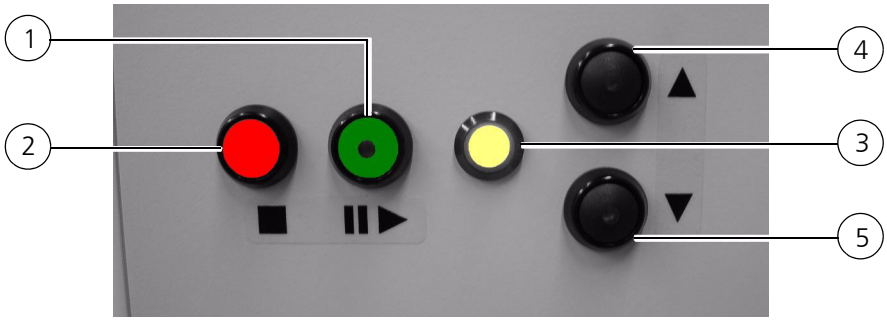


Fig. 22: Operation controls at the belt stacker

1 "Disable/Enable" button
2 "Stop-and-down" button
3 Operating state display point
4 "Up" key
5 "Down" key

▲ ▼	**Up, Down** (4, 5 *Fig. 22*,) keys These keys trigger up-motion or down-motion of the belt if depressed. If a microplate is detected in the lowermost or uppermost position, then down-motion or up-motion will stop. The same occurs if the door at the belt-drive stack is opened.
■	**Stop** (2, *Fig. 22*) key Currently running motion will be aborted on pressing of this key.
II ▶	**Disable/Enable** (1; *Fig. 22*) button *This function is only required in the event of operating trouble.* This key will only be enabled in manual operation mode (**green** operating state indicator lights). On pressing of this button, drive belt motion will be enabled, i. e. the motor has no holding torque any longer (**red** operating state indicator lights). The driving belt may now be moved by manual force. This function may be required in combination with the "**solenoid control**" button in order to trigger down-motion of a jammed microplate with lid and remove this plate from the stack. On pressing this button again, the belt stacker can be switched to manual mode. The manual mode can only be exited when the door is closed.

7.4.3 Belt-Drive Stack

Microplates can manually be stacked in or out on the left-hand side of the belt stacker. Plates can be inserted or retrieved as necessary, once the door is open.

Using the left **"solenoid control"** button, one may release the magnetic latches of this stack so a jammed microplate can be placed down onto the carriage (transporting unit) by manual action.

NOTICE

As soon as the door at the belt-drive stack is opened, belt motion will stop and a currently running process be canceled, including in PC mode. Open this door only in standby mode for this reason.

7.4.4 Beltless Stack

For manual placement of microplates into or removal of microplates from this stacker stack, a stack of microplates or a single microplate can be inserted into, or removed from, the stack at its top end.

As the stack is being filled, a new microplate is placed onto the uppermost microplate contained in the stack or onto the magnetic latches.

Using the right **"solenoid control"** button, one may release the magnetic latches of this stack so a jammed microplate can be placed down onto the carriage (transporting unit) by manual action.

NOTE

For stacking of lidded microplates, please consult the Service Department of CyBio AG.

7.5 Requirements on Microplates

To be able to stack microplates in the stacker, the following preconditions must be met (→ *see fig. 23*):

- ❑ Microplates/reservoirs must not get jammed as they are being loaded. Comply with format specifications (ANSI/SBS standard)!
- ❑ Make sure that microplates/reservoirs are mechanically stable (no cover foil, frame, etc.).

7.5.1 Microplate Properties

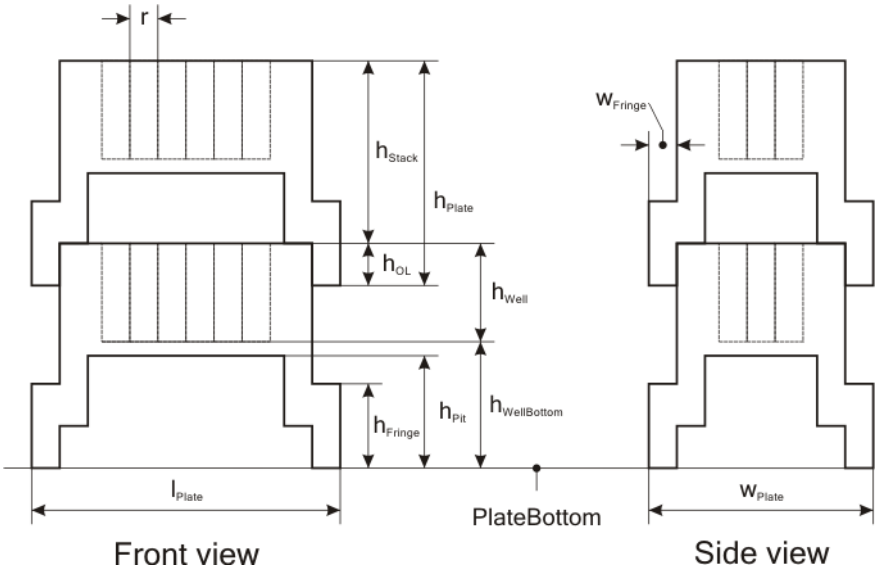


Fig. 23: Microplate properties

h_{Plate}	Plate height	**$h_{Well\ bottom}$**	Vertical distance of inner well bottom to plate bottom
h_{Stack}	Stack height	**l_{Platte}**	Plate length
h_E	Overlap height of stacked plates	**r**	Grid size
h_{Bottom}	Height of stacker finger contact face ("Bottom height")	**w_{Plate}**	Plate width
h_{Edge}	Edge height	**w_{Edge}**	Edge width
h_{Well}	Depth of well		

7.6 Fault Removal

7.6.1 Unlocking of Stack

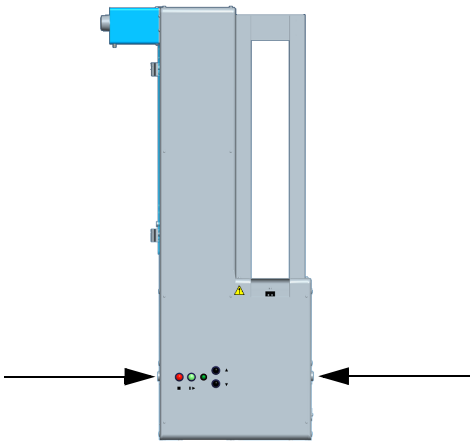


Fig. 24: "Solenoid control" button on right-hand and left-hand side of belt stacker

NOTICE

There is potential danger of microplates falling off!

The stack unlocking device ("solenoid control") must not be actuated during normal operation.

The two pushbuttons are provided to unlock the magnetic latches of the corresponding plate stack. On pressing of one of these buttons, the related latches will be released. If the lowermost microplate is found to be jammed, the "solenoid control" button can be pressed together with the "stop-and-down" button in order to trigger down-motion of this microplate
and/or a lid and remove it from the stack.

7.6.2 "Stop-and-down" pushbutton

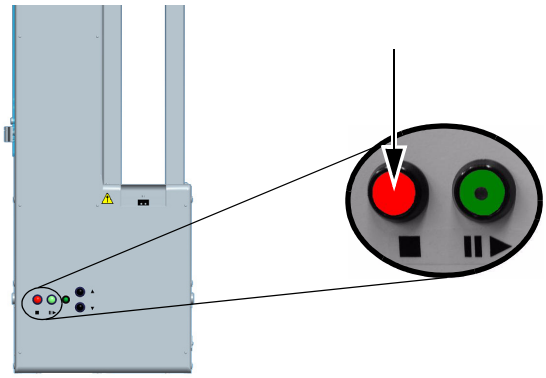


Fig. 25: "Stop-and-down" pushbutton

This button will stop up-motion of the corresponding lifter if pressed. The lifter then restores its lower limit position.

8 Tip Wash Station, TWS/CWS

The tip wash station consists of the following components:

- ❑ Wash trough (for ordering number refer to following tables or → *chapter A 2*)
- ❑ TWS module (ordering number) OL0026-345-24)
- ❑ Inflow sensor
- ❑ Tubing

Available wash troughs

Wash trough 96	Ordering number
Shallow well, right, PEEK	OL3397-24-160
Shallow well, left, PEEK	OL3397-24-165
Deep well, right, PEEK	OL3397-24-280
Deep well, left, PEEK	OL3397-24-285

Wash trough 384	Ordering number
Shallow well, right, PEEK	OL3191-170-24
Shallow well, left, PEEK	OL3191-175-24
Deep well, right, PEEK	OL3191-180-24
Deep well, left, PEEK	OL3191-185-24

NOTE

For further information about washing troughs, refer to Exhibit, section → *"CyBio Assortment of Tip & Capillary Washing Troughs & Reservoirs"*

8.1 Technical Description

8.1.1 Washing Trough

The tip wash station consists of a washing trough (3; *Fig. 26*) with one inflow (2; *Fig. 26*) and one outflow point (1; *Fig. 26*).

The wash trough contains two chambers - one for fresh and one for used washing liquid. Liquid inflow and liquid outflow are achieved with one peristaltic pump for each direction (e. g. via TWS module).

A tubing diagram of the tip wash station is shown in → *Fig. 30*.

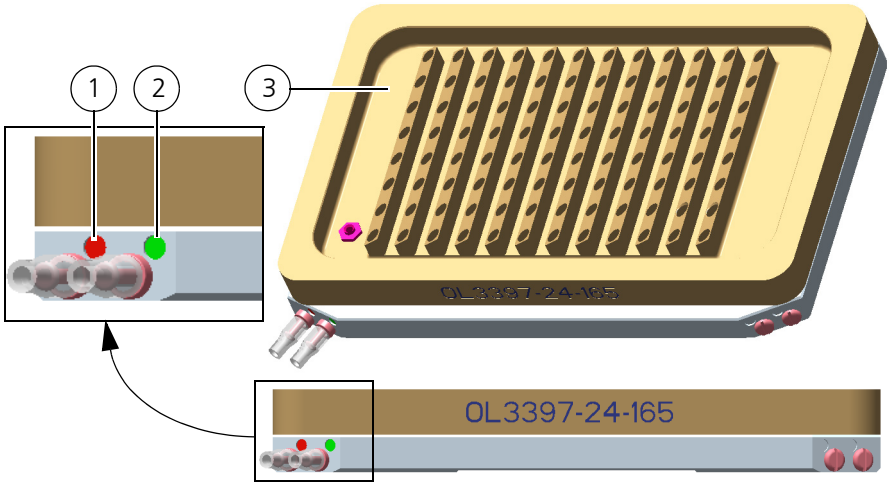


Fig. 26: Wash trough 96 left (shallow-well)

1 Connection point for outflow tube (red)
2 Connection point for inflow tube (green)
3 Wash trough

NOTICE

Aggressive acids, leaches or organic solvents may cause material damage!

Installed tubing, trough parts, tube connectors and seals are in direct contact with liquid being pumped. Make absolutely certain that selected tubing, trough parts, tube connectors and seals are resistant to acids, leaches and organic solvents!

Tubes of silicon peroxide, trough surface parts of teflon, trough bottom parts of chemically nickel-plated aluminum, tube connectors of PP and seals of EPDM are included in the standard scope of delivery.

NOTE

In case of doubt as to the use of certain substances, you should contact CyBio AG.

8.1.2 TWS Module

The purpose of the TWS module is to deliver and aspirate liquid. The module has two peristaltic pumps that can be energized individually.

Power supply is drawn from a companion pipettor (e. g. CyBi®-Well) or a power supply module. The pipettor or power supply module will carry a label with specified line voltage level.

Operation control of the TWS module is accomplished by CyBio control software.

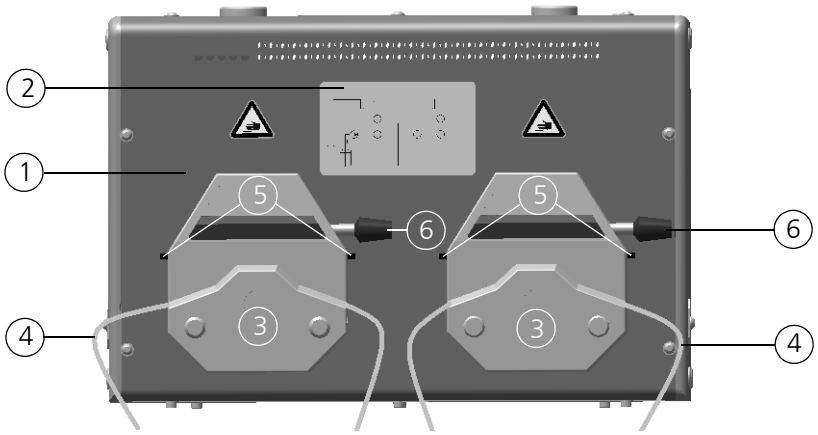


Fig. 27: TWS module with two peristaltic pumps

1 TWS module
2 Tubing chart
3 Peristaltic pumps
4 Tube
5 Tube fixator
6 Lever

NOTICE

Aggressive acids, leaches or organic solvents may cause material damage!

Installed tubing at the peristaltic pumps will come into direct contact with liquid being pumped. Make absolutely certain that selected tubing is resistant to acids, leaches and organic solvents!

Tubes of silicon peroxide are included in standard delivery.

NOTE

You are advised to contact CyBio AG in case of doubt as to the use of certain substances.

Located on the rear panel are the following connector terminals:

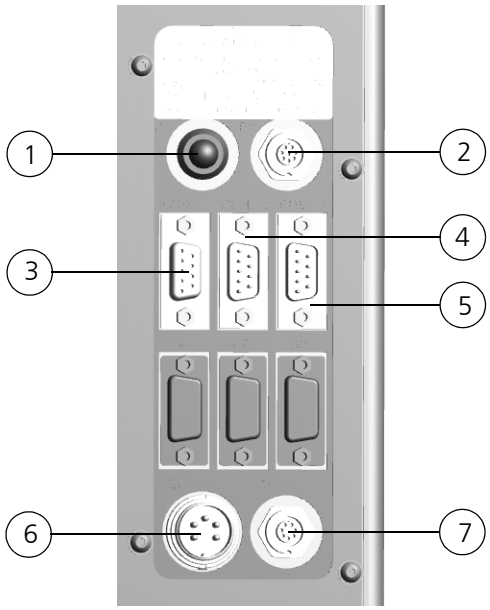


Fig. 28: TWS module terminal points (rearside panel)

1	B 1	Operating state indicator
2	B 2 (BC)	Outlet for connection of a barcode reader
3	COM 1	Host PC
4	COM 2	Host equipment (e. g. CyBi®-Well)
5	COM 3	Next downline unit
6	B 3 (PSPL)	Power supply
7	B 4 (SW)	Switch output

8.1.3 Peristaltic pumps

Peristaltic pumps of type Masterflex Easy-Load are installed in the TWS module. One peristaltic pump delivers liquid into the tip wash station, one pumps liquid out of the tip wash station.

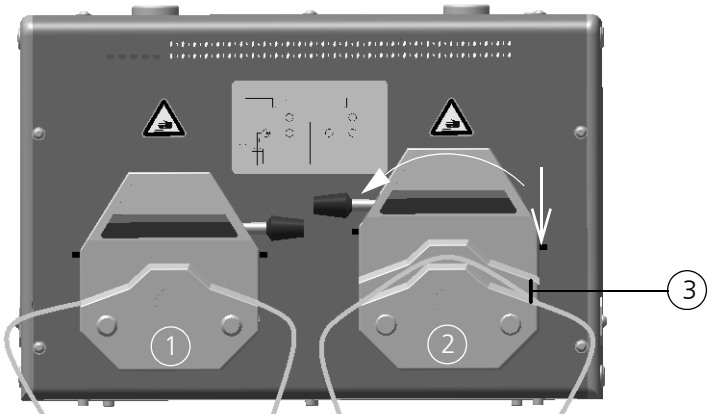


Fig. 29: Peristaltic pump – closed and open

1 Peristaltic pump, closed
2 Peristaltic pump, open
3 Tube fixed

By moving a lever into the other position, the given peristaltic pump can be opened or closed. A tube can then be easily inserted or removed as necessary. The tube fixation device keeps the tubes in their correct position. This prevents unwanted shifting motion of tubes during normal operation.

8.1.4 Tubing Chart

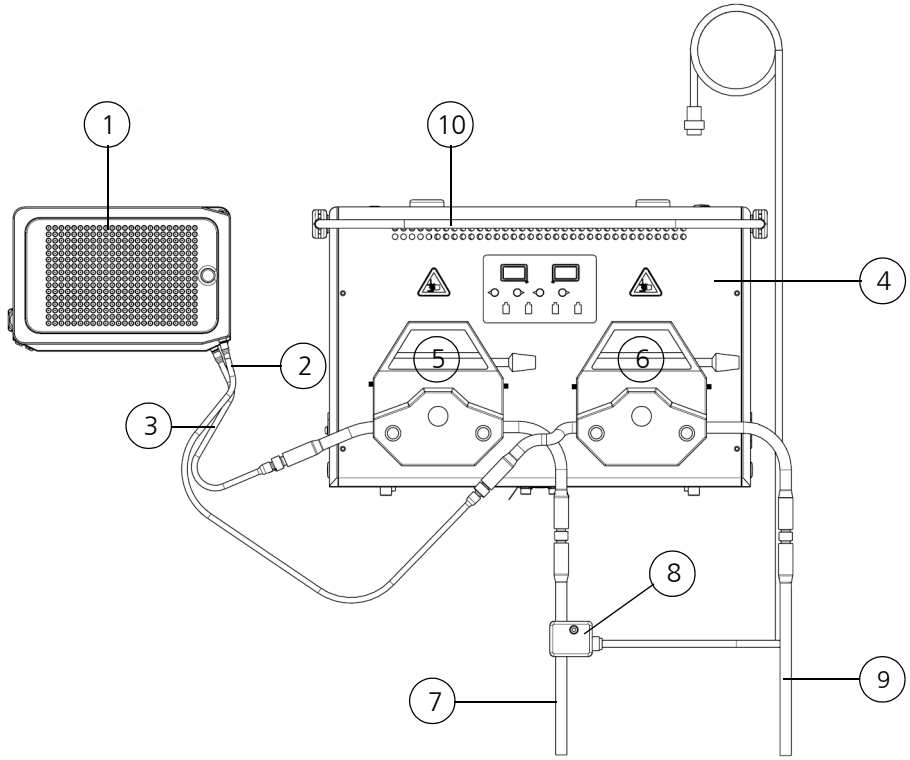


Fig. 30: Tip wash station - tubing chart

1 Wash trough (right-side version)
2 Outlet port
3 Inlet port
4 TWS module
5 Peristaltic pump for inflow
6 Peristaltic pump for outflow
7 Inflow tube (reagent vessel)
8 Tube sensor
9 Outflow tube (waste tank, liquid drain)
10 Tube rejector

Support chain for flexible guidance of tubes (optional)

Ordering number

- ❑ OL3803-12-420

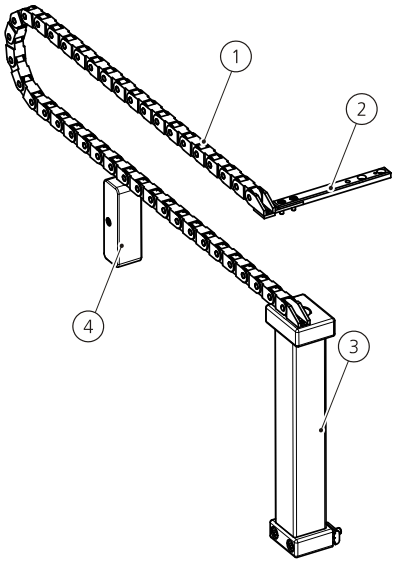


Fig. 31: Support chain (left side version)

1 Support chain
2 Mech. fastener to carriage
3 Carrier at frame
4 Support

The support chain functions as a flexible guiding device for tubes of the tip wash station, which connect the two peristaltic pumps with the wash trough on the carriage. It provides controlled guidance thus preventing accidental shifts with consequential restricted functionality of the tubes. The support chain may be installed in right side and in left side position.

The support chain is mechanically fixed to the carriage and the basic frame.

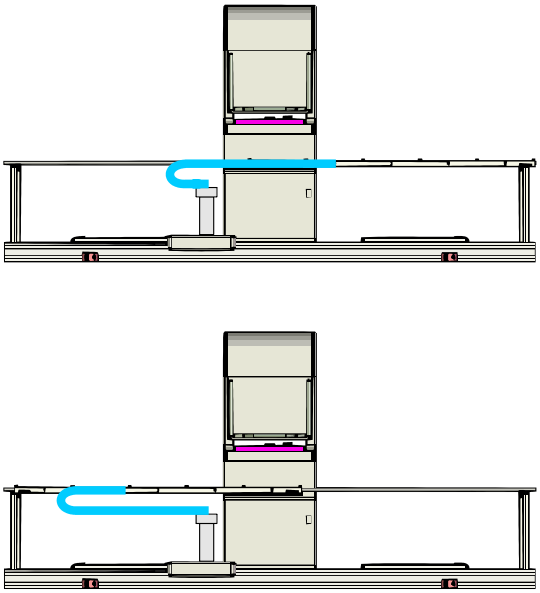


Fig. 32: Carriage motion with support chain of left side version

NOTE

When tubes need to be disconnected from the wash trough for cleaning or for replacement, one should mark both tube ends in order to prevent side reversal.

8.1.5 Function of Tip Wash Station

One peristaltic pump fills washing liquid into the lower chamber of the wash trough. The chamber has openings through which washing liquid emerges.

The washing liquid is suctioned away from these openings and the inner space of tips thus washed. As the tips dip into these openings they are washed on the outside. Washing liquid is then dispensed into grooves located between the openings. These grooves are connected via a common drain to the outflow pump. The peristaltic pump for outflow direction has a certain pre-run and after-run phase. It runs at higher speed. This prevent overflow situations of the wash trough.

A sensor is mounted at the inflow tube directly above the storage bottle to monitor for proper delivery of clean washing liquid. If there is a break in washing liquid delivery, an error message will be generated by CyBio control software.

8.2 Technical Data

8.2.1 TWS Module

General	
Designation/Type	TWS module
Pumps	Peristaltic pumps of type Masterflex Easy-Load 7518-00

Dimensional & weight details	
Width x height x depth	(300 x 200 x 180) mm
Weight	About 11.5 kg (without accessories)

Operating data	
Utility class	Bench-top device, closed room facilities in clean condition
Protection class	I
Protection type	IP 20
Operating voltage of power supply module	230 V ± 10%, 50/60 Hz
Power consumption	< 100 VA
Airborne sound emission	< 70 db (A)
Interfacing	RS 232 C, Sub-D 9-pole, Sub-D 15-pole,
Interference suppression	EN 55011 (DIN VDE 0875, Part 11) Limit value class A
Interference immunity	EN 61000-6-2 (industrial area)

8.2.2 Washing Trough

General	
Designation/Type	Tip Wash Station
Number of openings to hold clean washing liquid	96 / 384

Dimensional & weight details		
	Shallow well	**Deep well**
Phys. dimensions (width x depth x height)	(154 x 102 x 20) mm	(154 x 102 x 34) mm
Weight	About 350 g	About 550 g

Storage & operating conditions	
Storage & transportation: – Permissible ambient temperature – Permissible relative air humidity	 - 10 °C to + 50 °C ≤ 85% at 30°C
Operation – Permissible ambient temperature – Permissible relative air humidity	 + 15 °C to + 25 °C ≤ 75% at 30°C, no formation of condensate

8.3 Safety Notes

The general safety notes contained in → *chapter 2* will be binding in all cases.

8.3.1 Safety Labeling & Inscriptions

NOTE

Affixed warning signs and safety symbols are integral parts of the station and must be followed!

Check warning labels and safety symbols for intactness and completeness before you begin any kind of start-up action. Do not proceed to start-up 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! A damaged warning note or safety symbol must be promptly replaced!

The following safety symbols are affixed on the TWS module:

Safety symbol	Meaning	Comment
	There is danger of crushing or pinching!	Warns of potential crush effects of human extremities due to mechanical motion

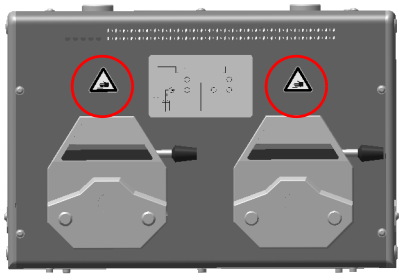


Fig. 33: Warning symbols at the TWS module

8.3.2 Danger Zones

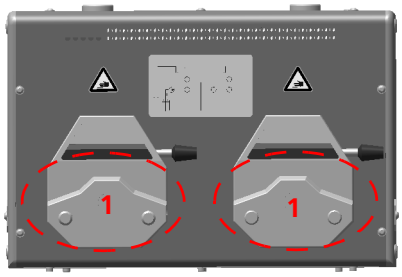


Fig. 34: Danger zones at TWS module

1 Peristaltic pumps

- ❑ Do not place your hands or fingers into the peristaltic pump when open, including with objects as long as operation has not finished.

8.4 Operation

Operation control of the TWS module and, hence, the tip wash station is accomplished by CyBio control software communicating via RS-232 interface. The pumps can be individually powered.

NOTE
For advice regarding configuration settings for the tip wash station, you are referred to the CyBio® Composer Plugin "extension module" manual.

NOTE
To perform initial starting up, place the wash trough into liquid with little surface tension. This warrants that the pipetting tips will be uniformly washed thereafter.

8.4.1 Peristaltic Pumps: Insertion of Tubes

CAUTION
There is danger of crushing or pinching while the pump is in action.

Terminate all currently running system programs or turn system power off before you begin work at a peristaltic pump.

1. Turn peristaltic pump lever to the left
   ✓ **Pump is open.**
2. Insert tube as required for the direction of liquid flow
3. Return lever of peristaltic pump into rightmost position.
4. Let right and left tube fixator snap in.
   ✓ **Pump is closed and ready for operation.**

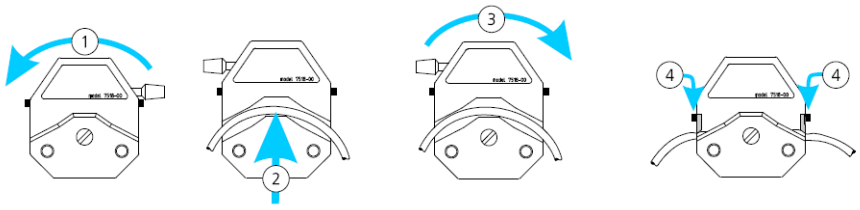


Fig. 35: Insert tube in peristaltic pump

The direction in which a pump is running determines the direction in which liquid will be transported→ *siehe Abb. 36 auf Seite 52* (
).

The feeder wheels of the delivery pump (left-hand side) rotate anticlockwise, which means that liquid is pumped from right to left. The right tube end must be submerged in the storage vessel for washing liquid, the left tube end connects to the washing trough's inlet port.

The feeder wheels of the outflow pump (right-hand side) rotate clockwise, which means that liquid is pumped from the left to the right. The left tube end connects to

the outlet port of the washing trough, the right tube end to the waste tank or the drain inlet.

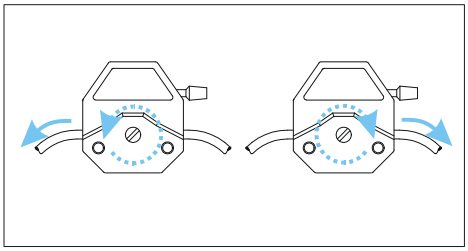


Fig. 36: Peristaltic pump at TWS module, direction of rotation and liquid flow

8.5 Fault Removal

8.5.1 TWS Module

On identifying maloperation or failure of the module, you should check for all potential error sources, following the information and advice given in the table below.

Error message	Cause	Action for removal
Wrong parameters	One or more parameters are out of the permissible range.	Check this/these parameter(s) and repeat setting(s) if necessary.
Pump not ready for action	Pump still busy executing previous command.	Wait for pump to signal readiness again.
Unknown command	Unknown or wrong command was triggered. CyBio control software has transmitted a command that is not yet implemented in this product.	You should contact your service contractor in such cases.

Potential module errors are:

Fault	Cause	Action for removal
Pump working in wrong direction	Tube installed incorrectly/ non-conformingly.	Turn tube around.
		Let pump run in other direction by triggering a "Drain tube" software command.
Pump does not deliver	Tube installed incorrectly/ non-conformingly.	Install tube correctly.

If this fails to remove operating trouble or should other faults occur of a type that is not described in the table above, you should notify the Customer Service at CyBio AG in Jena or your competent service contractor.

8.5.2 Washing Trough

On noticing malfunction of the wash trough, you should consult the following list for all potential error sources.

Fault	Cause	Action for removal
Tips are not washed in a uniform manner	Inflow monitoring inactive, no washing liquid available.	Refill washing liquid, activate inflow monitoring.
	Washing trough was not filled up properly before wash cycles started.	Include filling cycle prior to washing process.
	Too little inflow of washing liquid.	Increase rotation speed of inflow pump
	Piston speed excessively high.	Reduce piston speed
Fill level in washing trough higher than allowed	Rotation speed of suction pump too small.	Check inflow and outflow for correct mutual rotation speed ratio.
Liquid splashes emerging from outlet tube-piece	Suction tube incorrectly installed.	Insert suction tube according to → *Fig. 35*; view chart is also provided at TWS module.

NOTE
To perform initial starting up, put wash trough into liquid with little surface tension.

If difficulties persist despite this check or on identifying a fault situation of a type that is not described in the table below, you should notify your service partner.

8.6 Capillary Wash Station

The CyBi®-Well vario with capillary head requires a special wash station for cleaning of its capillaries.

The capillary wash station consists of the following components:

- ❑ Capillary wash trough
- ❑ TWS module
- ❑ Tubing
- ❑ Vacuum suction device

Available wash troughs

- ❑ Capillary wash trough 96, drain right
- ❑ Capillary wash trough 384, drain right
- ❑ Capillary wash trough 384, drain left

The capillary wash station consists of a wash trough with sleeves for 96 or 384 capillaries. The wash trough has one inflow point (green) and one outflow point (red). Inflow and outflow of washing liquid are accomplished with one peristaltic pump (TWS module) for each direction. Washing liquid is pumped through the inflow point into the space between the sleeves in the trough so the capillaries may subsequently be submerged for taking in washing liquid. Contaminated washing liquid is then pumped off through the outflow point. The capillaries dispense their previously aspirated amounts of liquid into the respective sleeve for suction removal by vacuum.

NOTE

The speed of the outflow pump must be greater than that of the inflow pump, in order to prevent flooding of the wash trough.

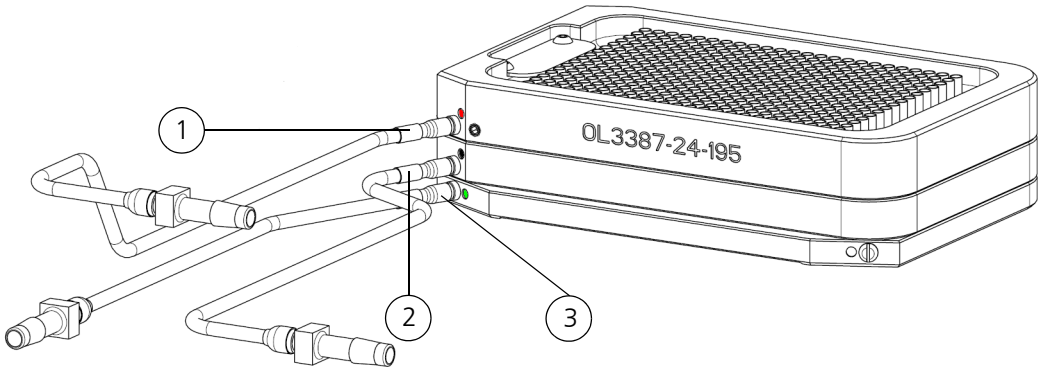


Fig. 37: Capillary wash station, left

1 Red marker: Washing liquid outflow achieved with peristaltic pump
2 Black marker: Waste - used washing liquid is suctioned out of sleeves with vacuum
3 Green marker: Washing liquid inflow achieved with, (10% DMSO)

8.6.1 Cleaning Routine Using Capillary Wash Station

NOTE
Before a sample transfer, the capillaries must be cleaned and blown out with a pressure pulse. Action for blowing out must be repeated in order to remove any residual liquid that may have remained at the capillary walls after the first pressure pulse of air.

To obtain an effective cleaning routine, you should make the following CyBio control software parameter settings:

Parameter	Value
Lifter speed	50 r.p.m.
Speed control for inflow	130 r.p.m.
Speed control for outflow	>180 r.p.m.
Time to aspirate	3 – 6 s
Number of washing cycles	4 – 10
Depth of capillary submergence	2 mm
Output pulses for sleeves of wash trough	2
Time of vacuum suctioning	0.5 – 1 s

NOTICE
Beware of material damage due to faulty capillary positioning!

Prevent mechanical contact with a capillary.

NOTE
Carry-over losses are less than 0.1% using the capillary wash station from CyBio AG.

8.6.2 Tubing Diagram of Capillary Wash Station

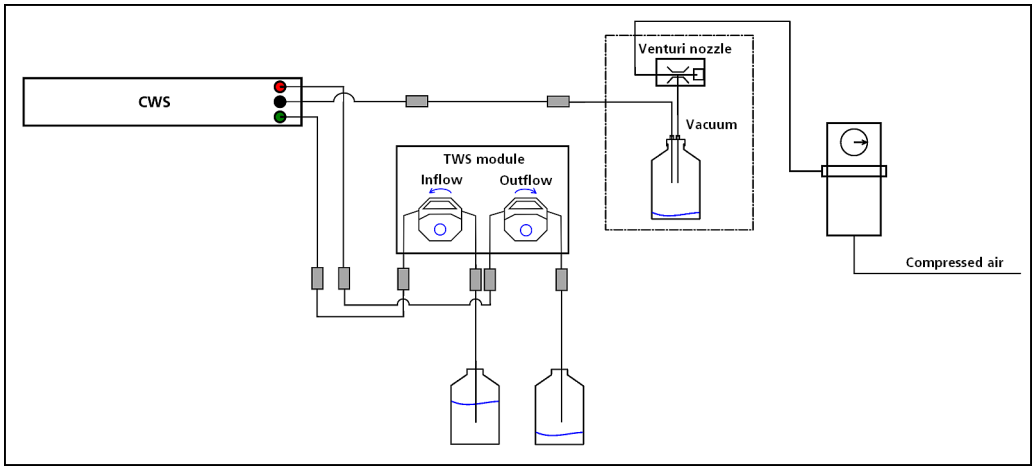


Fig. 38: Tubing diagram of capillary wash station - schematic view

9 Transporting Modules

NOTE
Please do not hesitate to contact our "Automation" department at info@cybio-ag.com on questions regarding this chapter.

9.1 Lifter

9.1.1 Technical Description

The external lifter is intended to pick up or place down individual microplates from and onto other equipment components or other additional units of a system from CyBio AG. These may be:

- ❑ Transporting unit (linear)
- ❑ Rotary arm
- ❑ Loading trays of other analytical instruments

The lifter consists of these components:

- ❑ Basic body with motor and interface
- ❑ Lifter unit to carry a microplate
- ❑ Extension module (→ *refer to chapter 16.1*)

It operates under the control of an extension module (→ *refer to chapter 16.1*) communicating via RS232 interface. Configuration settings are made via CyBio control software.

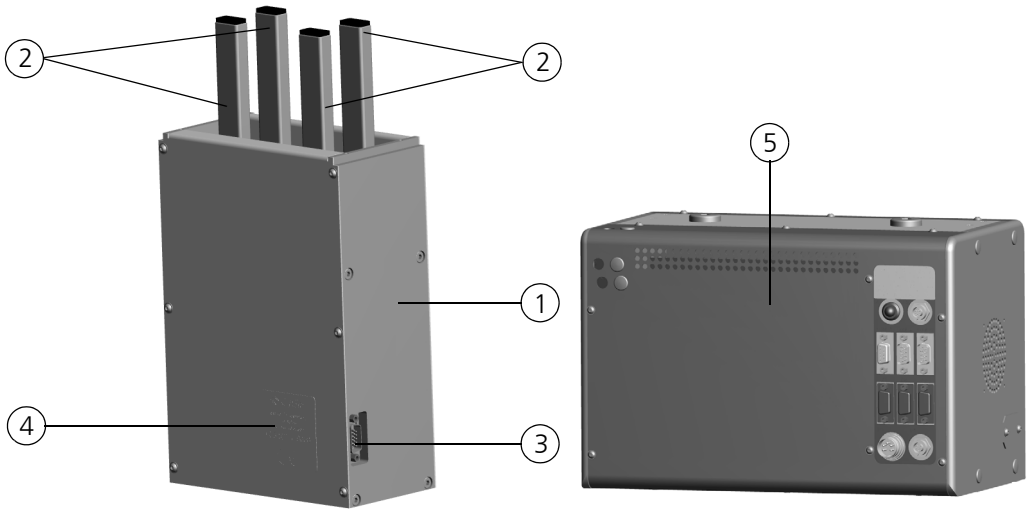


Fig. 39: Lifter

1 Basic body
2 Lifter unit
3 Interface
4 Nameplate
5 Extension module

The basic lifter functionality provides pick-up and place-down motion of microplates from and onto a carriage of the transporting unit or a transfer platform (rotary arm, gripper, loading trays, etc.)

Functional sequence (e. g. transfer from carriage)

1. Carriage moves microplate into the position for transfer.
2. Lifter unit raises microplate.
3. Transfer platform (e. g. rotary arm) moves into position between the carriage and a microplate in raised position (horizontal motion).
4. Lifter unit performs down-motion.
   ✓ **Microplate now rests on transfer platform.**

Once the lifter unit has reached its lower limit position, the transfer platform and the carriage may move out of their transfer positions.

9.1.2 Technical Data

General	
Designation/Type	Lifter
Max. lifter stroke length	100 mm
Lifting force	0.5 kg
Phys. dimensions (width x height x depth)	(152 x 223 x 80) mm
Weight:	2.2 kg
Airborne sound emission	< 70 dB (A)

Operating data	
Utility class	Bench-top device, closed room facilities in a clean condition
Protection class	III (SELV)
Protection type	IP 20
Interference suppression	EN 55011 (DIN VDE 0875, Part 11) Limit value class A
Interference immunity	DIN EN 61000-6-2
Interface	RS 232 Sub D9

Storage & operating conditions	
Storage & transportation: – Permissible ambient temperature – Permissible relative air humidity	 - 10 °C to + 50 °C ≤ 85% at 30°C

Storage & operating conditions	
Operation – Permissible ambient temperature – Permissible relative air humidity	 + 15 °C to + 25 °C ≤ 75% at 30°C, no formation of condensate

9.1.3 Safety Notes

The general safety notes contained in → *chapter 2* will be binding in all cases.

CAUTION

There is danger of minor physical injury!

There is danger of minor physical injury (pinching, shearing impacts) in the range of lifter motion. Do not place your hands or fingers into the lifter motion range. Always use CyBio control software to correct faulty motion. To remove non-lifter items wait until the module and other adjacent equipment units have been shut down.

9.1.4 Operation

Lifter operation control is accomplished with an extension module (→ *refer to chapter 16.1*). Configuration settings and operation control are performed with the help of CyBio control software.

9.1.5 Maintenance

Maintenance & care item	Periodicity	Comment
Clean lifter	1/2-yearly	

Follow advice and instructions in chapter → *"Maintenance & Care" on page 11*.

9.2 Parking Deck

9.2.1 Technical Description

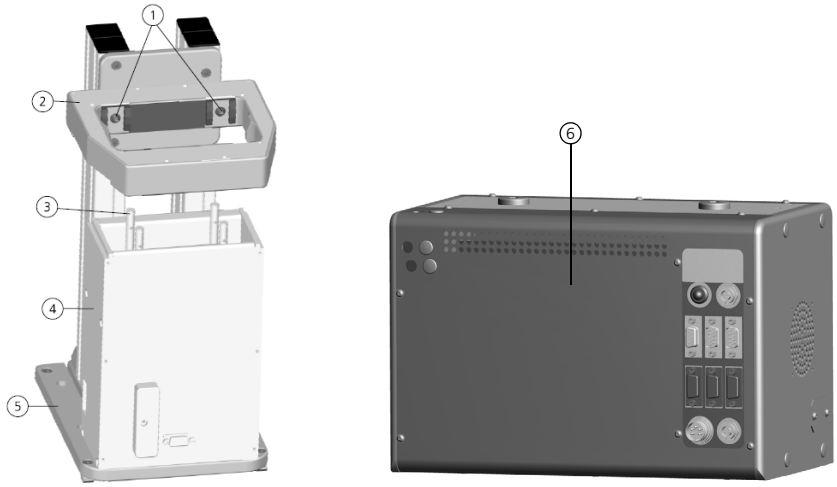


Fig. 40: Parking deck

1 Latches (shown 2 of 4)
2 Latch ring
3 Lifter pins
4 Lifter
5 Bottom plate
6 Extension module

The parking deck is an integrated part of a pipettor working area. It picks a microplate from a pipettor carriage up or places it down again onto that carriage. This allows a microplate to be temporarily swapped out (parked) to an off-location in order to use the carriage place for another microplate. It is also possible to transfer a microplate to another place on the same carriage. Operation control of the parking deck is accomplished with an extension module (→ *refer to chapter 16.1*). Configuration settings and operation control action are performed with the help of CyBio control software.

Function

The lifter picks up a microplate from the carriage. Simultaneously, the latches of the latch ring are withdrawn. If the microplate is located above the latches, these will move out and the lifter places the microplate down onto the latches. Transportation of a microplate from the parking deck to the carriage is in reverse order.

9.2.2 Technical Data

→ *refer to chapter 9.1.2*

9.2.3 Safety Notes

The general safety notes contained in → *chapter 2* will be binding in all cases.

CAUTION

There is danger of minor physical injury!

There is danger of minor physical injury (pinching, shearing impacts) in the range of lifter motion. Do not place your hands or fingers into the lifter motion range. Always use CyBio control software to correct faulty motion. To remove non-lifter items wait until the module and other adjacent equipment units have been shut down.

Danger zone

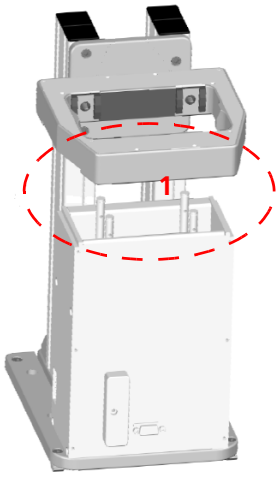


Fig. 41: Danger zone at parking deck

1 Beware of light pinching

9.2.4 Operation

Operation control of the parking deck is accomplished with an extension module (→ *refer to chapter 16.1*). Configuration settings and operation control action are performed with the help of CyBio control software.

9.2.5 Maintenance

Maintenance & care item	Periodicity	Comment
Clean parking deck	1/2-yearly	

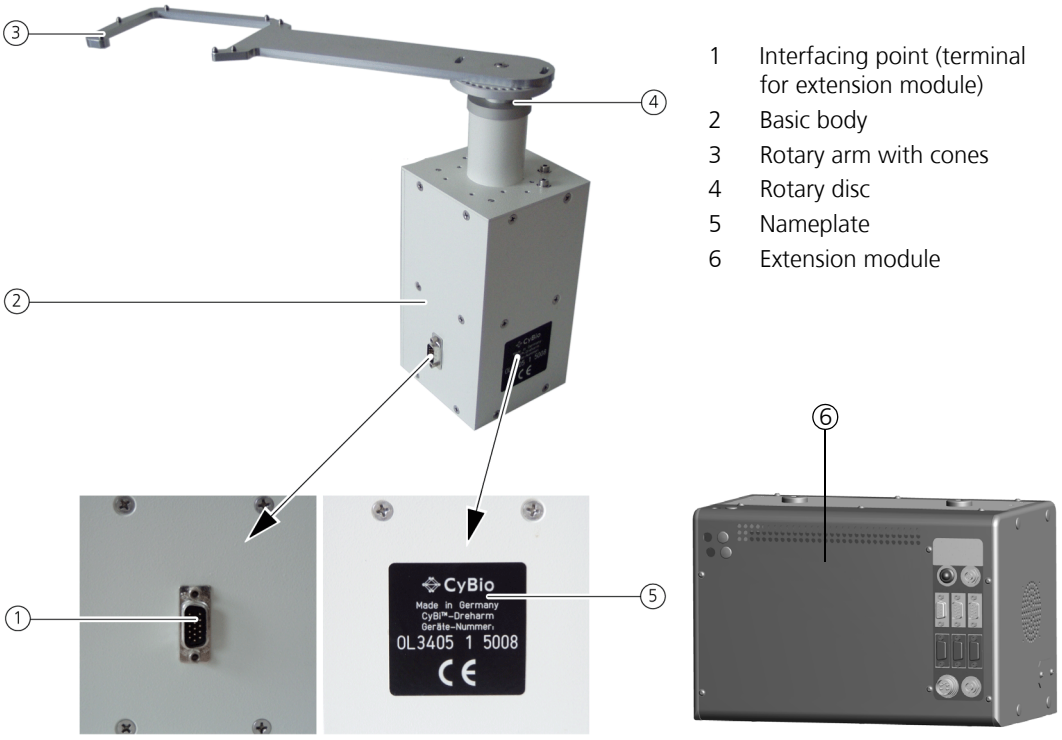
Follow advice and instructions in chapter → *"Maintenance & Care" on page 11*.

9.3 Rotary Arm

9.3.1 Technical Description

The rotary arm is designed to transport a microplate along a circular path and provide a link between various transporting systems. The rotary arm consists of the following components:

- ❑ Basic body with motor and interface
- ❑ Rotary disc with rotary arm mounted onto
- ❑ Rotary arm proper with cones for safe placement of a microplate (available in right-side and left-side version)



1 Interfacing point (terminal for extension module)
2 Basic body
3 Rotary arm with cones
4 Rotary disc
5 Nameplate
6 Extension module

Fig. 42: Rotary arm

Operation control of the rotary arm is exclusively accomplished by an extension module (→ *Fig. 93*) communicating via (→ *Fig. 42*). Hardware configuration settings are available for selection of a direction of rotation and of the type of rotary motion (→ *refer to page 62*).

Direction of rotation

- ❑ clockwise
- ❑ anticlockwise

Rotary motion

- ❑ Full circle
  Rotary arm is able to perform full rotation through 360°. There is no obstacle in the motion path. The shortest motion length is always traveled trough.

Example:
Actual position is 0°, target is 270°, rotation in clockwise direction:
The rotary arm moves 90° in anticlockwise direction.

- ❑ Semicircle
  There is an obstacle in the rotary arm's motion path.

NOTE
The obstacle must be located between the last position to be reached (max. 300°) and the initialization (zero point) position.

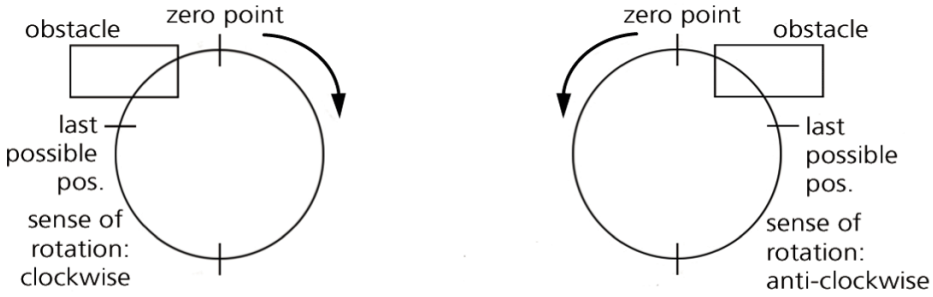


Fig. 43: Direction of rotary arm rotation (semi circle)

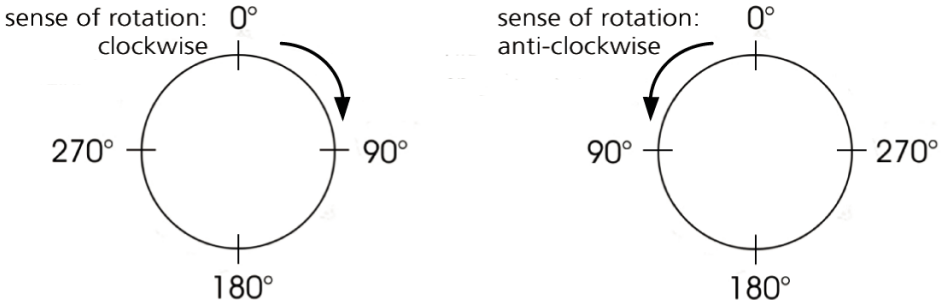


Fig. 44: Direction of rotary arm rotation (full circle)

Positional values are specified in increments counting from the zero point of initialization with one full rotation of 360° corresponding to 4096 steps; i. e. a given positional value is calculated from a desired angle (...°) / 360° * 4096.

Example

Desired angle: 270°

Positional value = 270° / 360° * 4096 = 3072

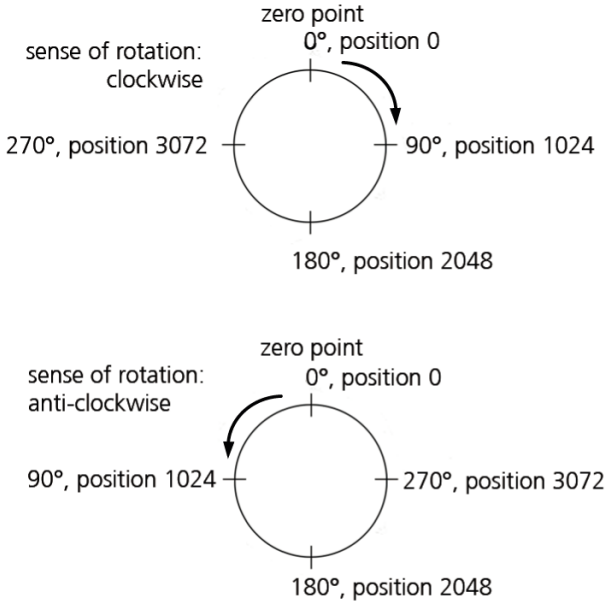


Fig. 45: Positioning examples of rotary arm

The rotary arm's basic function is to carry a microplate and rotate the arm by a user-defined angular amount as required to transfer the microplate to or from the tray of a measuring device or to or from a microplate carriage.

Sequence of actions:

- ❑ The lifter raises a microplate from a carriage high enough for the rotary arm to swing into position between the carriage and the microplate.
- ❑ Once the microplate is precisely positioned above the rotary arm's cones, the lifter can move down.
- ❑ Once the microplate rests on the rotary arm and the lifter columns have travelled down far enough for the carriage and the rotary arm to move freely, the rotary arm with microplate can perform rotary motion and the carriage is able to move away.
- ❑ A transfer sequence from the rotary arm to a carriage occurs in reverse order.

9.3.2 Technical Data

General	
Designation/Type	Rotary arm
Phys. dimensions (width x height x depth)	(152 x 223 x 80) mm
Weight:	2.2 kg

General	
Airborne sound emission	< 70 dB (A)

Operating data	
Utility class	Bench-top device, closed room facilities in a clean condition
Protection class	III (SELV)
Protection type	IP 20
Interference suppression	EN 55011 (DIN VDE 0875, Part 11) Limit value class A
Interference immunity	DIN EN 61000-6-2
Interface	RS 232 Sub D9

Storage & operating conditions	
Storage & transportation: – Permissible ambient temperature – Permissible relative air humidity	 - 10 °C to + 50 °C ≤ 85% at 30°C
Operation – Permissible ambient temperature – Permissible relative air humidity	 + 15 °C to + 25 °C ≤ 75% at 30°C, no formation of condensate

9.3.3 Safety Notes

The general safety notes contained in → *chapter 2* will be binding in all cases.

CAUTION

Beware of minor physical injury!

There is danger of minor physical injuries (pinching, bruising) in the motion range of (→ *see fig. 46*) the rotary arm. Do not plate your hands or fingers into the range of rotary arm motion. Always use CyBio control software to correct faulty motion. To remove non rotary-arm items, wait until the module and any adjacent equipment unit have been completely shut down.

Fig. 46: Danger zone at rotary arm

1 Beware of light bruises

9.3.4 Operation

Operation control of the rotary arm is accomplished with an extension module (→ *refer to chapter 16.1*). Configuration settings can be made hardware-based. Control action of the rotary arm is triggered via CyBio control software.

9.3.5 Maintenance

Maintenance & care item	Periodic-ity	Comment
Clean rotary arm	1/2-yearly	

Follow advice in chapter → *"Maintenance & Care" on page 11*.

9.4 Turn Station

9.4.1 Technical Description

With robotic systems it may be necessary to change the orientation of a microplate for gripping. The turn station is able to switch a microplate between landscape and portrait position. A microplate which has been placed onto the turn station can be rotated through 90° to be subsequently picked up by the gripper in its new orientation.

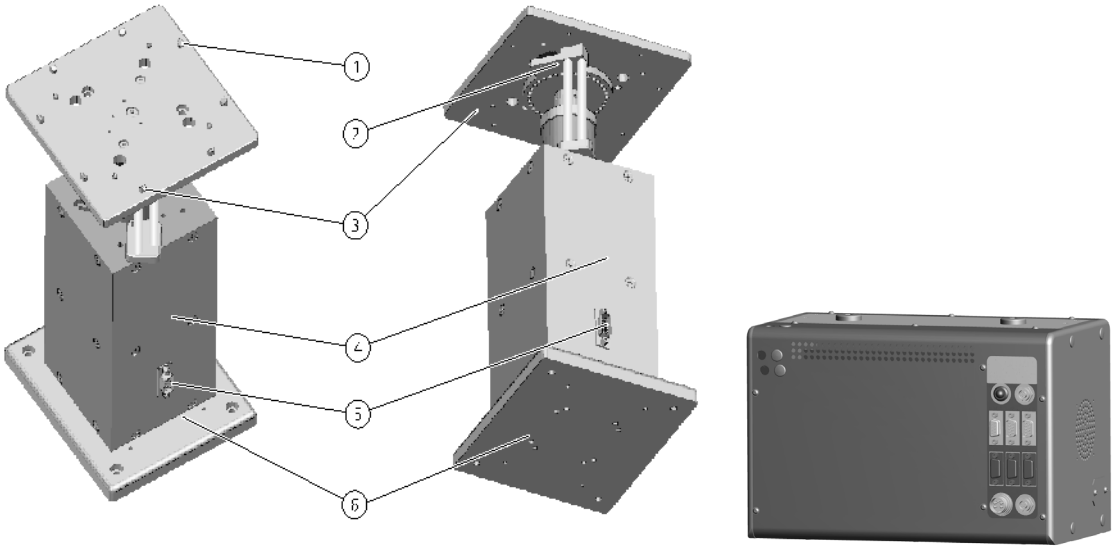


Fig. 47: Turn station

1 Center-alignment pins
2 Sensor holder with plate detection sensor
3 Carrier plate for microplates (rotating)
4 Basic body with integrated drive unit
5 Control terminal
6 Bottom plate
7 Extension module

Function

- ❑ Robotic gripper places microplate down onto carrier plate
- ❑ Carrier plate rotates through ±90°
- ❑ Robotic gripper picks up microplate from carrier plate

9.4.2 Technical Data

→ *refer to chapter 9.3.2*

9.4.3 Safety Notes

The general safety notes contained in → *chapter 2* will be binding in all cases.

9.4.4 Operation

Operation control of the turn station is accomplished with an extension module (→ *refer to chapter 16.1*). Configuration settings and operation control action are performed with the help of CyBio control software.

9.4.5 Maintenance

Maintenance & care item	Periodicity	Comment
Clean turn station	1/2-yearly	

Follow advice and instructions in chapter → *"Maintenance & Care" on page 11*.

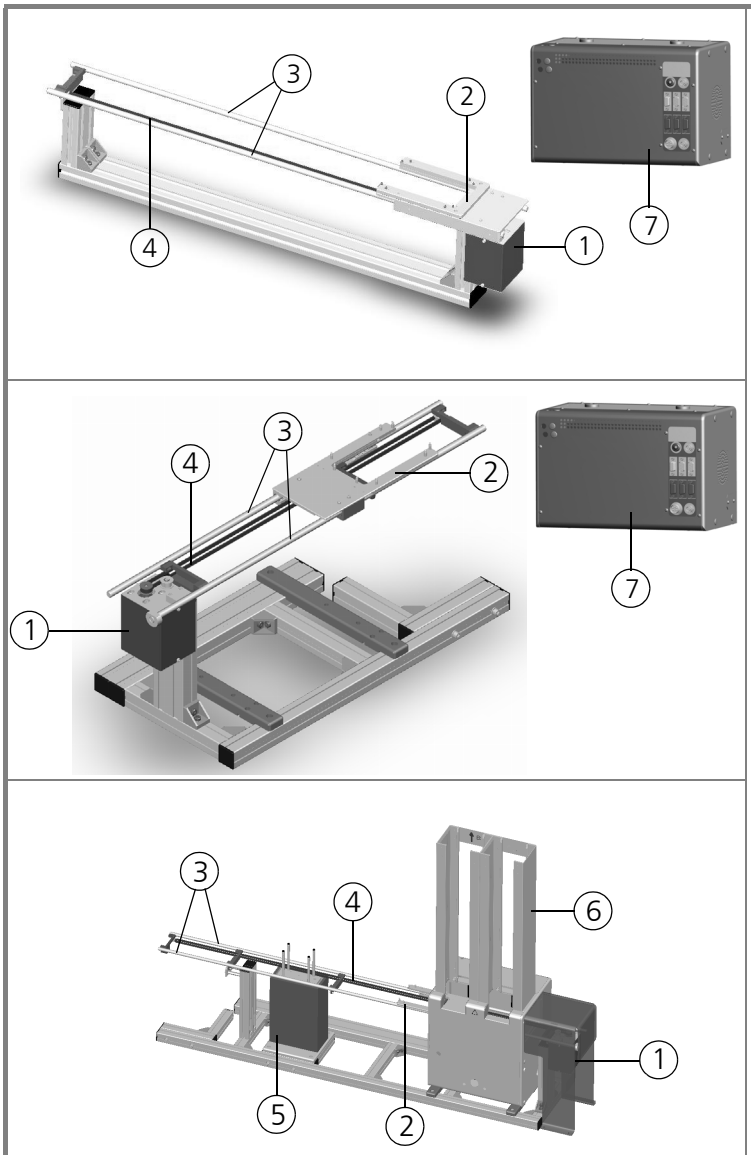
9.5 Transporting Units

9.5.1 Technical Description

The transporting unit (transporting track) allows reservoirs, wash troughs (→ *refer to chapter A 2*) and microplates to be transported between different points of transfer (e. g. lifter) and the stacks. Depending on the type of equipment or product version, the transporting unit's setup may strongly differ. Mounted onto the carriage are adapters (→ *refer to chapter A 1*) to hold microplates and reservoirs of different size.

The carriage is driven by a stepper motor working via a toothed belt to result in guided motion on guide rails via slide bearings.

The stepper motor is controlled via an RS232 interface by a stacker. The carriage positions are defined and stored in the configuration settings of the control program so they can be achieved by positioning motion in a defined manner.



1 Drive unit
2 Carriage
3 Guide rails
4 Toothed belt
5 Lifter
6 Stacker
7 Extension module

Fig. 48: Transporting unit versions

9.5.2 Safety Notes

The general safety notes contained in → *chapter 2* will be binding in all cases.

CAUTION

Beware of light physical injury!

There is danger of light physical injuries (pinching, bruising) in the motion range (→ *see fig. 46*) of the transporting track. Do not place your hands or fingers into the motion range of a transporting unit or that of a belt drive. Always use CyBio control software to correct faulty motion. To remove non-transporting-unit items, wait until the module and other adjacent equipment units have been fully shut down.

Danger zone

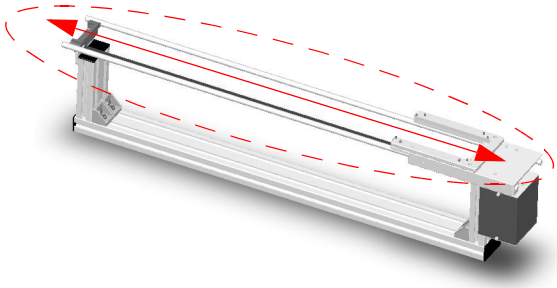


Fig. 49: Danger zone of a transporting track

9.5.3 Operation

Operation control of the transporting unit is accomplished with CyBio control software.

9.5.4 Maintenance

Maintenance & care item	Periodicity	Comment
Clean carriage	half-yearly	

Follow advice and instructions in chapter → *"Maintenance & Care" on page 11*.

10 Plate Transfer Unit

Ordering number

- ❑ OL3376-24-100 (CyBi®-Well, CyBi®-WellFlex)
- ❑ OL3382-24-200 (CyBi®-Well vario, CyBi®-WellFlex vario)

10.1 Technical Description

The plate transfer unit provides an accessory device to CyBi®-Well or CyBi®-Well vario to allow the repositioning of microplates. During a plate transfer, a microplate is relocated from one carriage place to another.

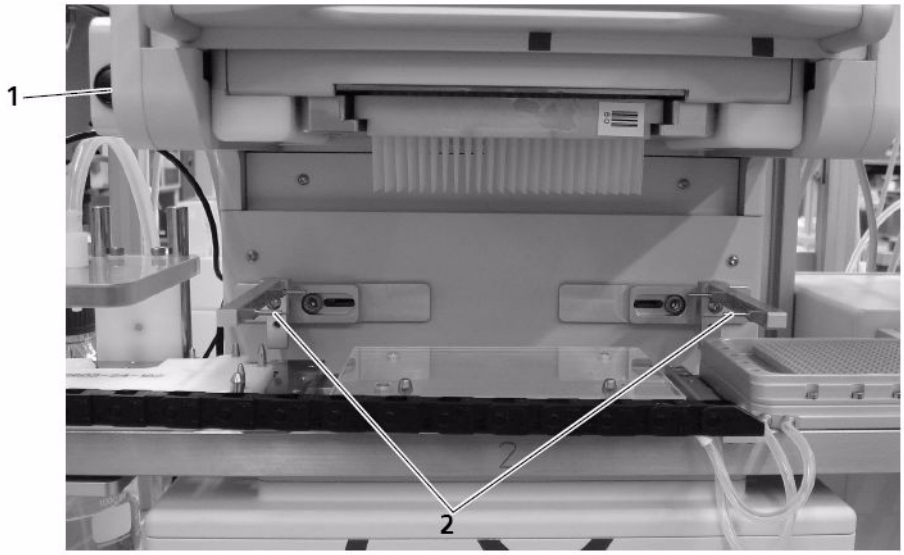


Fig. 50: Plate transfer unit (at CyBi®-Well vario)

1 Manual opener
2 Gripper

Microplate transfer cycle

A microplate transfer cycle is program-controlled. It consists of a sequence of actions:

1. Carriage moves microplate into position for pipetting head
2. Lifter raises microplate
3. Gripper of plate transfer unit below microplates closes
4. Lifter moves into lower limit position
5. Carriage moves other place into position for pipetting head
6. Lifter moves below microplate and raises microplate slightly
7. Gripper of plate transfer unit opens
8. Lifter moves into lower limit position

✓ **A microplate transfer cycle is complete.**

10.2 Safety Notes

The general safety notes contained in → *chapter 2* will be binding in all cases.

CAUTION

There is danger of minor physical injury!

There is danger of minor physical injury (pinching) in the motion range of the plate transfer unit. Do not place your hands or fingers into the motion range of the plate transfer unit. Always use CyBio control software to correct faulty motion. To remove non-transfer-unit items, wait until the module has been completely shut down.

10.3 Operation

Action for operation control of the plate transfer unit is triggered via CyBio control software in normal operating mode.

CAUTION

Beware of physical injury from mechanically moving parts!

Do not place your hands or fingers into the motion range of the carriage or that of the plate transfer unit as long as the CyBi®-Well vario is operating.

Manual actuation in a fault situation

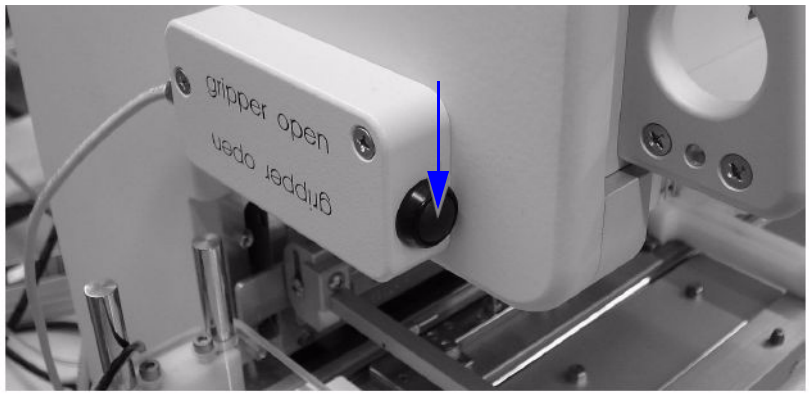


Fig. 51: Plate transfer unit, manual opener

The pushbutton for manual unlocking is located at the plate transfer unit→ *Fig. 51* ( ).

NOTICE

Prevent material damage due to microplates falling off. The manual opener must not be actuated as long as an operating session has not finished!

Press this button to release (open) the gripper of the plate transfer unit if necessary to restore initial position.

11 Magazine Transfer Unit

NOTE
Please do not hesitate to contact our "Automation" department at info@cybio-ag.com on questions regarding this chapter.

11.1 Technical Description

The magazine transfer unit provides an add-on module to the CyBi®-Well vario. It is designed to perform automated insertion and removal of tip magazines. A tip magazine can be transferred to the magazine transfer unit e. g. by a robot. A robot is not part of magazine transfer unit delivery.

Magazine transfer motion is achieved with a pneumatic-powered cylinder. Transfer motion is controlled by a three-way solenoid valve. Required motion is triggered with control software commands changing the state of the appropriate switching output of the CyBi®-Well vario.

The limit positions can be monitored via external devices. The signals of the limit position sensors (Reed contacts) are equally processed by the CyBi®-Well vario.

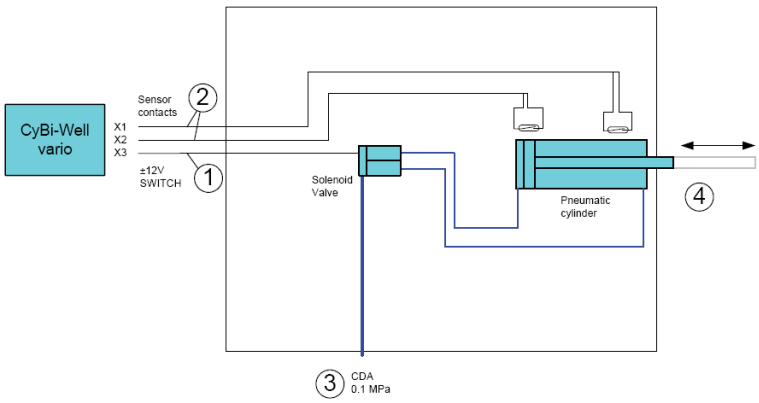


Fig. 52: Magazine transfer unit: interfacing points

1 Electrical: switching input (switch)
2 Sensors: cylinder limit positions
3 Pneumatical: input pressure (refer to → *"Technical Data"*)
4 Mechanical: piston movement (magazine changer)

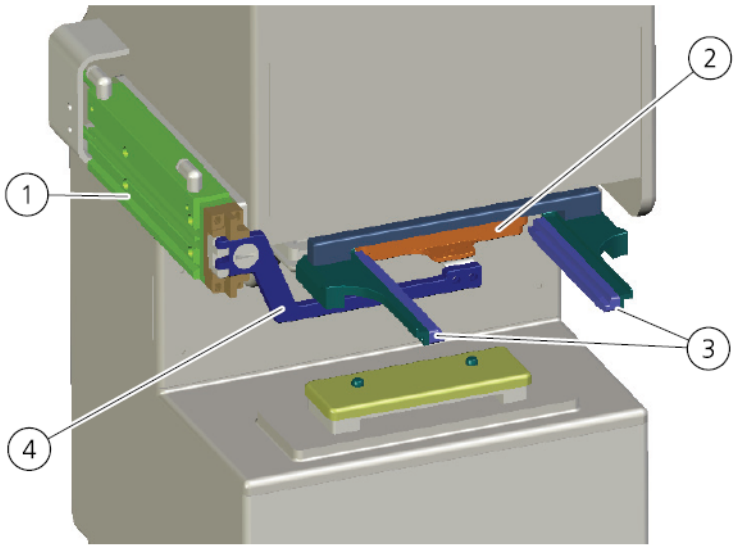


Fig. 53: Magazine transfer unit, mechanical setup

1 Pneumatic cylinder
2 Tip magazine
3 Rails
4 Magazine changer

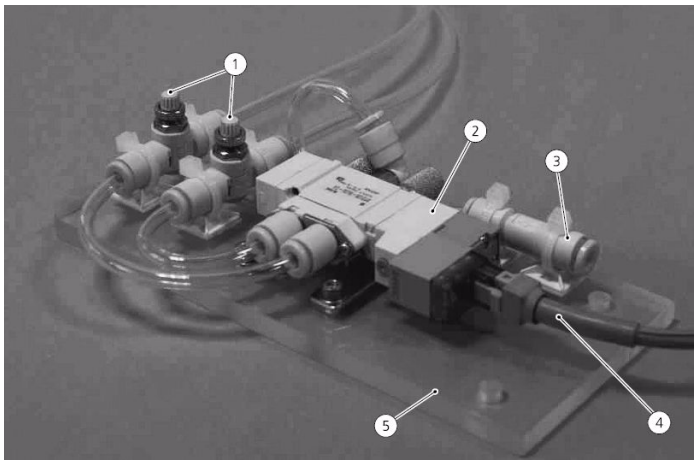


Fig. 54: Valve assembly

1 Restrictor valves
2 3-way solenoid valve
3 Compressed air inlet
4 Operating voltage inlet
5 Base plate

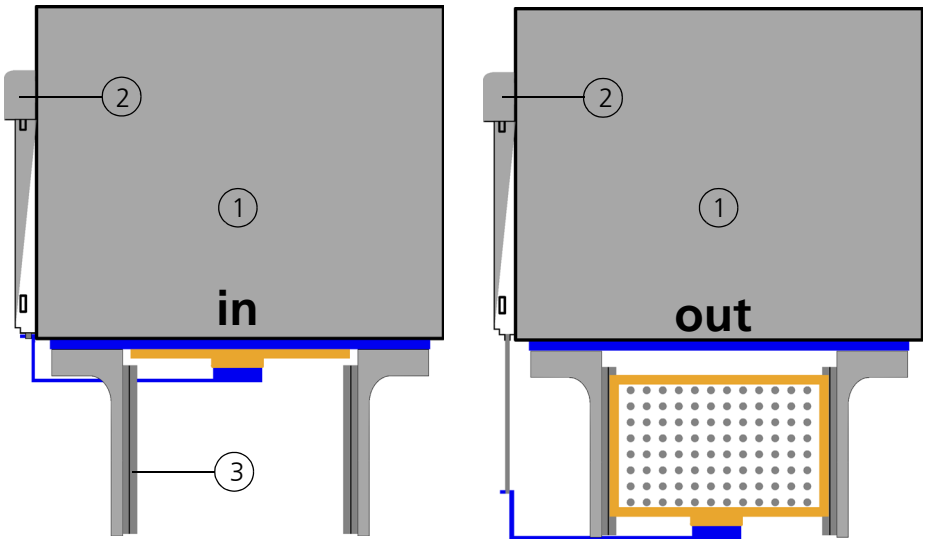


Fig. 55: Positions of magazine changer

1 CyBi®-Well vario
2 Magazine changer
3 Transfer position for tip magazines

The magazine changer is in idle state when in position "out" (→ *see fig. 55*). This means that a tip magazine can be picked up or placed down by an external gripper in the transfer position.

Switch state	Magazine changer position
On	in
Off	out

To load a tip magazine into the basic unit, the switching output must be set to "On". The three-way valve then energizes and switches the pneumatic cylinder so the magazine changer can push the tip magazine into the magazine frame below the pipetting head of the basic unit. To protect the basic unit from faulty insert-motion of a tip magazine, the basic unit itself monitors the tip magazine for precise and conforming placement within the magazine frame. A tip magazine cannot be clamped to the sealing mat and piston motion will be impossible, unless enabled by the internal monitoring circuit.

Motion to tighten a tip magazine in the magazine frame of the CyBi®-Well vario is also accomplished with CyBio control software.

NOTICE

Beware of material damage!

Tip magazines which are not completely filled with tips must not be inserted. Disregarding this advice may cause material damage to the basic system unit. Always make sure that only completely filled magazines are inserted!

11.2 Technical Data

Pneumatic interface	
Utility	Compressed air, filtered (max. 5 µm)
Compressed air	max. 0.2 – 0.25 MPa (2 – 2.5 bar, 29 – 36 psi)
Terminal	SMC TU 0425 (PU 4x25 mm tube)
Solenoid valve	
Power supply	± 12 V; via CyBi®-Well vario
Power consumption	< 0.55 VA
Further interfacing facilities	
Limit position monitoring	Limit position sensors (Reed contacts) / connection to CyBi®-Well vario

11.3 Safety Notes

The general safety notes contained in → *chapter 2* will be binding in all cases.

11.3.1 Safety Labeling & Danger Zone

NOTE

Affixed warning signs and safety symbols are integral parts of the magazine transfer unit and must be followed!

Check warning labels and safety symbols for intactness and completeness before you begin any kind of start-up action. Do not proceed to start-up 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! A damaged warning note or safety symbol must be promptly replaced!

The following safety symbols are provided at the magazine transfer unit:

Safety symbol	Meaning	Comment
	Warns of a danger point	Warns of mechanical hazard due to mechanically moving parts

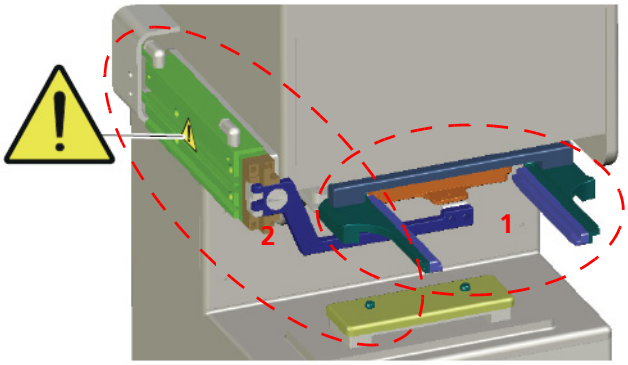


Fig. 56: Warning sign and danger zones

1 Motion range of magazine changer
2 Motion range of pneumatic cylinder

Indicates crushing hazard due to mechanically moving parts in the working range of the pneumatic cylinder or the magazine changer. Do not place your hands or fingers into this motion range while operation is going on.

11.4 Operation

In normal operating mode, the magazine transfer unit is controlled by CyBio control software. However, it may be necessary to change a tip magazine by manual action. To change a tip magazine, proceed as follows:

For manual replacement of a tip magazine, action for operation control of the CyBi®-Well vario must be triggered at the control panel. For a description of manual operation action, please refer to the CyBi®-Well vario manual.

1. Trigger "Manually/Changing tips" command.
   ✓ **Tip magazine is released.**
2. Acknowledge "Move out magazine changer" query (outward motion of magazine changer) by pressing key at the control panel.
   ✓ **The tip magazine will move from the pipetting head into transfer position.**
3. Remove the tip magazine

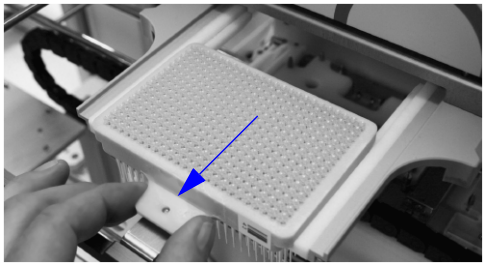


Fig. 57: Replacement of tip magazine

4. Install a new tip magazine in transfer position.
   Note: Mount tip magazine in such a position that it sits on the rails of the maga-

zine transfer unit and the magazine changer pin engages with the recessed handle (→ *see fig. 57*).

5. Acknowledge "Insert tip rack" (installation of tip magazine) query by pressing key  at the control panel.

   ✓ **The tip magazine will move from transfer position into the pipetting head. Once inside of the pipetting head, the tip magazine will be fixed. A tip replacement cycle is complete.**

11.5 Maintenance

CAUTION

There is danger of physical injury by compressed air.

Remember to break compressed air supply before beginning any kind of maintenance work on the basic unit with magazine transfer unit.

Performing maintenance or care you should also follow User Manual advice of the basic unit.

12 Tip Changer

Ordering number

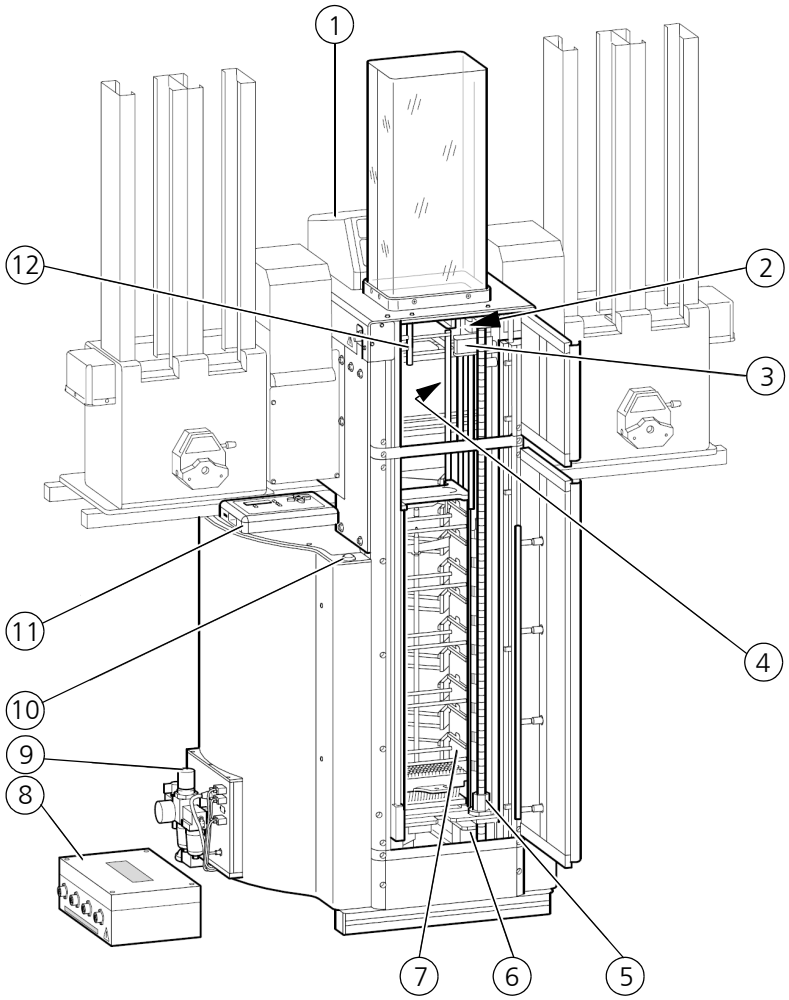
- OL3803-24-001 (CyBi®-Well, Shallow Well)
- OL3804-24-001 (CyBi®-Well, Deep Well)
- OL3814-24-001 (CyBi®-Well vario)

12.1 Technical Description

The tip changer provides a tool for fully automated replacement of tip magazines in CyBi®-Well and CyBi®-Well vario automatic pipetting systems (only with rear-side head change).

12.1.1 Setup

The tip changer is specifically adapted to work with equipment that includes a linear transporting unit. It can be integrated into a test flow sequence with the help of CyBio control software. A magazine can be replaced without delay time in a matter of 20 to 60 seconds, depending on its position.



1 CyBi®-Well
2 Magazine detector
3 Barcode reader
4 Rack code reader
5 Lifter
6 Carousel
7 Rack
8 Power supply
9 Compressed air supply
10 STOP button
11 Control panel
12 Transfer position

Fig. 58: Assembly drawing view of tip changer (with CyBi®-Well and stackers)

12.1.2 Function

The tip changer comprises several function units:

Function unit	Function
Carousel	Contains 10 racks, these are rotated into a required position
Rack	Contains 10, 8 or 6 tip magazines
Lifter	Moves a rack out of the carousel into working position at the changer
Transfer position	Magazine sliders transfer tip magazines from the changer to the rack and vice versa
Rack code reader	Identifies a given rack type by reading a drill-hole code pattern at the rack
Barcode reader	Identifies the tip magazine via barcode label
Magazine detector	A sensor detects the position of a tip magazine in the rack
Control panel	The operator may control a tip magazine change cycle using manual commands
STOP button	Stops all motion of the lifter and the carousel
Compressed air supply	Turns compressed air supply for the magazine slider on or off

12.1.3 Working Principle

The tip changer is designed to perform a fully automated cycle for replacement of a tip magazine at the CyBi®-Well or the CyBi®-Well vario (only with rear-side head change) with a new tip magazine that is retrieved from the rack.

NOTE
The tip magazines are processed from the bottom to the top in order to prevent contamination.

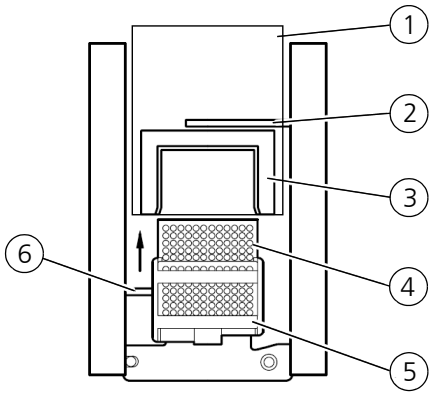


Fig. 59: Magazine change (top view)

A tip change cycles comprises the following work steps:

1. Used tip magazine is released by CyBi®-Well/CyBi®-Well vario (→ *Fig. 59*/**1**).
   – On selection of option **[Release tips]** the tip magazine is released with electromotoric force (also refer to CyBi®-Well/CyBi®-Well vario User Manual).
2. Used tip magazine is output and deposited in the rack (→ *Fig. 59*/**5**).
   – The magazine slider (→ *Fig. 59*/**2**) pushes the tip magazine from the magazine frame (→ *Fig. 59*/**3**) of CyBi®-Well/CyBi®-Well vario into the rack.
3. A new tip magazine is withdrawn from the rack (→ *Fig. 59*/**5**).
   – The leads crew drive of the lifter (→ *Fig. 60*/**2**) moves the rack in door position (→ *Fig. 60*/**1**) out of the carousel and into the required working position. The carousel is able to store a maximum of 10 racks.

A rack may contain 10, 8 or 6 tip magazines, depending on the type of tip:

Rack type	Magazine with tips of type
6 tip magazines	Deep well 96/250 µl
8 tip magazines	Shallow well 96/250, 96/25 µl, 384/25 µl
10 tip magazines	Shallow well 384/10 µl

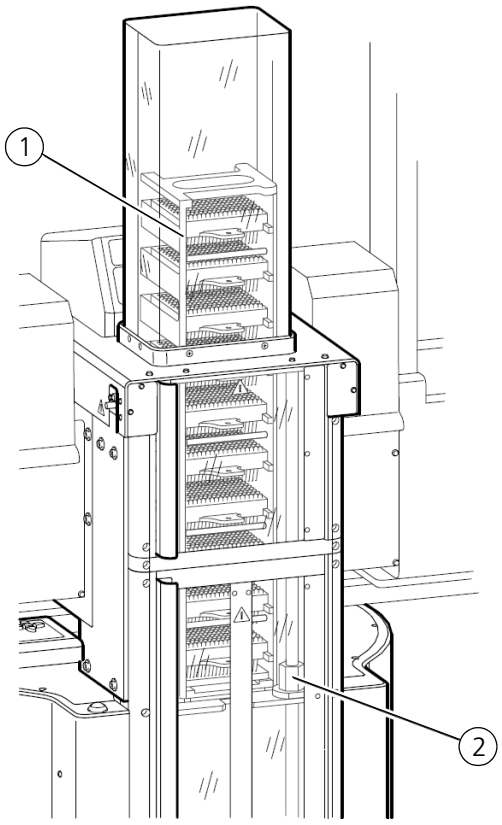


Fig. 60: Rack in transfer position

4. A new tip magazine is inserted
   – Another magazine slider (→ *Fig. 59*/**6**) pushes a tip magazine (→ *Fig. 59*/**4**) out of the rack and until mechanical stop position in the magazine frame (→ *Fig. 59*/**3**).

5. The new tip magazine is tightened and sealed by the CyBi®-Well/CyBi®-Well vario.
   – On selection of option **[Tighten tips]**, the tip magazine will be fixed with electromotoric force (also refer to CyBi®-Well/CyBi®-Well vario User Manual).

Operation control of the tip changer is accomplished by CyBio control software communicating with the control panel.

CAUTION

There is danger of crushing or pinching!

The door, the access door, the top cover and the lateral tiltable doors of the tip changer represent safety shieldings that are equipped with a monitoring device each. These monitoring devices must never be defeated. Otherwise, exposed mechanical motion of tip changer assemblies may create danger of physical injury.

12.2 Technical Data

General	
Name	Tip changer
Type	For – CyBi®-Well (shallow well) – CyBi®-Well (deep well) – CyBi®-Well vario (backside)
Max. number of racks in carousel	10
Rack types OL3802-11-157 (shallow well) OL3802-11-405 (shallow well) OL3802-11-410 (deep well)	 Max. of 10 tip magazines type 384/10 µl (sw) Max. of 8 tip magazines type 96/250, 96/25 µl, 384/25 µl Max. of 6 tip magazines 96/250

Dimensional & weight details	
Basic body (width x height x depth)	772.5 x 1660.5 x 750 mm
Weight:	About 65 kg

Operating data	
Utility class	Closed room facilities in a clean condition
Protection class	III (SELV)
Protection type	IP 20

Operating data	
Operating voltage	2 x 12VAC/± 12 VDC unstabilized

NOTE
The voltage which is required for operation of the tip changer is supplied by a power supply module (→ *refer to chapter 16.2*) with a corresponding line voltage name-plate.

Compressed air for magazine slider	0.35 MPa (3.5 bar; 51 psi)
Airborne sound emission	< 70dB (A)
Interfacing	3x RS 232 C, Sub-D 9-pole
Interference suppression	EN 55011 (DIN VDE 0875, Part 11), limit value class A
Interference immunity	EN 61000-6-2 (industrial area)

Storage & operating conditions	
Storage & transportation: – Permissible ambient temperature – Permissible relative air humidity	 - 10 °C to + 50 °C ≤ 85% at 30°C
Operation – Permissible ambient temperature – Permissible relative air humidity	 + 15 °C to + 25 °C ≤ 75% at 30°C, no formation of condensate

12.3 Safety Notes

The general safety notes contained in → *chapter 2* will be binding in all cases.

12.3.1 Safety Labeling & Safety Devices

NOTE
Affixed warning signs and safety symbols are integral parts of the tip changer and must be followed!

Check warning labels and safety symbols for intactness and completeness before you begin any kind of start-up action. Do not proceed to start-up 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! A damaged warning note or safety symbol must be promptly replaced!

The stacker is provided with safety symbols as follows:

Safety symbol	Meaning	Comment
	Warns of a danger point	Warns of mechanical hazard due to mechanically moving parts

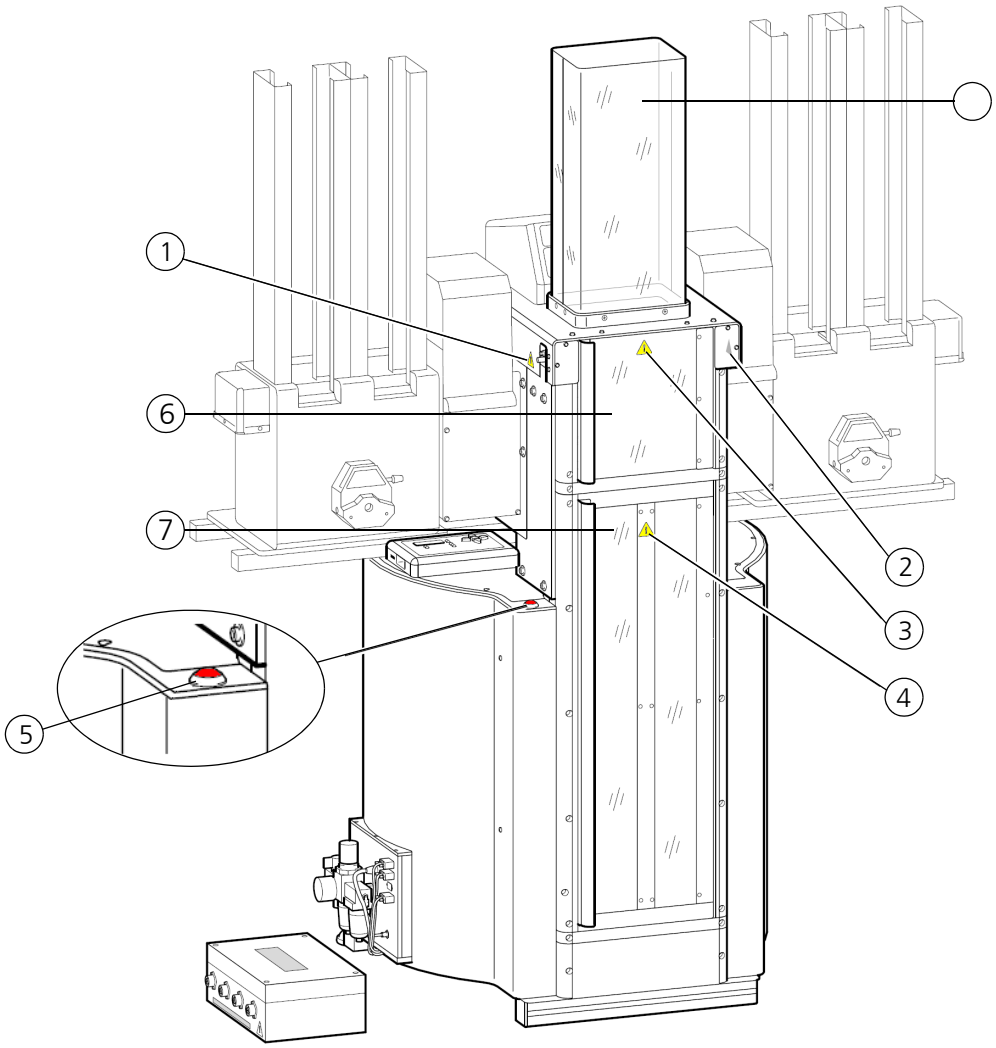


Fig. 61: Warning notes at the tip changer

1-4 Danger to users
5 STOP button
6 Access door
7 Safety door

Monitoring devices

A given monitoring device will immediately stop carousel and lifter motion if triggered by the removal or opening of its assigned shielding part. Motion of tip changer assemblies will not be released unless and before the particular movable shielding part has been closed or the door pressed on again.

NOTE

If the time length from an interruption of the mechanical motion of assemblies to a subsequent motion enable event is greater than the time-out presetting in CyBio control software, no motion will not be enabled.

Remedy:

Extend time-out setting to 120 seconds!

Shielding

Assemblies of the tip changer which perform dangerous mechanical motion are equipped with shielding. This prevent accidental physical contact with moving mechanical parts.

STOP button (emergency stop)

In the event of danger or malfunction the tip changer can be immobilized by pressing the STOP button (→ *see fig. 61*/**5**). This will stop all currently running motion of the carousel and the lifter. The display screen of the control panel will output "Cont" for "Continue". After "Cont" has been acknowledged by pressing **[Enter]** ■ key, the work sequence may be resumed.

NOTE

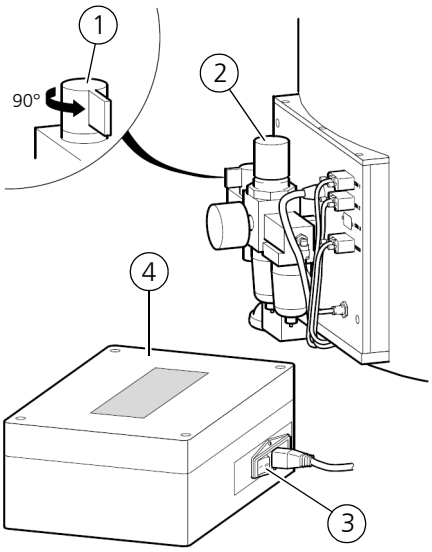
Power supply will continue even after actuation of the STOP button.

12.4 Operation

12.4.1 Turning the Tip Changer On

To turn the tip changer on, proceed in same order as described hereafter:

1. Turn computer on, then trigger CyBio control software session.
2. Turn compressed air supply on. Check air supply for correct operating pressure (→ *refer to page 83*).
3. Turn compressed air valve at the tip changer on. To do this, turn rotary switch 90° to the right (in anticlockwise direction; → *see fig. 62*/**1**).



1 Rotary switch for turning compressed air supply on
2 Compressed air valve
3 Tumbler switch to turn supply voltage on
4 Power supply module

Fig. 62: Turning the tip changer on

CAUTION

Beware of crushing or pinching!

As compressed air supply becomes available, the magazine sliders will move towards the basic unit. Do not place your hands or fingers into a motion zone of the tip changer.

4. Power to the tip changer must be turned on at the power supply module. This is done by transferring the tumbler switch into position "I" (→ *see fig. 62*/**3**). Wait until the green "State" lamp at the control panel lights.
5. Press **[Enter]** ■ key at the control panel. The tip changer starts an initialization routine. On completion of the initialization routine, the "Door" lamp at the control panel will light. Mount or close all shielding and cover parts
6. Press the door firmly on until the "**Door**" lamp extinguishes.

NOTE

Should an E PP error message appear on the display of the control panel before or after initialization, check for proper compressed air supply.

7. Turn the basic unit on (CyBi®-Well/CyBi®-Well vario).

NOTE
Refer to the relevant User Manual for basic unit operation instructions.

✓ **The tip changer is operational and ready for action.**

12.4.2 Control Panel Summary Table

The control panel is intended for operator-controlled magazine change cycles. Available controls are (→ *siehe Abb. 63 auf Seite 88*):

Control element	Function
7-segment display	❑ The first two numerals indicate the current rack position of the carousel in front of the door. ❑ The last two numerals indicate the current magazine in transfer position in front of the basic unit. ❑ In the event of a fault situation, an error code will appear.
State lamp	Indicates status of tip changer: ❑ Green: Tip changer ready for action ❑ Orange: Tip changer busy executing command ❑ Red: Tip changer has developed a fault ❑ Red/Green: Rack position occupied/Rack position vacant
Door lamp	Lights in red color if door is open or other shielding part is open or removed
Host lamp	Lights when operation of tip changer is controlled by host computer. Operation control is accomplished via computer.
Manual lamp	Lights when tip changer runs in manual mode. Operation control action is triggered at control panel.
Rx Px lamp	**Rx Px** starting mode: This lamp lights when a first magazine change cycle starts in a previously selected position.
Continue lamp	**Continue** starting mode: This lamp lights when a first magazine change cycle starts in the most recently used magazine position.
Change lamp	Lights when a magazine change cycle is performed with manual commands triggered at the control panel keys.
Enter key (■)	On pressing of Enter an input will be acknowledged or selected (or initialization be triggered as part of powering on process.
Up key (▲)	Provides multiple assignment: ❑ Selection of starting mode ❑ Change in starting position (in **Rx Px** starting mode) ❑ Motion of rack towards basic unit ❑ Upward motion of rack in front of the basic unit by one magazine compartment

Control element	Function
Down key (▼)	Provides multiple assignment: ❑ Selection of starting mode ❑ Change in starting position (in **Rx Px** starting mode) ❑ Motion of rack towards carousel ❑ Downward motion of rack in front of the basic unit by one magazine compartment
Left key (◀)	Provides multiple assignment: ❑ Clockwise motion of carousel ❑ Insertion of magazine plate into rack (in **Change** mode)
Right key (▶)	Provides multiple assignment: ❑ Anticlockwise rotation of carousel ❑ Insertion of magazine plate into rack (in **Change** mode)

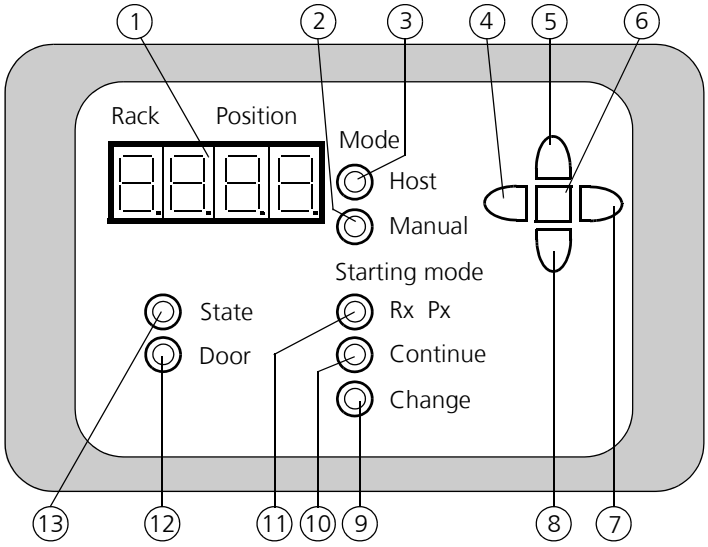


Fig. 63: Control panel

1 7-segment display
2 Manual lamp
3 Host lamp
4 Left key
5 Up key
6 Enter key
7 Right key
8 Down key
9 Change lamp
10 Continue lamp
11 Rx Px lamp
12 Door lamp
13 State lamp

12.4.3 Access door

The access door (→ *see fig. 64*/**1**) allows access to the transfer position at the basic unit if there is maloperation. It is equipped with its own monitoring device. As long as the access door is open, motion of all electrically powered assemblies remains disabled so no motion can be triggered. The "**Door**" lamp at the control panel will light as long as the door is open. Motion of mechanically moving assemblies will not be re-enabled unless the access door has been closed and firmly pressed on again.

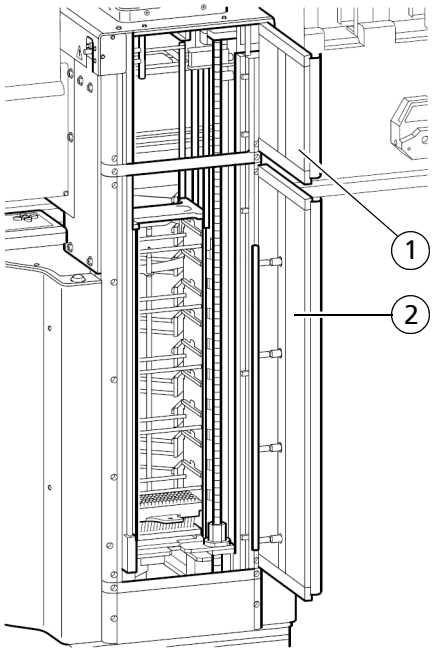


Fig. 64: Access door and door

12.4.4 Door

The door (→ *see fig. 64*/**2**) provides an operating access for insertion of a rack into the carousel. It is equally equipped with its own monitoring device. As long as the door is open, motion of all electrically powered assemblies remains disabled so no motion can be triggered. The "**Door**" lamp at the control panel will light as long as the door is open. Motion of mechanically moving assemblies will not be re-enabled unless the door has been closed and firmly pressed on again.

12.4.5 Rack With Magazines

A rack (→ *Fig. 65*) is required to carry tip magazines. Due to variations in the size of pipetting tips the number of magazines contained in a rack may differ. The following rack types can be used:

Rack type	Number	Tip magazine
OL3802-11-157	10 metal racks	shallow-well; 96 or 384/10 µl
OL3802-11-405	10 metal racks	shallow-well; 96/250 µl, 96/25 µl, 384/25 µl
OL3802-11-410	10 metal racks	deep-well; 96/250 µl

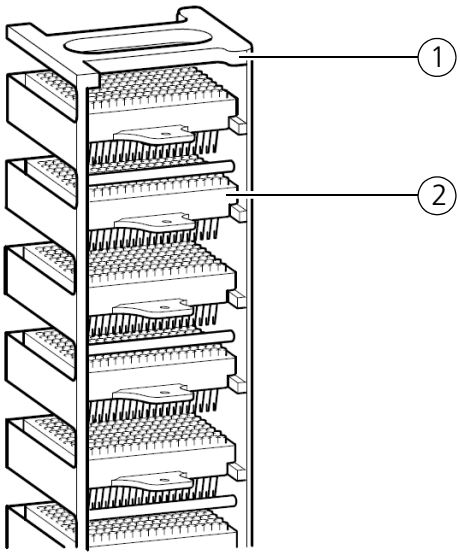


Fig. 65: Rack with magazines

1 Rack
2 Tip magazine

12.4.6 Magazine Change Process

Insertion of rack

Located behind the door is a carousel place for loading the carousel with racks.
Use ◀ key and ▶ key at the control panel as necessary to trigger further rotary motion of the carousel. Press just shortly in order to achieve carousel motion by one rack position. The rack which is currently positioned behind the door will be indicated on the display screen (01 to 10) of the control panel.

1. Make tip changer operational and ready for action if necessary.
2. Wait until all racks have been placed on the carousel and the lifter has reached its lower end position (motion will stop).
3. Press keys ◀ and ▶ as necessary to select a required rack position (repeatedly press just shortly or keep key depressed until particular rack position is reached).
4. Open door (→ *Fig. 66*/**1**) and place rack (→ *Fig. 66*/**2**) onto the carousel (→ *Fig. 66*/**3**). If target position is occupied, remove rack in this position at first.
5. Make sure that tip magazines rest flatly on the designated rails and that they do not protrude at the front or the back end. There must be no accidental shifting of the tip magazines as a rack is being inserted.
6. Press "Enter" key, the "**Chn**" indicator for "Change" will light. The magazines are marked as new ones thereafter.
7. Close the door. As you close the door, press it firmly on until the "**Door**" lamp on the control panel extinguishes. By pressing the door firmly on, you will restore any tip magazine that may have shifted somewhat to the front to its correct position.

NOTE

Check filling level of the collector trough below the rack in the carousel and drain collector trough if necessary.

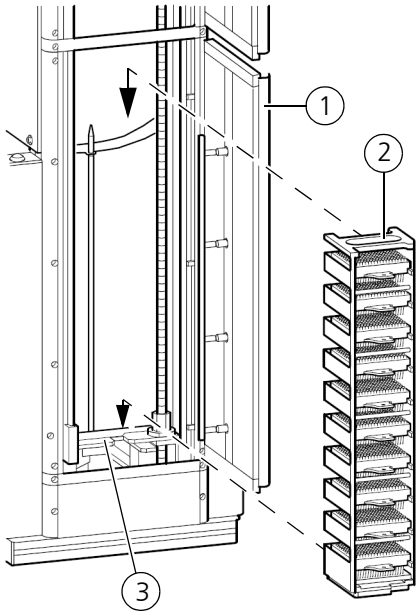


Fig. 66: Rack Change Process

Select starting mode

The tip changer provides two starting modes:

- **Rx Px** starting mode
- **Continue** starting mode

A required mode can be selected by pressing ▼ or ▲ at the control panel.

On completion of a power-on cycle, **Continue** starting mode will be set.

Rx Px starting mode

The first tip magazine change cycle begins in the position that was selected in this starting mode.

1. Press keys ▼ and ▲ until **Rx Px** lamp lights (→ *Fig. 67*/**3**). The current starting position shows on the display (→ *Fig. 67*/**1**) for a short moment.

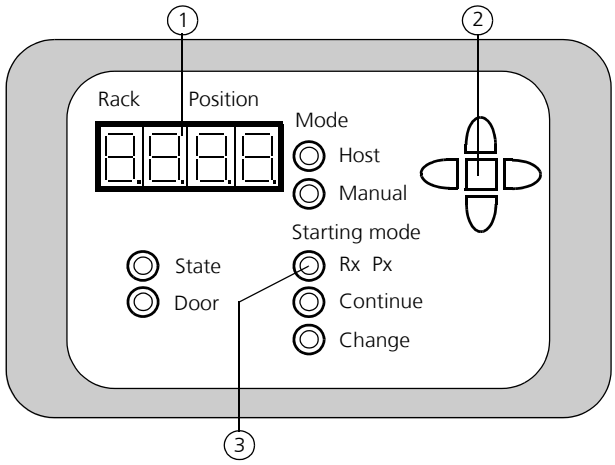


Fig. 67: Rx Px starting mode

To select a starting position, proceed as follows:

2. Press **[Enter]** ■ (→ *Fig. 67*/**2**) key at the control panel. The decimal points of the rack display will light.
3. Use keys ▼ and ▲ to select a starting rack at first.
4. Press **[Enter]** ■ key to save your selection for starting rack. The decimal points of the rack display (→ *Fig. 67*/**1**) will extinguish and the decimal points of the positional display will light instead. The starting rack has been saved.
5. Use keys ▼ and ▲ now as necessary to select a starting tip magazine.
6. Press **[Enter]** ■ to save your selection for starting tip magazine. The decimal points of the positional display will extinguish. The starting tip magazine has been saved.
7. Once the first tip magazine change cycle has finished, the tip changer automatically switches to **Continue** mode. The currently set magazine position is preserved and will appear on display when the next selection for **Rx Px** is made.

   ✓ **The starting rack and starting tip magazine have been selected.**

NOTE

As long as selections are made for starting rack and starting tip magazine in Rx Px starting mode, the tip changer is unable to work under the control of its host computer and CyBio control software.

Continue starting mode

The first tip magazine change cycle automatically begins in the most recently used magazine position.

1. Press keys ▼ and ▲ until lamp Continue lights. The current starting position appears on display for a short moment.

If the tip changer was set to Continue starting mode, you may press the **[Enter]** ■ key in order to have the selected magazine position displayed.

Automated computer-controlled change process

An automated change process can be triggered via CyBio control software of the basic unit. For more details regarding action to perform the individual working steps, you should consult the relevant user documentation of the basic unit and the CyBio control software description.

The tip changer replaces a tip magazine when a **[Change pipetting tips]** is carried out by CyBio control software. A tip change process includes three options: **[Tip change, automated]**, **[Release tips]** and **[Tighten tips]**.

On selection of **[Tip change, automated]** the tip magazine which is contained in the basic unit will be released, transferred into the rack, a new tip magazine is then pushed into and tightened in the basic unit.

Option **[Release tips]** releases the tip magazine in the basic unit and stores it in the rack when selected.

A new tip magazine will be transported into and tightened in the basic unit on selection of option **[Tighten tips]**. In this case, there must be no tip magazine in the basic unit.

Change process controlled by manual action at control panel

A manual tip magazine change process can be performed in **Change** mode. As a necessary precondition, the basic unit must be ready for operation. For further information about control action for the particular basic unit, you should consult the relevant User Manual.

1. Press keys ▼ and ▲ until the **Change** (→ *Fig. 68*/**3**) lamp lights.
2. Press **[Enter]** ■ (→ *Fig. 68*/**2**) key. All decimal points in the control panel display field will light (→ *Fig. 68*/**1**) will light.

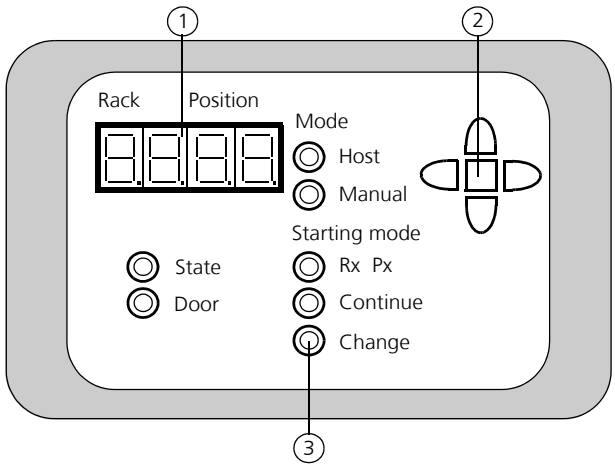


Fig. 68: Manual tip change process

NOTE

As long as Change mode (manual change of tip magazines) is active, changer operation control by the host computer and CyBio control software remains disabled.

3. Use the two keys ◀ and ▶ to select a desired rack position in the carousel. The

display screen of the control panel shows the currently selected rack position (first two digits).

4. Press key ▲ in order to trigger rack motion into the position for transfer to the basic unit behind the door. With the help of key ▼ another magazine can be selected. The lifter will move far enough for the lowermost magazine in the rack to reach the transfer position level. The display screen will show the current rack position (carousel) and the current location of a tip magazine in front of the basic unit.
5. Press ▶ key once the required magazine has reached the transfer position at the basic unit. A magazine slider pushes the magazine plate from the rack until mechanical stop position in the magazine frame of the basic unit. The basic unit then automatically tightens this magazine.

NOTICE

Only magazines filled with tips may be installed and clamped.

After use, a magazine can be placed into the rack as described hereafter:

- ❑ Press key ◀ in order to remove a used magazine from the basic unit and deposit it in the rack. A magazine slider pushes the magazine plate from the basic unit's magazine frame into the rack.

To insert another magazine, proceed as described above.

- ❑ Press **[Enter]** ■ key in order to place the rack down in the carousel. The lifter will move the rack down into initial position. All decimal points on the control panel display extinguish.

The **Change** mode (manual change of tip magazines) is automatically exited. On completion thereof, one of the two starting modes **Rx Px** or **Continue** remains to be set.

NOTE

Operation control by a host computer will be disabled unless Rx Px or Continue has been selected for starting mode.

12.4.7 Turning Tip Changer Off

Wait until all work sequences have been fully completed by the basic unit or the tip changer.

To turn power off, please observe the following order in all cases:

1. Ramp host computer (if integrated) down and turn it off.
2. Turn compressed air valve (→ *see fig. 62*/**2**) at the tip changer off. Turn rotary switch by 90° to the left (in clockwise direction).
3. Turn compressed air supply off.
4. Turn basic unit off (consult relevant User Manual).

5. Turn tip changer off. To do this, transfer tumbler switch into position "0" (→ *see fig. 62/***3**). The **State** lamp at the control panel extinguishes.

   ✓ **The tip changer is in fully shut down condition.**

CAUTION

There is danger of crushing or pinching!

As the tip changer is turned off, the magazine sliders will continue to move towards the basic unit. Do not place your hands or finger into the tip changer's motion range.

12.5 Fault Removal

WARNING

Physical contact with voltage-carrying parts may cause injury or even death!

You are strictly advised against opening the power supply module!

Refrain from repair work at the power supply module. Contact the Customer Service Department of or its authorized service contractor on noticing a faulty condition.CyBio AG

Malfunction or faults will be reported on the display screen. Where malfuntion or operating trouble is obviously due to operator action, work may be resumed after removal of the fault situation (→ *see section 12.5.1* and → *section 12.5.2*).

Check all potential fault sources on occurrence of a fault. If problems are found to persist after this check or on identification of an undescribed fault, you should notify the Customer Service Department of or its authorized service contractor.CyBio AG

Always use a form sheet for service calls.→ *"Declaration of Safeness" on page 217*

12.5.1 Error Messages

If a fault situation has occurred, the control panel display screen will show an error number.

Error code	Cause	Error removal
E PP	No compressed air	Turn compressed air on, replace filters and increase pressure (→ *refer to page 99*)
E 5	Failure by basic unit to detect magazine	Replace magazine
E 80	No barcode reading	Check magazine visually or replace magazine.
E 82	Command is not available	Notify your service contractor
E 83	Command currently not available	Notify your service contractor

Error code	Cause	Error removal
E 84	Wrong parameter was received	Notify your service contractor
E 85	Not enough parameters received	Notify your service contractor
E 86	Command not implemented	Notify your service contractor
E 87	Stacker does not respond	Notify your service contractor
E 88	STOP button was pressed, program canceled by CyBio control software	Turn power supply off and on again.
E 89	Barcode reader does not respond	Notify your service contractor
E 90	Equipment unit not available	Notify your service contractor
E 91	This rack place is empty.	There is no tip magazine in the position that has been selected Select other position
E 92	This rack place is occupied	Selected position already contains a tip magazine Select another position.
E 94	Magazine slider failed to reach position.	Check compressed air supply and position of tip magazine
E 95	Lifter motion error	Notify your service contractor.
E 96	Carousel motion error	Notify your service contractor
E 97	Door or access door open.	Close the door or the access door and press both parts firmly on
E 98	Unknown rack type	Check the rack and replace rack.
E 99	Magazine/all magazines used	Replace all tip magazines

12.5.2 Further Errors

No tip magazine in basic unit

1. Turn basic unit and tip changer on (→ *see section 12.4.1*).
2. Push tip magazine in by manual force (→ *see section 12.4.6*).

Jammed tip magazine in transfer position

1. Turn basic unit and tip changer off (→ *see section 12.4.7*).

NOTICE
Turn compressed air valve off in all cases in order to relieve tubing from residual pressure

2. Open access door (→ *see fig. 64*).
3. Use manual force to loosen the jammed magazine, then push it fully into the basic unit (right shuttle must be located behind the tip magazine, the left shuttle in front of it)
4. Close access door.
5. Turn equipment units on again.

Failure by left shuttle to move from rack to basic unit

1. Turn basic unit and tip changer off (→ *see section 12.4.7*)

NOTICE
Turn compressed air valve off in all cases in order to relieve tubing from residual pressure

2. Turn lifter leads crew (lifter moves down) until the shuttle becomes free.
3. Use manual force to push the shuttle as far as the basic unit.
4. Turn equipment units on again.

Red state lamp lights

1. Turn equipment units off and on again (→ *see section 12.4.7* and → *section 12.4.1*).
2. If this produces an error message at the control panel, try removing the error with the help of the error list (→ *section 12.5.1*).
3. On failure to remove the error, you should contact the Customer Service of CyBio AG or its authorized service contractor.

Trouble in communications between CyBio control software and basic unit

1. Terminate CyBio control software session and wait for message "Interface does not respond" Turn equipment units off and on again
2. On failure to remove the error, you should contact the Customer Service of CyBio AG or its authorized service contractor.

12.6 Maintenance & Care

12.6.1 Care

You should also follow additional advice in chapter.→ *"Maintenance & Care" on page 11*

Collector troughs must be cleaned on a regular basis.

- ❑ Check collector troughs in carousel for filling level after each rack change and clean troughs as may be necessary.
- ❑ Clean tip changer parts in regular contract with liquid at scheduled intervals (according to chapter "Maintenance & Care" in the relevant User Manuals of basic/host units).

12.6.2 Maintenance

NOTE
All changer parts which are capable of manual or motorized motion are subject to natural wear. Likewise, electronic components have no unlimited service life.

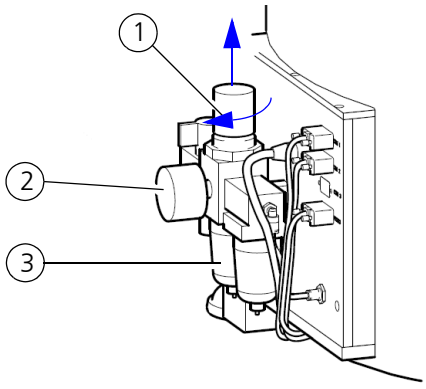


Fig. 69: View of compressed air setting components

Poor supply of compressed air

To remove a situation of poor compressed air supply, proceed as follows:

1. Pull out knob for pressure setting (→ *Fig. 69*/**1**).
2. Turn knob clockwise to increase pressure (→ *Fig. 69*/**2**) until the manometer reading is 3.5 bar (0.35 MPa; 51 Psi).
3. Press knob (→ *Fig. 69*/**1**) down until it perceivably snaps into position.

   ✓ **Air pressure is correctly set.**

If the flow rate is found to decrease strongly or if there is an excessively great drop in pressure, you should have the filter replaced (→ *Fig. 69*/**3**). Contact your service contractor or the Customer of CyBio AG (→ *refer to page III*) for this purpose.

13 Reagent Cooling System

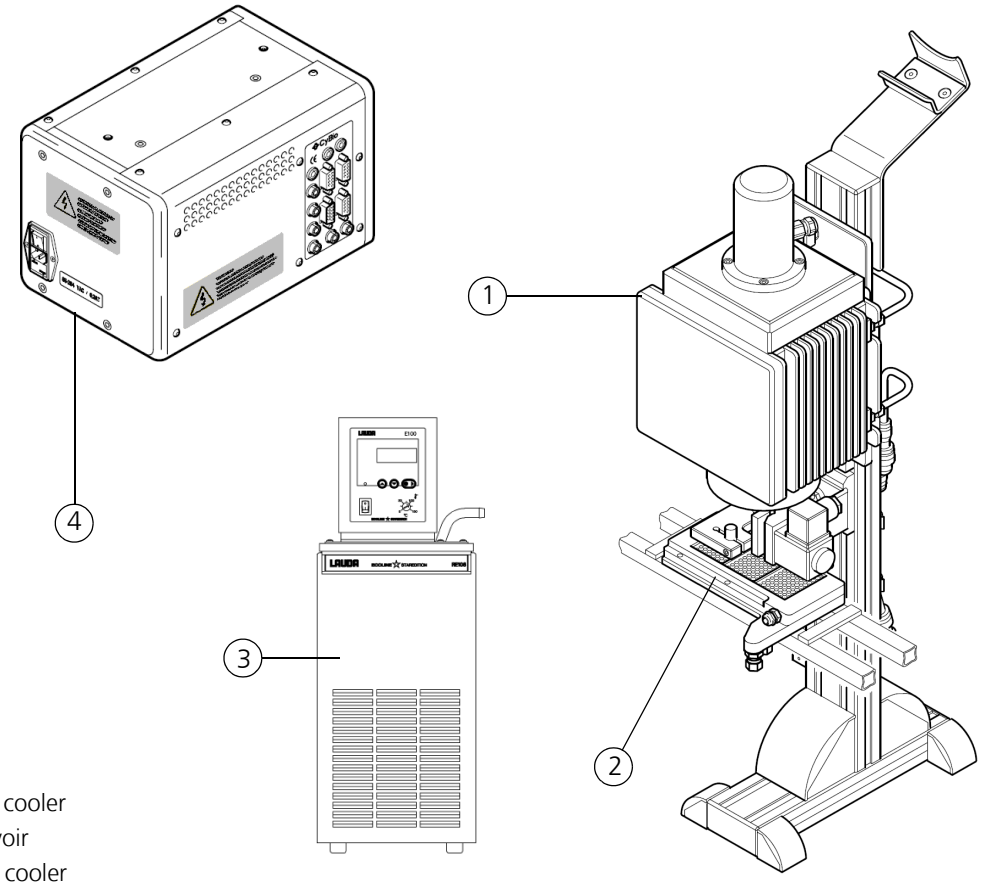
Ordering number

- ❑ KS3397-25-102
- ❑ KS3397-24-608 (cooling reservoir 96, right; → *refer to page 213*)
- ❑ KS3397-24-610 (cooling reservoir 96, left; → *refer to page 213*)
- ❑ KS3397-24-600 (cooling reservoir 384, right; → *refer to page 212*)
- ❑ KS3397-24-605 (cooling reservoir 384, left; → *refer to page 212*)

13.1 General Description

The reagent cooling system provides a fully automated solution for safe and easy handling of temperature-sensitive substances. It guarantees temperature stability of enzymes, proteins and acqeous solutions in temperature-sensitive assays. The cooling temperatures for reagents can be exactly regulated and maintained by a dual Peltier system within a range of 2°C to room temperature. The system may be equipped with a reagent reservoir and, where greater quantities of substance have to be cooled, with an additional bottle cooler.

13.1.1 Components



1 Bottle cooler
2 Reservoir
3 Lauda cooler
4 RCS module

Fig. 70: Components of reagent cooling station

13.1.2 Terminals

Located on the RCS module are the following terminals:

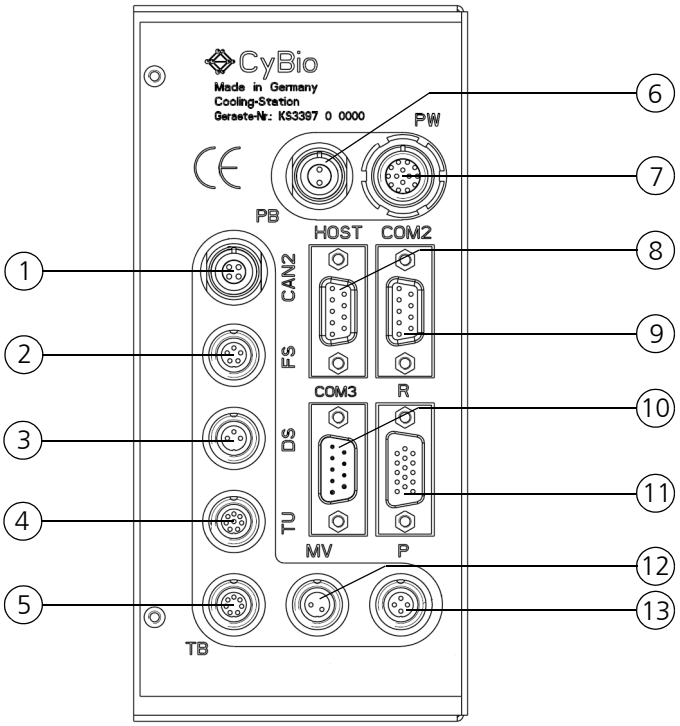


Fig. 71: Terminals the RCS module

1	CAN2	Unused
2	FS	Fill level sensor
3	DS	Flow sensor
4	TU	Temperature feeler
5	TB	Bottle cooler (right cooler)
6	PB	Bottle cooler (left coolet)
7	PW	Cooling reservoir
8	Host	Control PC
9	COM2	Host PC (Lauda cooler)
10	COM3	Unused
11	R	Stirrer
12	MV	Constriction-hose valve
13	p	Unused (pump)

13.2 Technical Data

Reservoir	
Intended for	Protein solutions, enzyme solutions, acqueous solutions
Reservoir temperature	Controlled by RCS module
Max. reservoir temperature	5°C below room temperature
Min. reservoir temperature	2°C
Temperature variation (reservoir bottom)	±1°C
Max. fill volume	45 cm³
Max. cooling water pressure	1 bar (0.1 MPa, 14.5 Psi)
Min. cooling water flow rate	0.5 l/min
Max. cooling water flow rate	1.0 l/min
Cooling water temperature	10°C to 18°C
Time to reach readiness for operation (cool reservoir bottom down from 20°C to 4°C)	Approximately 2 min

Bottle cooler with dosing device and stirrer	
Intended for	Protein solutions, enzyme solutions, acqueous solutions
Laboratory bottles	500 ml (with and without bottom) 100 ml (with adapter)
Cooling temperature	Controlled by RCS module
Maximum temperature	5°C below room temperature
Minimum temperature (liquid)	3°C
Max. fill volume	500 cm³
Max. cooling water pressure	1 bar (0.1 MPa, 14.5 Psi)
Min. cooling water flow rate	0.5 l/min
Max. cooling water flow rate	1.0 l/min
Cooling water temperature	10°C to 18°C

Bottle cooler with dosing device and stirrer	
Readiness for operation (time to cool bottle cooling body from 20°C to 4°C)	Approximately 20 min
Dosing device	Constriction-hose valve (energized via RCS module)
Collapsible tube	Silicon tube (2x4)
Fill level sensor for reservoir	In combination with RCS module
Stirrer – Stirrer turning speed – Operating mode – Direction of rotation – Number of blades	In combination with RCS module 25 – 100min^{-1} Continuous operation, periodic operation Right, left 2
Phys. dimensions & weight (bottle cooler)	
Phys. dimensions (W x H x D)	(162 x 231 x 710) mm
Weight:	Approx. 10 kg

Storage & operating conditions	
Storage & transportation: – Permissible ambient temperature – Permissible relative air humidity	 - 10 °C to + 50 °C ≤ 85% at 30°C
Operation: – Permissible ambient temperature – Permissible relative air humidity	 + 15 °C to + 25 °C ≤ 75% at 30°C, no formation of condensate

NOTE

For technical data of the Lauda cooler, you should consult relevant documentation parts.

13.3 Safety Notes

The general safety notes contained in → *chapter 2* will be binding in all cases.

NOTE
You should also follow special safety advice and instructions regarding the Lauda cooler. Refer to relevant documentation for this purpose.

13.3.1 Safety Labeling & Inscriptions

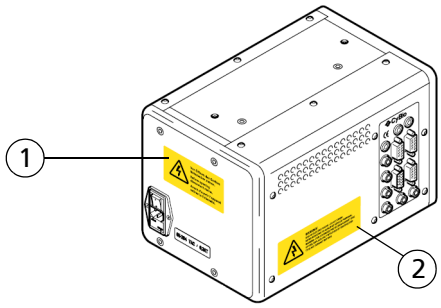


Fig. 72: Warning & information signs at the reagent cooling system

1 Remember to detach the mains plug before you open the system! (front side view of RCS module)

2 Warning! Risk of electric shock - Do not open! Refer servicing to qualified service personnel. Warning! For continued protection against risk of fire, replace only with a fuse of specified type and current ratings."

13.3.2 Special Safety Notes

- ❑ Refrain from disabling normal function of the reservoir fill level sensor (e. g. by jumpering)
- ❑ Make sure that no liquid can penetrate into an inner system space. Immediately on becoming aware that liquid has penetrated into the inner space of the reservoir, the bottle cooler or the stirrer, line power supply to the system must be broken.
- ❑ The ventilation slits of the Lauda cooler must not be misaligned – danger of overheating!
- ❑ To perform routine care work, break line power supply to the reservoir, the bottle cooler and the stirrer by shutting the power supply unit down.
- ❑ Rinse stirrer blades and reservoir under running water. Use caution to prevent penetration of water into the inner spaces as you do this.

13.4 Operation

Operation control of the reagent cooling system is accomplished via the Cooler Plugin as part of the CyBio control software package.

NOTE
You should also follow special operating advice in relevant documentation of the Lauda cooler.

The Cool Client program allows you to enter into dialog with the reagent cooling system
(→ *see section 13.4.3*). You may make settings or query the system status working in this program.

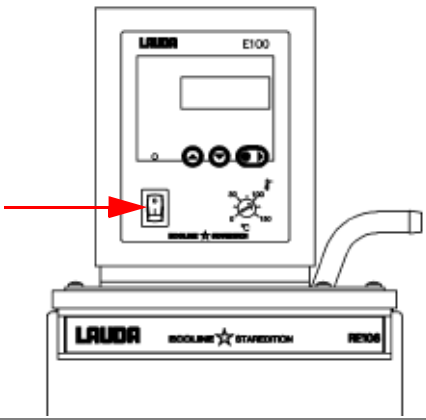
NOTE
The host PC of the host equipment must provide two serial interfaces.

13.4.1 Turning the Reagent Cooling System On

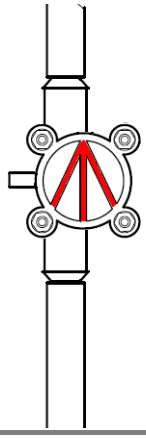
NOTICE
Beware of material damage due to emerging cooling water!

Check all cooling water connectors or cooling water tubes for firm seating and leak tightness (visual inspection) before you turn the system on.

To turn the system on, proceed as follows:

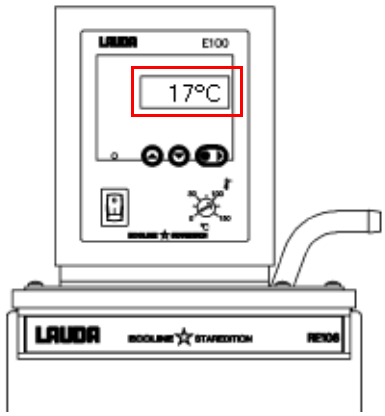
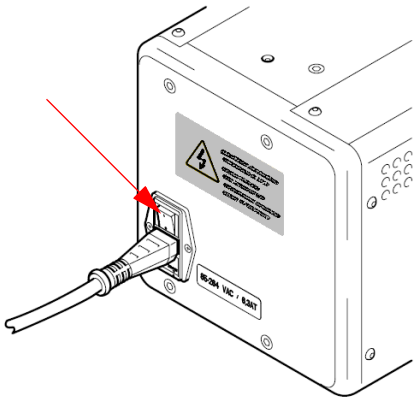


4. Use On/Off swtich to turn the Lauda cooler on. The green control LED lights.

	5. Check liquid sensor for undisturbed flow of cooling water (refer to note on → *page 107*. The vane must rotate smoothly. The arrow indicates the direction of liquid flow.

NOTE

If small air bubbles are seen to form in tubing or the liquid sensor, they can be removed by soft knocking so the may escape to the Lauda cooler. If the liquid sensor ceases to rotate, there is too much air in the cooling water circuit and the whole system must be vented.

	6. Press arrow keys as necessary to set a temperature of 17°C. Use the Lauda cooler User Manual for temperature setting if necessary.
	7. Turn on RCS module of reagent cooling system using the On/Off switch (position "I"). 8. Turn on host equipment unit (e. g. CyBi®-Well) to which the reagent cooling system is connected. Use the appropriate User Manual for this purpose. 9. Trigger a "Cool Client" software program session in order to make presettings (→ *refer to "CoolClient Program" on page 111*). 10. Trigger CyBio control software session of host equipment unit.

✓ **The reagent cooling system is powered on.**

13.4.2 Cooler Plugin

The Cooler Plugin is a plugin module of CyBio control software that provides the following functionality:

- ❑ Automated filling from bottle cooler (manual filling is only possible with the help of a **[Message]** CyBio control software command!)
- ❑ Turning the stirrer on and off
- ❑ Setting a speed and direction of stirrer rotation
- ❑ Defining a nominal temperature for reservoir and bottle cooler

Command selection

1. In the tool selection area on the graphical user screen of CyBio control software, the **[CoolerP Plugin]** command button must be actuated.

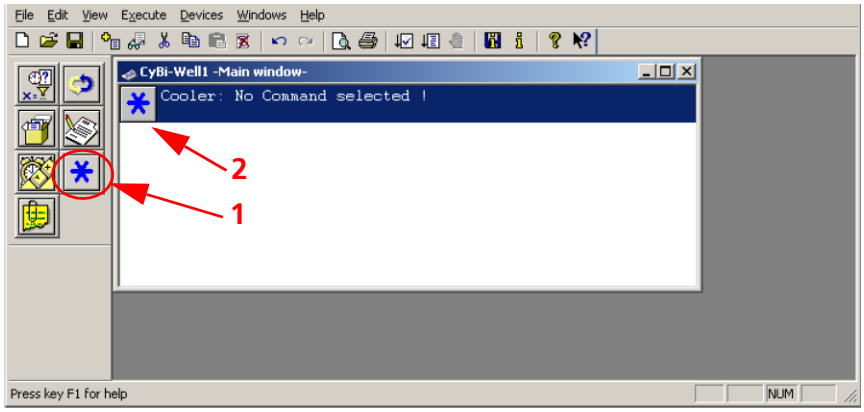


Fig. 73: Tool selection for CoolerP

2. After a double-click onto the **[CoolerP Plugin]** command area a dialog box opens.
3. From the **[Command - CoolerP]** (→ *see fig. 74*) dialog box a command for reservoir control can be selected.

Filling of reservoir

This command is available for automated filling of the reservoir.

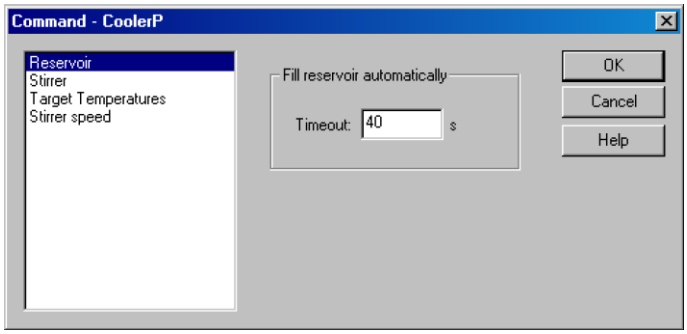


Fig. 74: Command - CoolerP/Reservoir dialog box

[Automated reservoir filling]

On selection of this command, the bottle cooler will fill the reservoir until "Full" fill level or a specified time limit (timeout) has been reached. The time limit (Timeout) can be set

to values from 20 s to 80 s. The reservoir must be in position below the bottle cooler before the filling cycle starts.

[Manually]

To perform a manual refill of the reservoir, the **[Message]** command of CyBio control software should be used.

Stirrer operation control

This command is intended for starting or stopping the stirrer.

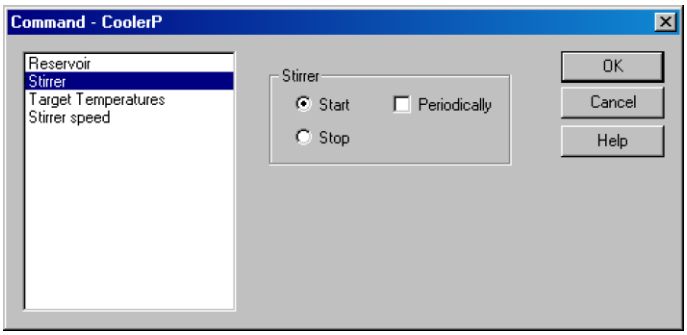


Fig. 75: Command - CoolerP/Stirrer dialog box

[Start]

This command triggers stirrer operation.

[Periodic]

This command switches the stirrer to periodic mode (stirring with breaks). One interval lasts 10 seconds (10 sec. of stirring; 10 sec. pause; 10 sec. of stirring, etc.).

[Stop]

This command will stop the stirrer.

Setting nominal temperatures

This command is provided for defining a nominal temperature for the reservoir and the bottle cooler.

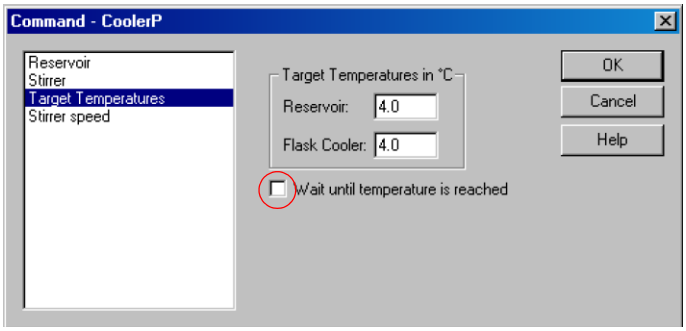


Fig. 76: Command - CoolerP/Nominal temperatures dialog box

All nominal temperatures are specified in units of °C.

[Reservoir]

This command allows you to set a nominal temperature for the reservoir. The range of valid values is from 5°C below room temperature (for technical reasons) to 2°C.

[Bottle cooler]

This command allows you to set a nominal temperature for the bottle cooler. The range of valid values is from 5°C below room temperature (for technical reasons) to 3°C.

[Wait until temperature is reached]

If this checker mark was set (→ *see fig. 76*), a running CyBio control software session will not continue, unless the nominal temperature for reservoir and bottle cooler has been reached. The readings for actual and nominal temperature are displayed in the Cool Client status window (→ *refer to "Temperatures" on page 116*).

Setting stirrer speed

This command is intended for setting a stirrer motion speed in the open cooling bottle.

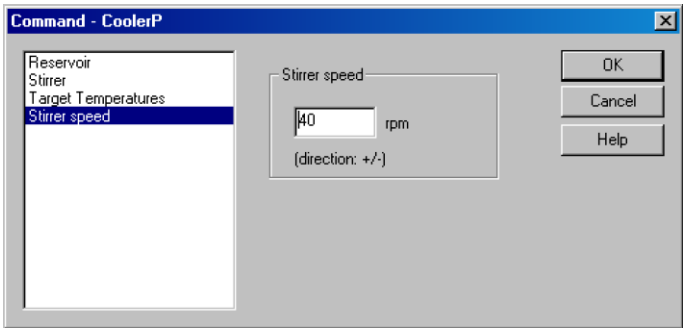


Fig. 77: Command - CoolerP/Stirrer speed dialog box

The speed is specified in rotations per minute (rpm).

[Stirrer speed]

This command defines the speed of stirrer rotation. The available value range is from 25 rpm to 100 rpm. To let the stirrer rotate anticlockwise, the particular value must be entered with a preceding minus character (–).

13.4.3 CoolClient Program

General

This program allows you to enter into dialog with the reagent cooling system independently of CyBio control software. Various parameter setting options are available in its configuration window. The system status may be queried working in the status window.

System components

- ❑ Reservoir
- ❑ Bottle cooler (optional)
- ❑ Stirrer (optional)

Parameter setting options available in CoolClient configuration window:

- ❑ Nominal temperature for reservoir and bottle cooler
- ❑ Pre-cooling of reservoir
- ❑ Automated filling or early termination of reservoir filling (Timeout)
- ❑ Speed and direction of stirrer rotation
- ❑ Periodic mode (stirring with breaks)
- ❑ Turning the stirrer on and off

Query options in CoolClient status window:

- ❑ System status
- ❑ Actual and nominal temperature of reservoir and bottle cooler
- ❑ Room temperature
- ❑ Version number

Quickstart

To quick-start, proceed as follows:

1. Trigger CoolClient program session
2. Select host interface
3. Open interface
4. Make settings

Configuration window

The configuration window allows you to establish communication with the system. You may then make settings for nominal temperature, stirrer rotation speed and stirrer operating mode.

NOTE

If you want operation control to be exercised by CyBio control software, only the monitor interface may be selected. Otherwise, CyBio control software will output a corresponding error message.

Establishing connection with the system

Action to establish connection includes selection of a serial interface (host or monitor) and the pressing of button **[Open port]** (→ *Fig. 78*) in order to activate the connection.

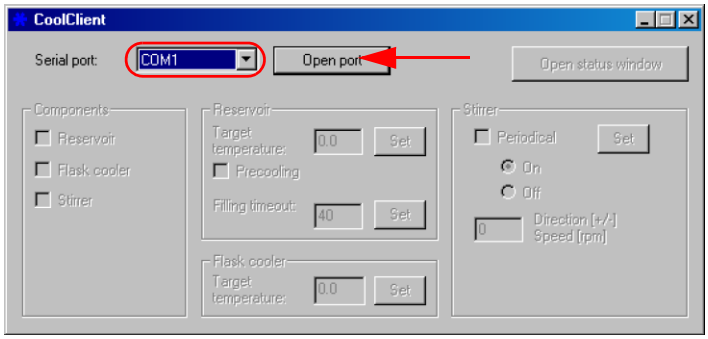


Fig. 78: Selection of interface

If communication was successfully established, the dialog box of → *Fig. 79* will take on a corresponding appearance (applies in the case of host interface selection; on selection of monitor interface all functions will be disabled except for **[Open status window]**).

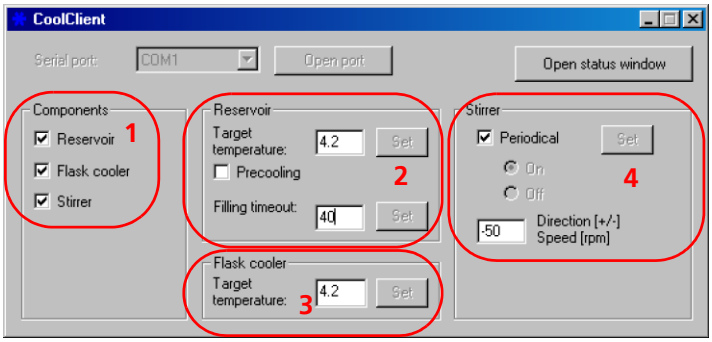


Fig. 79: Connection established

Components

Working in the dialog box (*1*; → *Fig. 79*) you may select installed system components (reservoir, bottle cooler and stirrer). A component must have been selected to be able to make relevant parameter settings.

Reservoir

Define a nominal temperature for the reservoir and a time limit (Timeout) for reservoir filling (*2*; → *Fig. 79*). Set a check mark at option **[Pre-cooling]** if you want the reservoir cooled.

NOTE

To prevent formation of condense water in an empty reservoir, option **[Pre-cooling]** should be turned off. This option has no influence on reservoir cooling in CyBio control software mode.

The nominal temperature and timeout value which are used as valid settings at the moment of a program session start will correspond to the most recently set values. The valid range of nominal temperatures is from 5°C below room temperature (for technical reasons) to 2°C.

To change a value, enter your new setting in the appropriate field and press button **[Set]** for acknowledgement.

Bottle cooler

You may set a nominal temperature for the bottle cooler at this field (*3*;→ *Fig. 79*). The range of valid nominal temperature values is from 5°C below room temperature (for technical reasons) to 3°C.

To change a value, enter your new setting in the appropriate field and press button **[Set]** for acknowledgement.

Stirrer

The stirrer can be switched to **[Alternating]** mode (periodic mode: stirring with breaks). If you do not select this option, you may turn the stirrer on and off by using button **[On]** and **[Off]**, respectively (4; → *Fig. 79*).

It is also possible to vary the speed of stirrer rotation (rotation speed from 25 to 100 rpm). The preceding mathematical sign (+ / –) determines the direction of rotation.

If a speed value is signed (+), the stirrer will rotate clockwise; if it is signed (–) it will rotate anticlockwise.

To change a value, enter your new setting in the appropriate field and press button **[Set]** for acknowledgement.

Status window

Press button **[Open status window]** in configuration window (→ *Fig. 80*) to open the status window screen.

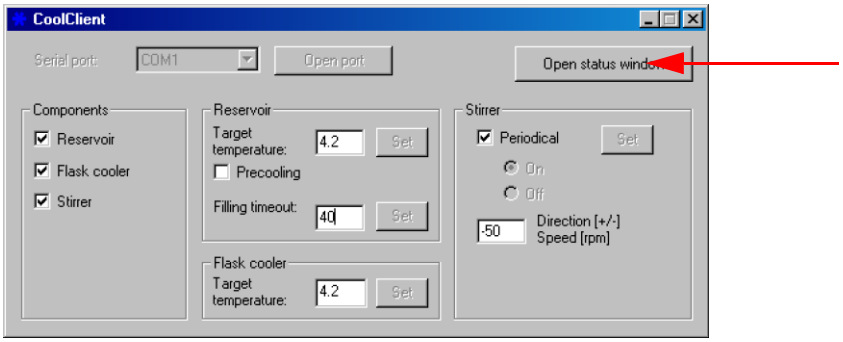


Fig. 80: Opening the status window

The status window (→ *Fig. 80*) shows the current system state. Besides the individual component status, the related current temperature and version number will be displayed.

By pressing button **[Back to configuration]** (→ *Fig. 80*) you will exit the CoolClient status window and restore the configuration screen.

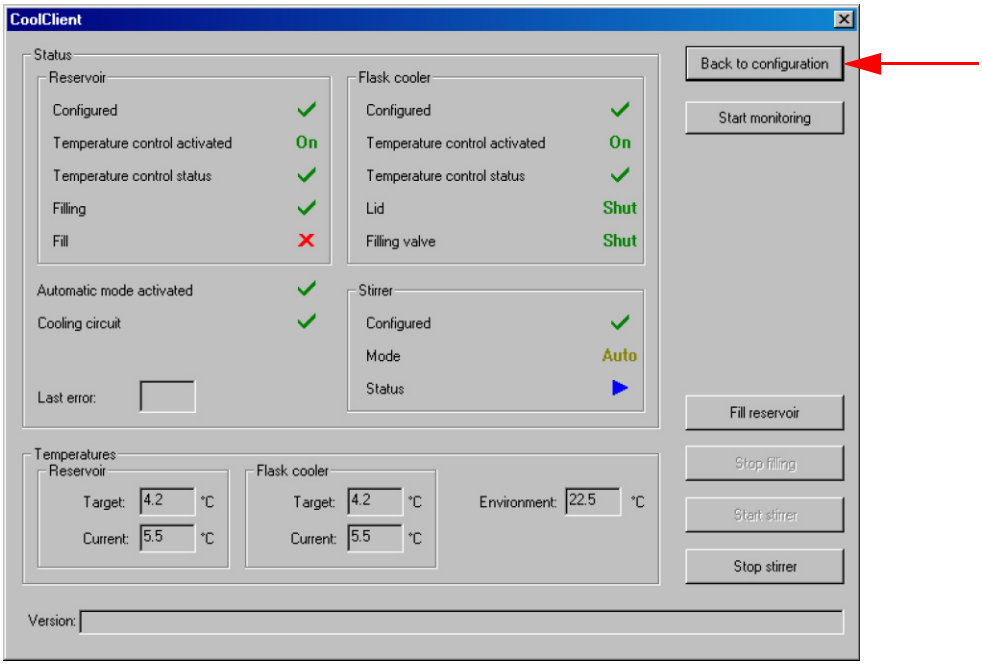


Fig. 81: CoolClient status window

Start monitoring

The **[Start monitoring]** button allows you to trigger cyclic queries of status information (status query), i. e. status queries repeating automatically about 2 times per second (→ *Fig. 82*).

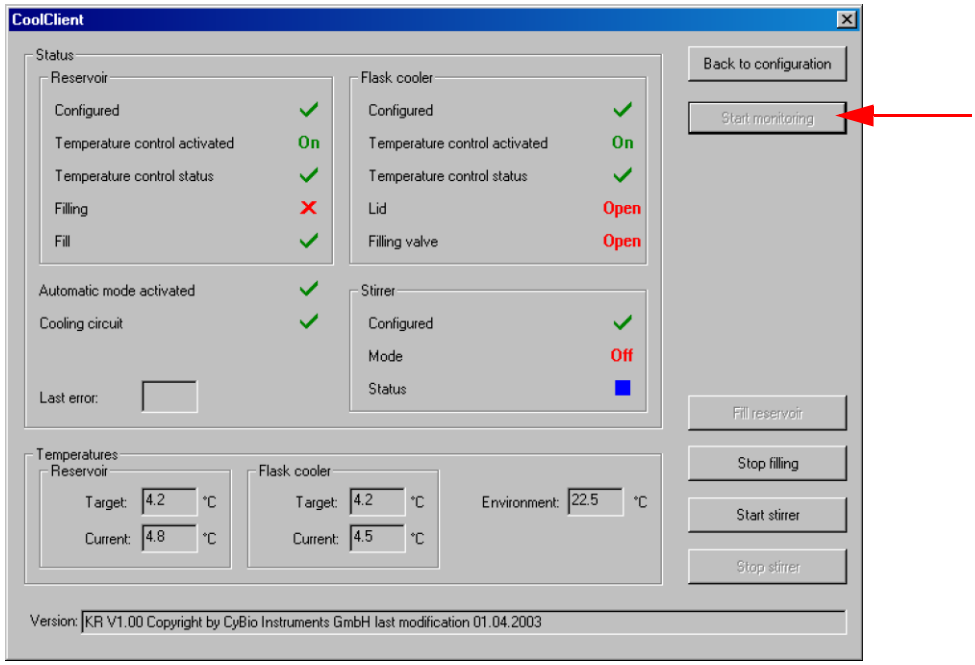


Fig. 82: CoolClient status window with monitoring enabled

Status indicators

Reservoir

Status display		Explanation
Configured	✓	Reservoir configured
	✗	Reservoir not configured
Nominal temperature control active	On	Nominal temperature control is active
	Off	Nominal temperature control is inactive
Nominal temperature control state	✓	Nominal temperature control O. K.
	✗	Nominal temperature control error
Filling	✓	Reservoir filling from bottle cooler O. K.
	✗	Timeout on filling of reservoir
Fill level	✓	Reservoir full
	✗	Reservoir not full

Bottle cooler

Status indicator		Explanation
Configured	✓	Bottle cooler configured
	✗	Bottle cooler not configured
Nominal temperature control active	On	Nominal temperature control is active
	Off	Nominal temperature control inactive
Nominal temperature control state	✓	Nominal temperature control O. K.
	✗	Nominal temperature control error
Lid	Shut	Lid on bottle cooler closed
	Open	Lid on bottle cooler open
Filling valve	Shut	Filling valve closed
	Open	Filling valve open

General

Status indicator		Explanation
Automatic mode active	✓	
	✗	
Cooling circuit	✓	
	✗	
Most recent error	An error message is displayed in the event of a fault	

Stirrer

Status indicator		Explanation
Configured	✓	Stirrer is configured
	✗	Stirrer is not configured
Mode	On	Stirrer is on
	Auto	Alternating mode
	Off	Stirrer is off
Status	▶	Stirrer running
	■	Stirrer not running
	⏸	Stirrer stopping
	✗	Error in stirrer control
	?	No stirrer function

Temperatures

The temperature indicator displays the actual and nominal values for reservoir and bottle cooler in degrees Celsius (→ *siehe Abb. 82 auf Seite 114*). Likewise, the current room temperature is displayed in degrees Celsius.

Version

The lower part of the status window displays the firmware version number.

[Reservoir filling]

This button will trigger a reservoir fill process if pressed. A fill process will automatically end as soon as the reservoir is full. This button is only available for action if a bottle cooler has been configured. Otherwise, it will be gray-shaded.

[Stop filling]

This button will stop a reservoir fill process. This button is only available for action if a bottle cooler has been configured. Otherwise, it will be gray-shaded.

[Start stirrer]

This button starts stirrer action if pressed. The stirrer will run at a speed and in a direction as set in the configuration window (→ *see fig. 79*; *4*). This button is only available for action if a stirrer has been configured. Otherwise, it will be gray-shaded.

[Stop stirrer]

This button stops stirrer action if pressed. This button is only available for action if a stirrer has been configured. Otherwise, it will be gray-shaded.

13.4.4 Turning Reagent Cooling System Off

To turn the reagent cooling system off, proceed as follows:

- ❑ Wait until all processes currently running on the host system have finished.
- ❑ Terminate CyBio control software session and turn host equipment unit off.
- ❑ Transfer On/Off switch of RCS module into position "0".
- ❑ Transfer On/Off switch of Lauda cooler into position "0".
  - ✓ **The reagent cooling system is in power-off state.**

13.5 Fault Removal

Error message	Cause	Error removal
Alarm in cooling circuit Cooling turned off!	Cutoff valves are not open.	Open cutoff valves at circulation cooler.
	Defect in cooling circuit	Notify Service Department of CyBio AG or its authorized service contractor.
Lid of bottle cooler open.		Close lid of bottle cooler.
Dongle key access refusal	Dongle key is missing or not enabled for this plugin.	Notify Service Department of CyBio AG or its authorized service contractor.
Value entry for nominal temperature of bottle cooler invalid.	The selected nominal temperature is out of the valid value range.	Enter valid value i.e. within the range of acceptable values (→ *refer to "Setting nominal temperatures" on page 109*).
Value entry for nominal temperature of reservoir invalid	The selected nominal temperature is out of the valid value range.	Enter valid value i.e. within the range of acceptable values (→ *refer to "Setting nominal temperatures" on page 109*).
Error on communicating with the system	The cooling reservoir is in power-off condition or there is trouble in serial communication.	Check if/that reservoir is turned on. Inspect serial communication cable for firm seating.
Failure to open re-fill valve. Reservoir is already full.	A reservoir you want filled is already full.	Notify Service Department of CyBio AG or its authorized service contractor.
No connection with system	The cooling reservoir is in power-off condition or there is trouble in serial communication.	Check if/that reservoir is turned on. Inspect serial connection cable for firm seating.
Re-fill valve already closed	The re-fill valve you want closed is already closed.	Notify Service Department of CyBio AG or its authorized service contractor.
Re-fill valve already open	The re-fill valve you want open is already open.	Notify Service Department of CyBio AG or its authorized service contractor.
Stirrer unconfigured	Reports attempted transmission of a command to the stirrer that has not been configured.	Notify Service Department of CyBio AG or its authorized service contractor.

Error message	Cause	Error removal
Timeout on filling of reservoir	System has failed to fill the reservoir within a specified time interval because of: – no carriage place below bottle cooler – cooling bottle empty – viscosity of liquid too great	Check if/that a carriage place is positioned under the bottle cooler, the cooling bottle is full and check liquid for viscosity.
	Fill level sensor defect	Notify Service Department of CyBio AG or its authorized service contractor.
Timeout on temperature adjustment of bottle cooler	System has failed to adjust the temperature level within the specified time interval of 10 min.	Notify Service Department of CyBio AG or its authorized service contractor.
Timeout on temperature adjustment of reservoir	System has failed to adjust the temperature level within the specified time interval of 10 min.	Notify Service Department of CyBio AG or its authorized service contractor.
Unknown error	An error occurred during program runtime, which is not specified in greater detail.	Update firmware. Notify Service Department of CyBio AG or its authorized service contractor.
Unknown command	Host PC has transmitted an unknown command to the reservoir. This command is not included in the valid command set.	Update firmware. Notify Service Department of CyBio AG or its authorized service contractor.

13.6 Maintenance & Care

NOTE
You are strongly advised to follow all safety and general notes regarding system maintenance and care contained in → *chapter 4*.

13.6.1 Maintenance

Work for maintenance of the reagent cooling system is restricted to the following actions. These are required *before each start-up procedure*:

- ❑ Check cooling water circuit for leakage
- ❑ Inspect Lauda cooler for cooling water level and refill cooling water if necessary
- ❑ Check tubes of liquid sensor for air bubbles; use slight knocking to detach these and allow them to escape via the Lauda cooler.

CAUTION
Danger of electric shock!

Immediately on identifying a cooling water leakage, electric power supply and cooling water supply must be broken..

13.6.2 Care

Observe the following rules for system care:

- ❑ Clean the system on a regular basis. Contamination of assemblies may lead to increased stress loads during operation, and, hence, a higher probability of system failure.
- ❑ Rinse the stirrer blades under running water. Use caution to prevent penetration of liquid into the inner stirrer space as you do this. Do not fully submerge the stirrer into water.

Reservoir

Because any contact with metal ions must be prevented where - in some cases - highly sensitive liquids are processed, the visible surface part of the reservoir bottom has a high-grade thermo-plastic fluorine coating. This plastic skin provides good non-stick properties, it is smooth, free from pores and resistant to a multitude of chemicals. For this reason, please note the following:

- ❑ Although the surface is abrasion-proof, no metal or sharp-edged aids should be used for cleaning.
- ❑ Use only a soft brush for cleaning and water for subsequent rinsing. Use particular caution to prevent water jet exposure of the electric clutch and the cable screw connector at the reservoir.
- ❑ Remove any splashes of water from the fill level sensor using a cotton swab, in order to prevent impaired functionality of the sensor.

13.7 Cabling Diagram

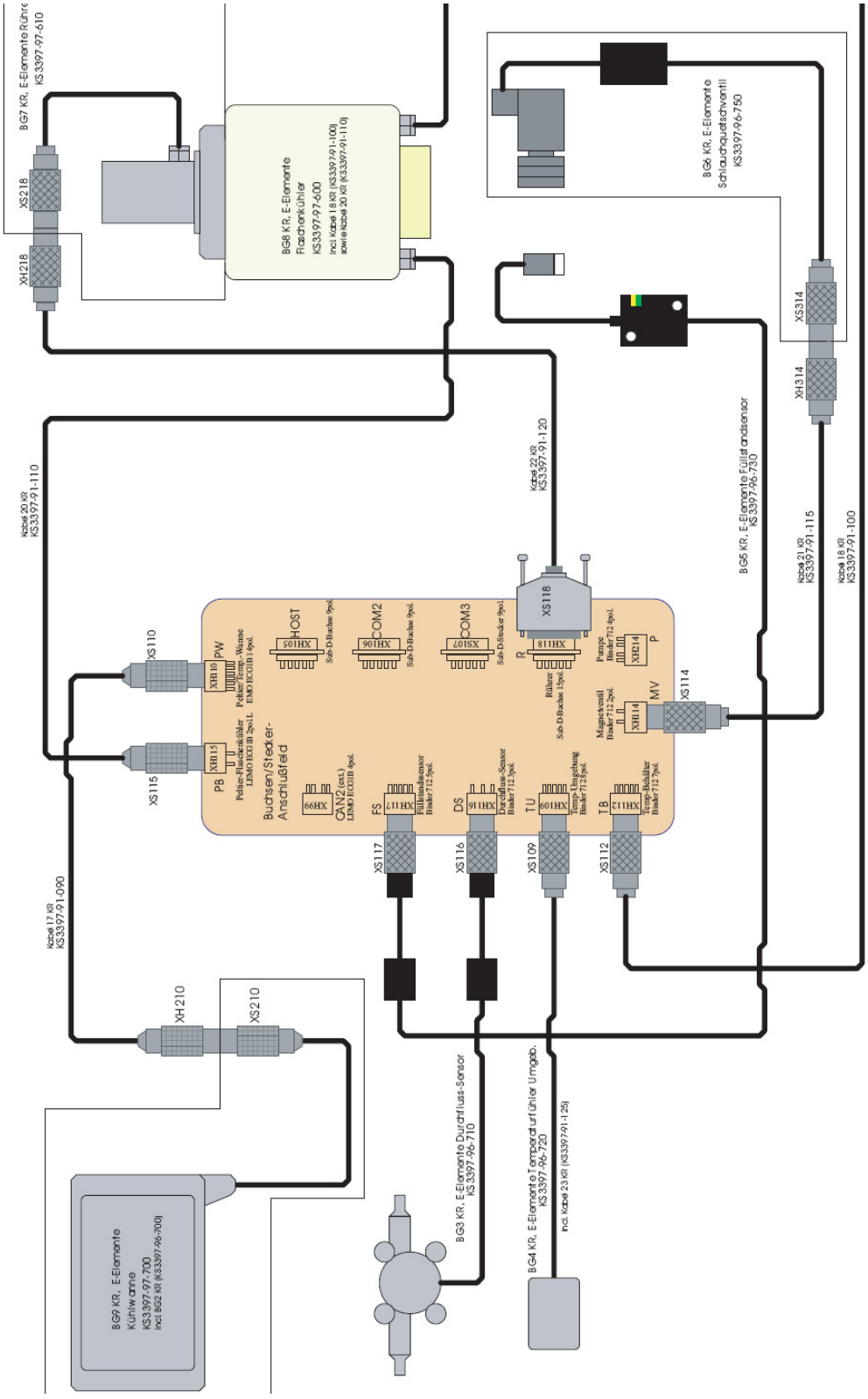


Fig. 83: Cabling diagram for reagent cooling system

13.8 Cooling Tubes Connection Diagram

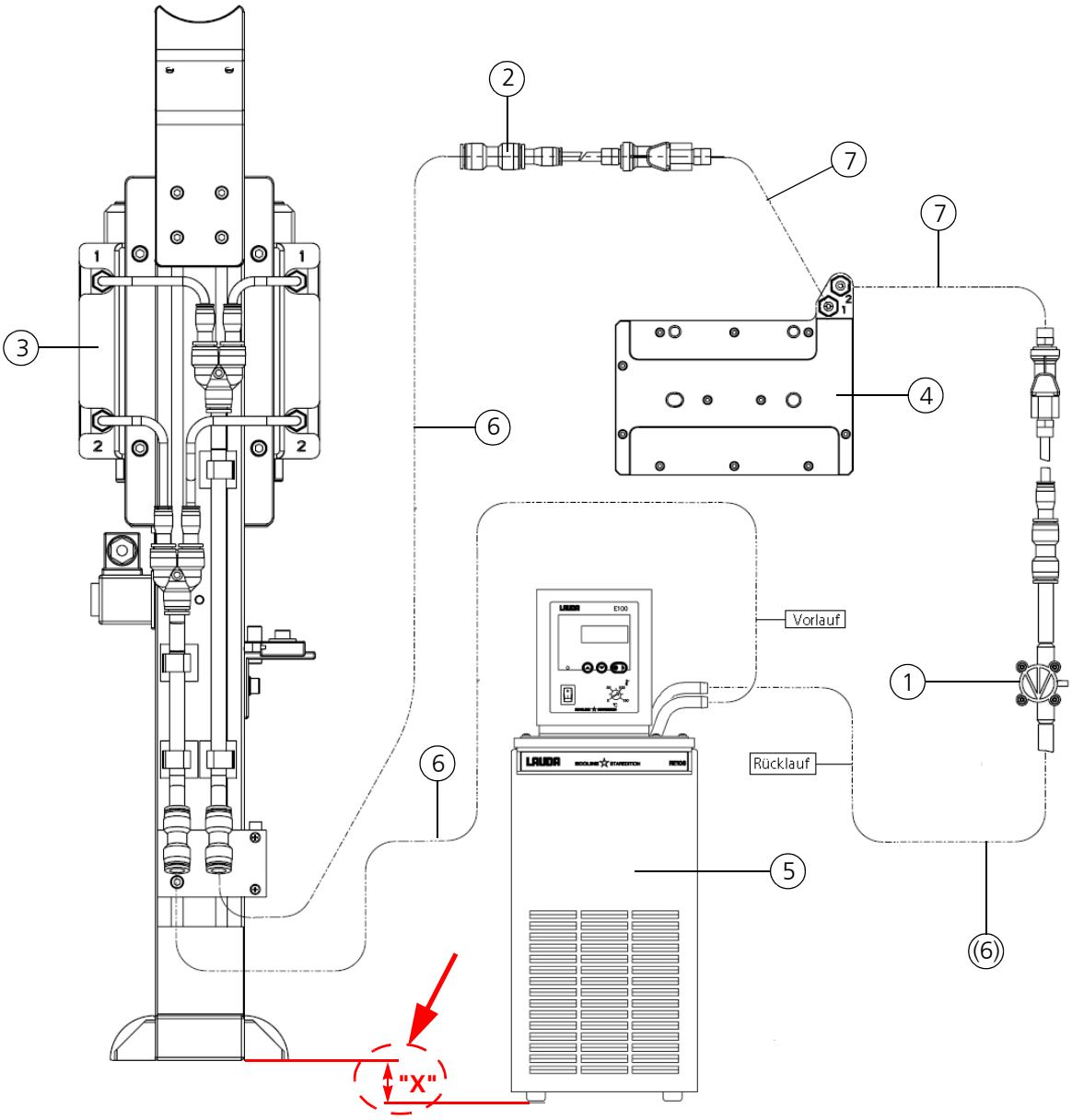


Fig. 84: Cooling tubes connection diagram for reagent cooling system

1 Liquid sensor
2 Reservoir connection
3 Bottle cooler
4 Reservoir
5 Lauda cooler
6 Tube 8
7 Tube 10

NOTE

For initial filling of the system with cooling water, the measure for "X" (→ *Fig. 84*) must be as close as possible to 0 mm, otherwise 800 –1000 mm in the maximum case.

14 Microplate Heating Station

Ordering number:

- ❑ OL3396-266-24 (controller)
- ❑ OL3396-262-24 (heating adapter; PCR)
- ❑ OL3396-259-24 (heating adapter for reservoirs or microplates with flat bottom)
- ❑ OL3396-272-24 (heating adapter for 96-well microplates with round bottom)

NOTE
For further heating adapter details, please refer to → *chapter A 1.11*

14.1 Technical Description

The microplate heating station is intended for heating microplates or reservoirs. Loading onto the heating adapter is performed from the top (manually or with the help of a gripper). A temperature controller maintains the heating adapter temperature at nominal level.

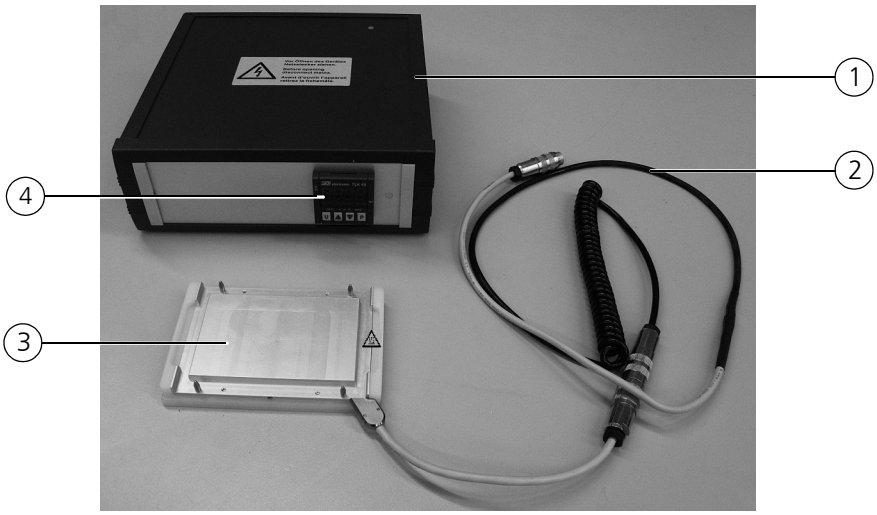


Fig. 85: Microplate heating station

1 Controller
2 Cable
3 Heating adapter
4 TLK-48 digital controller

The microplate heating station consists of a controller and a heating adapter. The heating adapter communicates with the controller via cable.

NOTE
For further information and a technical description of the TLK-48 digital controller you should consult the relevant User Manual.

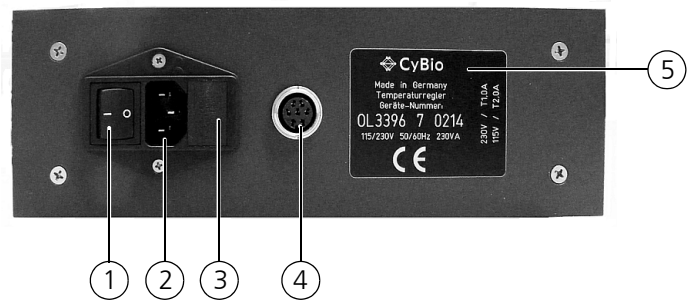


Fig. 86: Controller, rearside view

1 Main power switch
2 Power inlet
3 Combi-seal with fuse and facility for voltage setting
4 Port for connection of heating adapter cable
5 Nameplate

The controller operates with line voltage (→ *see section 14.2*).

The microplate heater can be turned on and off at its main switch. In normal operating mode, the microplate heater is turned on and off together with the host equipment so its main switch is not used.

Working principle

A nominal temperature can be set at the controller. This setting defines the temperature level that will be maintained on the surface of the round bottom heating adapter.

Located inside the heating adapter are a heating element and a temperature feeler.

The controller monitors the values that are measured and output by the temperature feeler to make tracking corrections necessary to restore nominal temperature.

14.2 Technical Data

General characteristics	
Designation/Type	Control Heating adapter Cable
Dimensional & weight details	
Controller (WxHxD) Heating adapter (WxHxD)	(248 x 85 x 250) mm (153 x 19 x 118) mm
Total weight	5 kg
Microplate specifications	
Formats	SBS standard

Operating data	
Operating voltage	230 V ±10%, 50/60 Hz 115 V ±10%, 50/60 Hz (optional)
Power consumption	< 140 VA
Fuses	230 V: T1.0 A 115 V: T2.0 A

14.3 Safety Notes

The general safety notes contained in → *chapter 2* will be binding in all cases without any restriction.

14.3.1 Safety Labeling & Inscriptions

NOTE

Affixed warning signs and safety symbols are integral parts of the station and must be followed!

Check warning labels and safety symbols for intactness and completeness before you begin any kind of start-up action. Do not proceed to start-up 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! A damaged warning note or safety symbol must be promptly replaced!

The following safety symbols are affixed on the controller of the microplate heating station:

Safety symbol	Meaning	Comment
	Warns of dangerous electrical voltage	There is life-threatening danger or danger of serious physical injury if warnings of this kind are disregarded!

Warning note	Meaning	Comment
	Warns of dangerous electrical voltage	You are strictly prohibited from opening the controller! Have necessary repairs carried out by qualified expert personnel only!
werkseitig230 V eingestellt Factory set: 230 V or werkseitig115 V eingestellt Factory set to: 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!

Fig. 87: Warning label on controller

14.3.2 Danger Zones

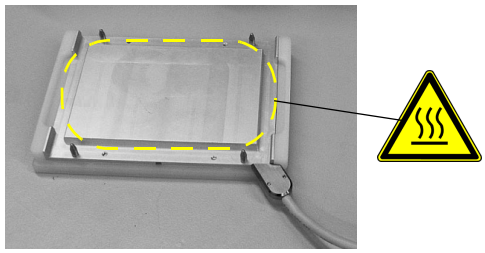


Fig. 88: Danger zones at the heating adapter

1 Hot surface

The surface of the heating adapter may become very hot. With temperatures over 40°C; it is the user's responsibility to take safety precautions against accidental physical contact.

14.4 Operation

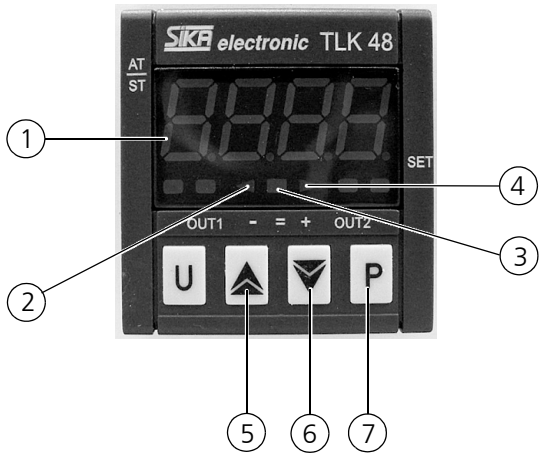


Fig. 89: Controller, operator keypad

1 Display (actual temperature)
2 Signal LED for: actual temperature below nominal temperature
3 Signal LED for: actual temperature equals nominal temperature
4 Signal LED for: actual temperature above nominal temperature
5 UP key
6 DOWN key
7 P key

The microplate heating station comes with pre-configured settings.

For operation of the microplate heating station with preset parameter values, no further action is required. A microplate mounted on the heating adapter will undergo corrective thermostatic control until the preset temperature level has been reached; thermal variations are automatically adjusted.

For operation of the microplate heating station with other than preset parameter values, required value entries must be made at the operator keypad.

Please follow the special controller manual. A current version is available for downloading at *www.sika.net*.

NOTE
No warranty will be assumed by CyBio AG for proper functioning if the microplate heating station is found to have been operated with parameters deviating from those of the station's presettings.

Presetting

The nominal temperature setting is stored in memory SP1 (also refer to → *"Changes in nominal temperature value"*).

Changes in nominal temperature value

CAUTION
Hot surface! With temperatures over 40°C; it is the user's responsibility to take safety precautions against accidental physical contact.

NOTICE
At 110°C the fuse of the heating adapter will be destroyed. Refrain from setting a temperature above 100°C!

1. Shortly press key P:
   The display shows "SP1" and the currently valid setting.
2. Set new nominal value:
   UP key: increases value, DOWN key: decreases value. Each time one of the two keys is pressed the setting will rise or fall by 0.1 °C. However, if a key is kept depressed for at least one second, the setting will increase or decrease more quickly, and if the key remains depressed for two seconds, the speed of change is even higher, which allows you to reach a desired value in little time.
3. Press P key:
   Express setting mode is exited. Express setting mode will automatically be exited if no key is pressed for approximately 15 seconds.
   ✓ **The display defaults to normal operating mode.**
   The new nominal value has been set.

14.5 Maintenance & Care

14.5.1 Maintenance

Replacement of fuse

NOTICE
- ❑ Use only fuses of a type that is specified for a specified operating voltage! (→ *Refer to "Technical Data" on page 125.*)
- ❑ Make sure that you install the combi-seal in correct position (use combi-seal labeling for orientation)!

1. Turn controller off
2. Pull mains plug
3. Extract combi-seal (→ *Fig. 86*) from socket
4. Replacement of fuse (refer to note → *page 127*)
5. Install combi-seal (refer to note → *page 127*)

14.5.2 Care

Maintenance & care item	Periodicity	Comment
Cleaning	As necessary	

Follow advice and instructions in chapter → *"Maintenance & Care" on page 11*.

15 Lid Station

NOTE
Please do not hesitate to contact our "Automation" department at info@cybio-ag.com on questions regarding this chapter.

15.1 Technical Description

15.1.1 Setup (Static)

A lid station for microplates consists of a rack for temporary storage of microplate lids and a control unit. The storage rack provides four lid placement positions and one reference & placement position with integrated plate sensor. At each of the lid storage devices a microplate can be unlidded. The lids are held by suction cups. Located on the rearside of each lid storage device is a pushbutton that may be pressed if necessary to vent the suction cups for service work.

The current status of a lid storage device is monitored by a vacuum sensor.

The control unit contains an electronic controller to power the various actuators and sensors at the lid storage devices, the pneumatic valves for vacuum (suction cups) and compressed air supply for blowing off (stroke cylinder). Compressed air and vacuum are required as input media. Sensors monitor the availability of these media. Availability/ non-availability are indicated via LEDs.

The control unit runs under the control of the host PC communicating via a RS-232 interface. Vacuum supply to the lid storage devices can thus be turned on and off.

Option (Dynamic)

Optionally, each lid storage device may include a motion capability, i.e. perform motion energized by a pneumatical stroke cylinder. A lid which is not to be reused for another time can thus be disposed. Limit position sensors will detect the position of the piston in the stroke cylinder.

The control unit runs under the control of the host PC communicating via a RS-232 interface. Vacuum supply to the individual lid storage devices can thus be turned on and off, the pneumatic cylinders can be extended or retracted and the sensor states queried.

15.1.2 Function (Static)

De-lidding

For de-lidding, a microplate is moved up against a lid storage device by a robot that approaches from below. The lid is kept by vacuum applied to the suction cups, while a robot moves the microplate down and onto the next station.

Lidding

For lidding, a microplate is moved up against the lid in a lid storage device by a robot approaching from below. The vacuum supply tube opens for venting and blowing off with compressed air. The lid rests on the microplate. To warrant precise positional placement of the microplate in relation to the lid, it may be necessary to place the microplate down - before de-lidding and before lidding - in the reference & placement position and pick it up again from that position.

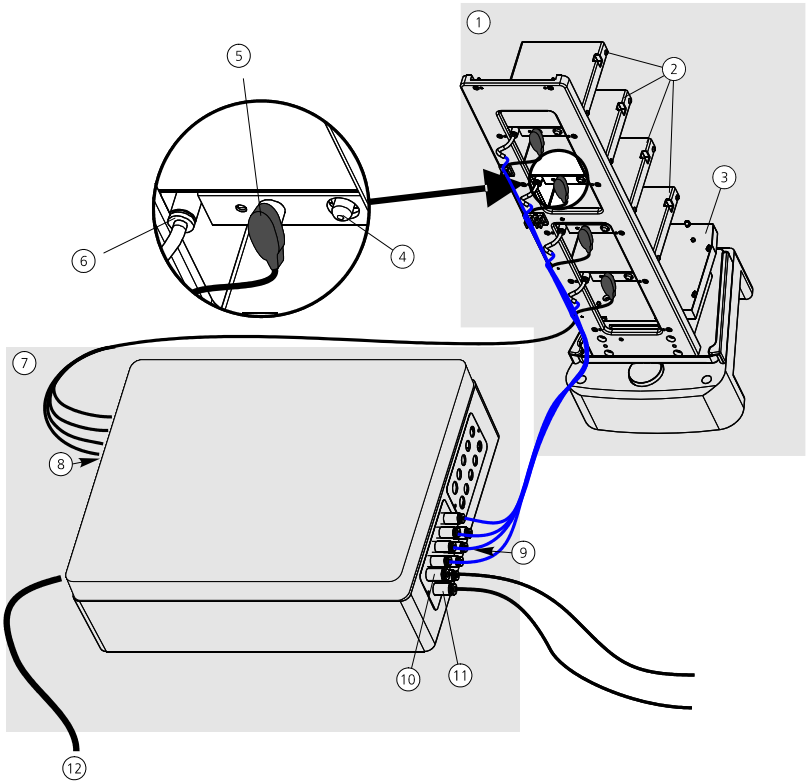


Fig. 90: Lid station (static)

1 Storage rack
2 Lid storage devices
3 Reference & placement position
4 Pushbutton for venting
5 Electric power port of lid storage device
6 Pneumatic power port of lid storage device
7 Control unit
8 Control cables 1...4 ()
9 Pneumatic terminals K1...K4 (→ *Fig. 91*)
10 Compressed air inlet
11 Vacuum inlet
12 Voltage supply of control unit

Option (Dynamic)

Discarding a lid:

A lid storage device moves into front-end limiting powered by a pneumatic cylinder. As the vacuum tube is released and vented the lid falls off into a box located directly below.

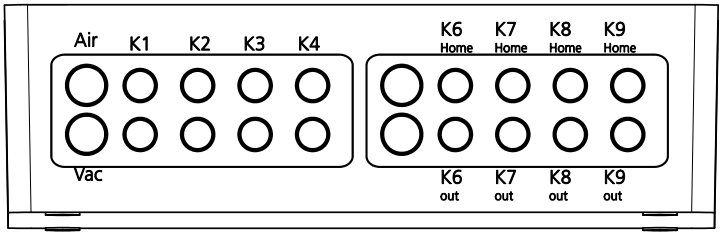


Fig. 91: Control unit: Pneumatic terminals

Air	Compressed air inlet
Vac	Vacuum inlet
K1...K4	Pneumatic lines for section cups of lid storage devices 1...4
K6...K9	Pneumatic lines to stroke cylinders of lid storage devices 1...4
	Home: Cylinder retracted (lid holder in standard position)
	Out: Cylinder extended (lid holder in the position for discarding)

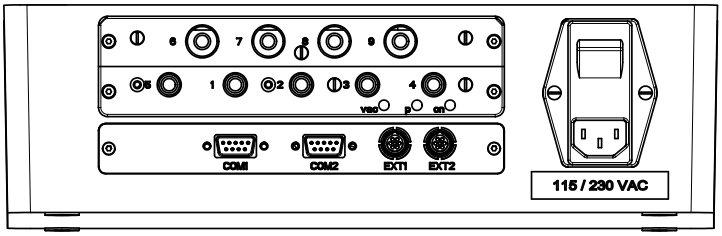


Fig. 92: Control unit: Electric connection points, indicators, switches

1...4	Control cables for lid storage positions 1...4
5	Sensor for detection of microplate in reference & placement position
6	Limit sensors for stroke cylinder in lid holder 1 position (optional)
7	Limit sensors for stroke cylinder in lid holder 2 position (optional)
8	Limit sensors for stroke cylinder in lid holder 3 position (optional)
9	Limit sensors for stroke cylinder in lid holder 4 position (optional)
COM 1	Control cables to system PC
COM 2	Control cables (cascading) to further components (optional)
EXT 1	Electrically isolated switching output
EXT 2	Switching output for vacuum pump
115 / 230 VAC	Wide-range mains input 110...240 VAC
Switch	On/Off switch (always ON; turn off for service work only)
vac	LED lights: Input vacuum OK
p	LED lights: Input pressure OK
on	LED lights: Supply voltage OK

15.2 Technical Data

Operating data	
Operating voltage	110...240 V AC, turn-on current: 40 A
Compressed air	5 bar (0.5 MPa; 72.5 psi)
Vacuum	- 0.8 bar (- 0.08 MPa; - 11.6 psi)
Vacuum supply	1. Facility vacuum supply or 2. Separate vacuum pump
Number of vacuum stations	4
Number of cylinders (motion axes)	0...4
Sensors	Monitoring of vacuum line (input) Monitoring of compressed air line (input) Monitoring of vacuum at lid storage devices Monitoring of microplate in reference & placement position
Functions	De-lidding, holding and lidding

15.3 Safety Notes

The general safety notes contained in → *chapter 2* will be binding in all cases.

15.4 Operation

The lid station is an integral part of a system along with other equipment components. It is exclusively intended for operation under the control of CyBio control software. A description of relevant scripts, required interfaces and starting conditions is not part of this document scope. User instructions and on-site support are provided by Customer Service personnel of CyBio AG.

15.5 Fault Removal

Manual removal of lid

If a microplate is at one of the lid storage devices at the moment of a fault situation, it must be removed before a new system program session can be triggered. Important! Hold the lid with one hand in position as you do this! Press pushbutton on the rearside of the lid storage device to vent the corresponding vacuum line. The lid can be removed now.

1. Make sure that the lid station and all media supplies are turned on.
2. Make sure that no other program is currently being performed by CyBio control software.
3. Hold one hand below the lid.
4. Press pushbutton on the rearside of the lid storage device (→ *item 4*; *Fig. 90*)
5. Remove the microplate.

15.6 Maintenance & Care

CAUTION

There is danger of physical injury by compressed air!

Break compressed air supply to the lid station before you begin work for care or maintenance of any kind.

Maintenance & care action	Periodicity	Comment
Wipe suction cups clean with moistened cloth	Weekly	

Follow also instructions and advice in chapter → *"Maintenance & Care" on page 11*.

15.7 Spare Parts

Name	Manufacturer	Ordering number
Suction cup	Festo	ESS-10-BS

16 Additional Modules

Ordering number

- ❑ OL0026-341-27 (extension module)
- ❑ OL3402-501-25 (power supply module)

16.1 Extension Module

The purpose of the extension module is to accomplish operation control of further accessories:

- ❑ Rotary arm
- ❑ Turn station
- ❑ Lifter
- ❑ Linear horizontal drive, external

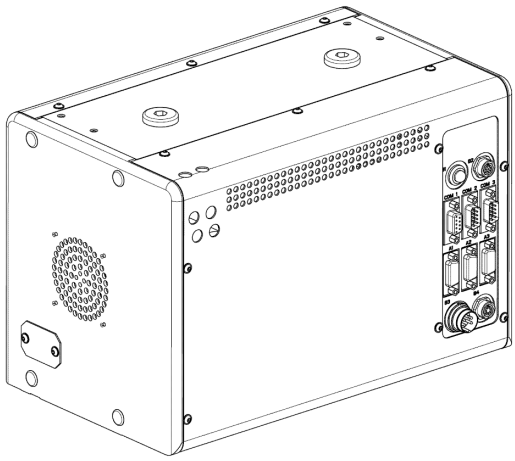


Fig. 93: Extension module

16.1.1 Technical Data

General	
Name	Extension module

Dimensional & weight details	
Width x height x depth	(300 x 180 x 200) mm
Weight:	Approx. 11.5 kg

Operating data	
Utility class	Bench-top device, closed room facilities in clean condition
Protection class	III (SELV)

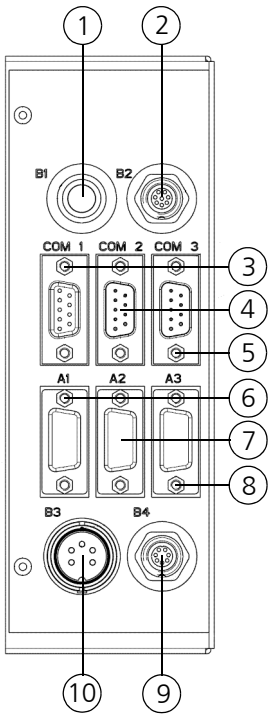
Operating data	
Protection type	IP 20
Operating voltage	2 x 12VAC/± 12 VDC unstabilized

NOTE
The power supply module is supplied with required voltages by the corresponding host equipment unit or a power supply module (→ *refer to chapter 16.2*) that will carry a respective line voltage label.

Power consumption	< 100 VA
Interfacing	RS 232 C, Sub-D, 9-position
Interference suppression	EN 55011 (DIN VDE 0875, Part 11) limit value class A
Interference immunity	EN 61000-6-2 (industrial area)

Storage & operating conditions	
Storage & transportation: – Permissible ambient temperature – Permissible relative air humidity	 - 10 °C to + 50 °C ≤ 85% at 30°C
Operation – Permissible ambient temperature – Permissible relative air humidity	 + 15 °C at + 25 °C ≤ 75% at 30°C, no formation of condensate

16.1.2 Terminals



1	B1	Operating state indicator
2	B2 (BC)	Barcode reader
3	COM1	Typically host PC
4	COM2	Serial interface
5	COM3	Typically next downline equipment unit
6	A1	Lifter
7	A2	Lifter
8	A3	Rotary arm/horizontal drive
9	B3 (PSPL)	Power supply
10	B4 (SW)	Switching output

16.2 Power Supply Module

NOTE

The power supply module is exclusively intended for electric supply of systems and system components from CyBio AG.

The power supply module provides a tool for centralized supply of all individual equipment units with required voltage levels. It is connected to line power supply via a power cable with PE contact. A set of connection cables is included for connection of pertaining equipment components. They carry labels on their cable ends for unequivocal assignment of connection points.

The power supply module has its own main switch.

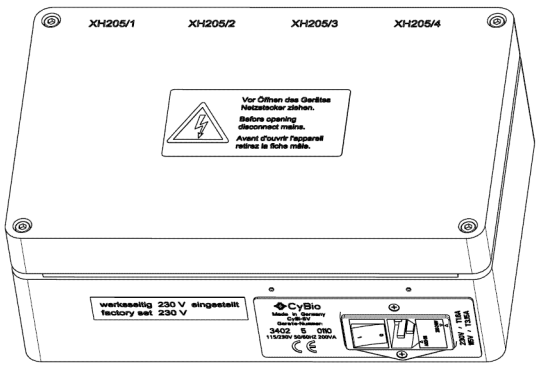


Fig. 94: Power supply module

16.2.1 Technical Data

General	
Name	Power supply module
Max. number of equipment units that may be connected	Four - via PSPL

NOTE
Please note maximum power consumption of power supply module (on nameplate)!

Dimensional & weight details	
Width x height x depth	(280 x 100 x 180) mm
Weight:	Approx. 5.0 kg

Operating data	
Utility class	Bench-top device, closed room facilities in clean condition
Protection class	I
Protection type	IP 20
Input voltage	115/230 V 50/60 Hz
Primary fusing	for 115 V: 2x 3.15 A for 230 V: 2x 1.6 A
Output voltage	12VAC/± 12 VDC; unstabilized
Secondary fusing	2x 6.3 A
Power consumption	200 VA
Interference suppression	EN 55011 (DIN VDE 0875, Part 11) limit value class A
Interference immunity	EN 61000-6-2 (industrial area)

Storage & operating conditions	
Storage & transportation: – Permissible ambient temperature – Permissible relative air humidity	 - 10 °C to + 50 °C ≤ 85% at 30°C

Storage & operating conditions	
Operation – Permissible ambient temperature – Permissible relative air humidity	 + 15 °C to + 25 °C ≤ 75% at 30°C, no formation of condensate

16.2.2 Safety Notes

The following safety symbols and warning notes are affixed on the power supply module:

Safety symbol	Meaning	Comment
	Warns of a danger point	
	Warns of dangerous electrical voltage	

Warning note	Meaning	Comment
	Warns of dangerous electrical voltage	Never open the power supply module! Allow repair work to be carried out by qualified experts only!
werkseitig230 V eingestellt Factory set: 230 V or werkseitig115 V eingestellt Factory set to: 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!

16.2.3 Operation Controls & Terminals

CAUTION

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

Never remove cabling as long as voltage is supplied! Make sure that the power supply module is actually in power-off condition and its line power cord detached from the line power socket before you remove a cable from the module.

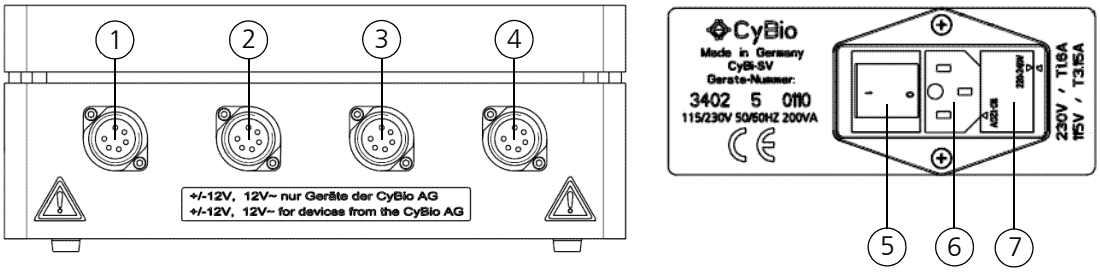


Fig. 95: Terminals & controls

1 XH205/1 - terminal for systems or system components
2 XH205/2 - terminal for systems or system components
3 XH205/3 - terminal for systems or system components
4 XH205/4 - terminal for systems or system components
5 On/Off switch
6 Line inlet jack
7 Fuse socket

16.2.4 Conversion of Voltage Level

WARNING

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

Turn power supply module off before you begin any kind of work described hereafter. Disconnect the power cord from the line power socket and remove the power cord from the module.

NOTE

Depending on the country of destination, the voltage level comes factory-set.

For necessary conversion of the power supply module to another voltage level, the primary fuse must be replaced and the fuse socket adapted. To do this, proceed as follows:

1. Use a small screwdriver to open the fuse socket compartment.
2. Replace the fuse. A fuse of following type must be installed:
   - for 230 V = T1,6 A
   - for 115 V = T3,15 A
3. Turn fuse socket onto the voltage level that is available in the operating room.

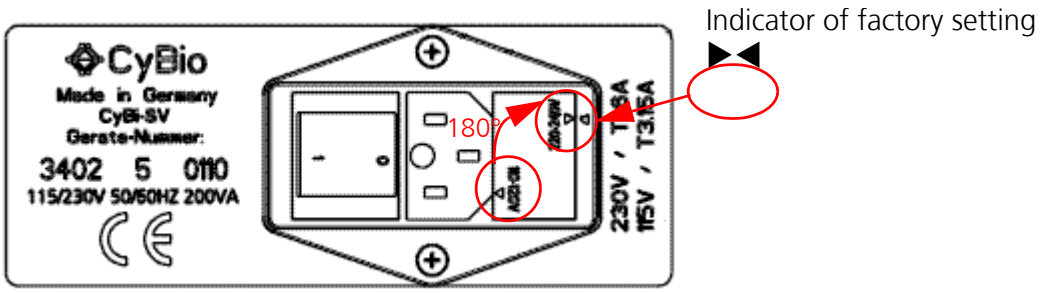


Fig. 96: Fuse socket at power supply module

4. Reinsert fuse socket.
5. Replace sticker label.

   ✓ **Voltage supply has been converted.**

NOTICE

There is danger of material damage from operation at the wrong supply voltage level.

Remember to replace the voltage label after voltage supply has been converted on the power supply module!

16.2.5 Replacement of Primary Fuse

WARNING

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

Turn power supply module off before you begin any kind of work described hereafter. Disconnect power cord from line socket and remove power cord from the module.

To replace a defective fuse, proceed as follows:

1. Turn power supply module off and disconnect its power cord from line power supply.
2. Remove power cord from power supply module.
3. Open fuse socket compartment with the help of a small screwdriver.
4. Replace defective fuse. Use only fuses of a type specified on → *page 140*.
5. Return the fuse socket to the power supply module.
   Make sure that the arrow on the fuse insert and the arrow on the combination seal do meet factory set voltage levels (→ *Fig. 96*).
6. Reconnect power supply module to the line power net.

   ✓ **The primary fuse has been replaced and the module can be turned on.**

16.3 Maintenance & Care

Maintenance & care item	Periodicity	Comment
Cleaning	As necessary	

Follow additional advice in chapter → *"Maintenance & Care" on page 11*.

17 Automation Accessories

NOTE
Please do not hesitate to contact our "Automation" department at info@cybio-ag.com on questions regarding this chapter.

17.1 Storage System for Microplates & Tip Trays

17.1.1 Technical Description

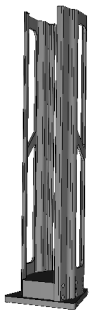
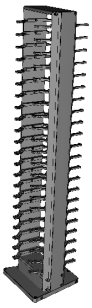
Microplate stack, single	Microplate rack, single	Tip tray rack, single
		

Fig. 97: Stack & rack for microplates or tip trays, single version

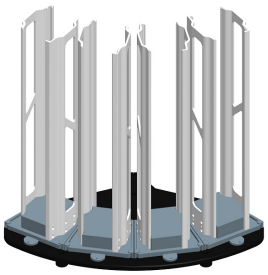
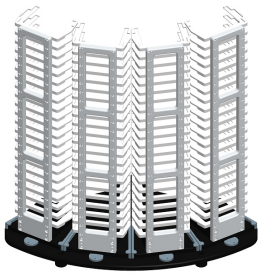
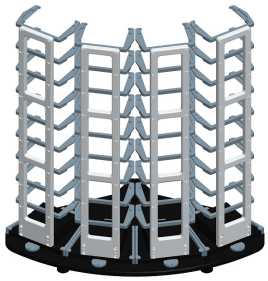
Microplate stack, 4-fold	Microplate rack, 4-fold	Tip tray rack, 4-fold
		

Fig. 98: Stacks or racks for microplates or tip trays, quadruple version.

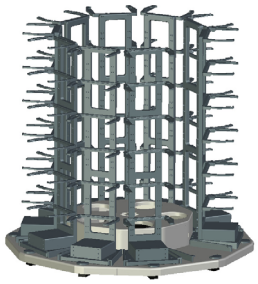
Carousel with microplate stacks	Carousel with racks	Carousel with tip tray racks
		

Fig. 99: Carousel with stacks or racks for microplates or tip trays

NOTE
The robot mentioned in the description hereafter is not part of the storage system.

The storage system is intended as a stockpiling or final storage facility for microplates or tip trays. It is loaded and unloaded by a robot running under the control of CyBio control software.

The storage system may consist of a single stack, a 4-fold stack or a carousel. The single stack and the 4-fold stack stand on a pedestal with a spring-loaded catch in each case. The carousel consists of a rotating basic frame with ten mountable microplate stack sections.

Direction of orientation:

	Stack	Rack
Microplates	Portrait	Portrait Landscape
Tip trays	—	Landscape

Rack

Racks allow random access to any microplate or tip tray they contain. Access is accomplished from the front.

Function sequence at carousel:

The carousel performs rotational motion until a desired stack reaches the robotic transfer position. The robot then positions its gripper in front of the desired compartment to retrieve or place a microplate.

Stack

A stack allows access to the uppermost plate it contains. (LIFO method; last in / first out).

Function sequence at carousel:

The carousel performs rotational motion until a desired stack reaches the robotic transfer position. The robot then positions its gripper over this stack and moves vertically down until it has reached the required position to retrieve or place a microplate.

17.1.2 Technical Data

Microplate stack, single	
Height of standard stack	440 mm
Height of long stack	630 mm
Capacity (standard)	30 microplates, standard
	9 microplates, deep-well
Capacity (long)	45 microplates, standard
	14 microplates, deep-well
Phys. dimensions	190 x 510 x 200 mm (standard)
	190 x 700 x 200 mm (long)

Microplate rack, single	
Height of standard stack	495 mm
Height of long stack	705 mm
Capacity (standard)	15 microplates, standard
	8 microplates, deep well
Capacity (long)	22 microplates, standard
	11 microplates, deep well
Phys. dimensions	160 x 565 x 150 mm (standard)
	160 x 775 x 150 mm (long)

Tip tray rack, single	
Height of standard stack	495 mm
Height of long stack	705 mm
Capacity (standard)	4, 6, 8 tip trays
Capacity (long)	6, 9, 12 tip trays
Phys. dimensions	160 x 565 x 150 mm (standard)
	160 x 775 x 150 mm (long)

Microplate stack , 4-fold	
Height of standard stack	440 mm
Height of long stack	630 mm
Capacity (standard)	120 microplates, standard
	36 microplates, deep-well
Capacity (long)	180 microplates, standard
	60 microplates, deep-well
Phys. dimensions	670 x 510 x 480 mm (standard)
	670 x 700 x 480 mm (long)

Microplate rack, 4-fold	
Height of standard stack	495 mm
Height of long stack	705 mm
Capacity (standard)	60 microplates, standard
	32 microplates, deep well
Capacity (long)	88 microplates, standard
	44 microplates, deep well
Phys. dimensions	670 x 565 x 480 mm (standard)
	670 x 775 x 480 mm (long)

Tip tray rack, 4-fold	
Height of standard stack	495 mm
Height of long stack	705 mm
Capacity (standard)	16, 24, 32 tip trays
Capacity (long)	24, 36, 48 tip trays
Phys. dimensions	670 x 565 x 480 mm (standard)
	670 x 775 x 480 mm (long)

Carousel	
Operating voltage	100...250 VAC
Control	RS-232
Height of standard stack	400 mm
Height of long stack	600 mm
Capacity (10 stacks, standard)	300 microplates, standard
	90 microplates, deep-well
Capacity (10 stacks, long)	450 microplates, standard
	150 microplates, deep-well
Capacity (10 racks, standard)	150 microplates, standard
	80 microplates, deep-well
Capacity (10 racks, long)	220 microplates, standard
	110 microplates, deep-well
Capacity (10 tip tray racks, standard)	40, 60, 80 tip trays
Capacity (10 tip tray racks, long)	60, 90, 120 tip trays
Rotation speed:	60°/s
Phys. dimensions	755 x 562 x 755 (standard)
	755 x 562 x 755 (long)

17.1.3 Safety Notes

The general safety notes contained in → *chapter 2* will be binding in all cases.

You are also strongly advised to follow safety notes or advice valid for all involved equipment units and the installed robot.

Carousel:

CAUTION

There is danger of minor physical injury due to pinching!

Please note that the carousel automatically takes up speed in automated operating mode. Do not place your hands or fingers into the range of carousel motion.

17.1.4 Operation

Automated

Stacks or racks are automatically loaded or unloaded under the control of CyBio control software. Microplates or tip trays are inserted at the required position by a robot. The carousel will rotate a particular requested stack (rack) into the required position.

Manual mode (loading)

Refer to → *"Auxiliary processes"*

Auxiliary processes

Filling & emptying racks or stacks

A rack or stack can be removed from its pedestal carousel for filling and be placed back again.

NOTICE

A stack must always be restored to the position from which it has been taken. Places and stacks are numbered at the spring-loaded catch. Observe the established order of positional assignments!

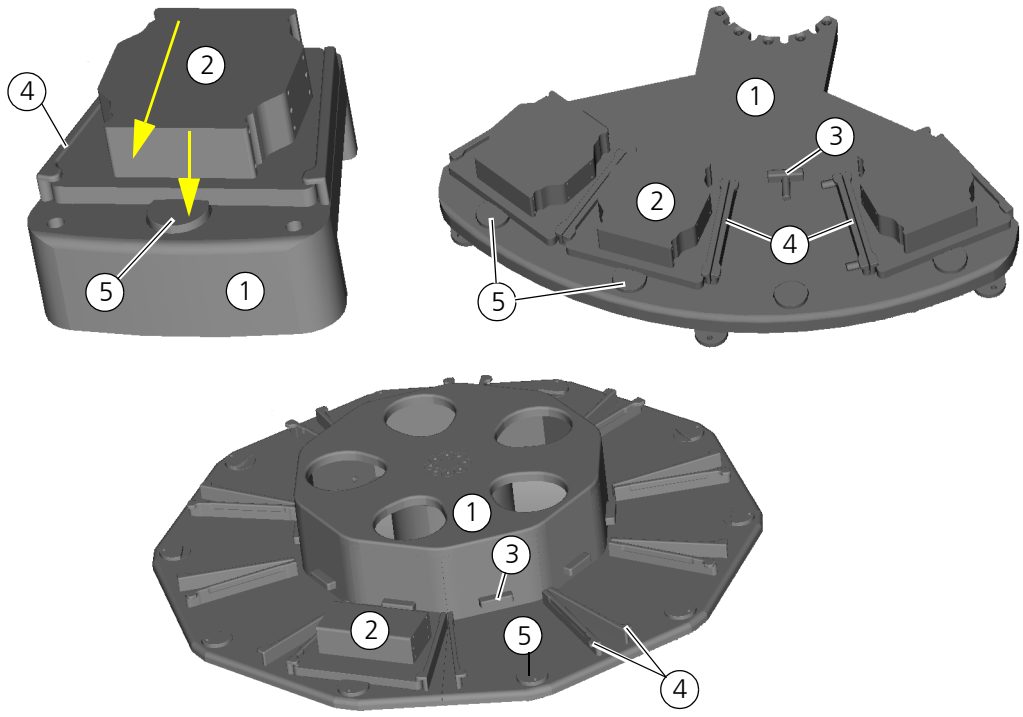


Fig. 100: Different pedestal versions of the storage system

1 Base frame
2 Bottom of hotel or stack
3 Support
4 Lateral guide
5 Spring-loaded catch

Removal of rack/stack

NOTICE

Beware of material damage caused by microplates falling off, especially where racks are handled.

Do not hold racks/stacks in an inclined position. Avoid jerky motion or excessive use of force as you release or lock a rack or stack.

1. Hold the rack or stack with one hand in position.
2. Press spring-loaded catch down.
   ✓ **The rack or stack is released.**
3. Push the rack or stack out of the basic frame from the front side (→ *see fig. 100*).

Installation of rack/stack

NOTICE

Beware of faulty loading action to prevent disturbances in a program sequence.

Please follow the numbering order as you load racks/stacks (onto the spring-loaded catches). Install each rack in its designated place at the carousel.

NOTICE

Beware of material damage due to microplates falling off, especially where racks are handled.

Do not hold the racks or stacks in an inclined position. Avoid jerky motion and excessive use of force as you release or lock a rack or stack.

1. Install the rack or stack in a free place.
2. Push the rack or stack in until back-end mechanical stop position, on reaching of which the spring-loaded catch will perceivably engage.
   ✓ **The rack or stack is locked**

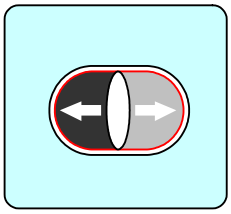
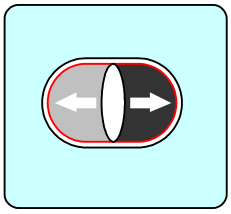
Rotation of carousel

NOTICE

Danger of material damage!

Refrain from carousel rotation, unless the system has come to a standstill!

By pressing the direction pushbutton, you may trigger rotational motion of the carousel.

Direction pushbutton	Actuation	Motion
	Short	Clockwise rotation by one station
	Long	Clockwise rotation until pushbutton is released again
	Short	Anticlockwise rotation by one station
	Long	Anticlockwise rotation until pushbutton is released again

17.1.5 Maintenance & Care

Maintenance & care item	Periodicity	Comment
Cleaning	As necessary	

Follow advice in chapter → *"Maintenance & Care" on page 11*.

17.2 Weighing of Waste Boxes with Balance CPW-plus-75

17.2.1 Technical Description

Fig. 101: Balance CPWplus-75 with display

The Balance CPWplus-75 is intended to monitor the fill level of waste reservoirs. The weight of a waste box is being continuously monitored by the control PC of the corresponding CyBio equipment unit and critical fill levels will be signalled in a running program.

Useful operating advice

- ❑ The balance is always turned on.
- ❑ Its "On/Off" button must not be pressed in normal operating mode. On actuation of this pushbutton, the balance will loose its calibration state, because as power is subsequently restored to the balance it will gauge to 0.00 kg even though it may carry a weight at that moment.
- ❑ Following a normal power shutdown of the equipment unit, the balance's own rechargeable battery will preserve the voltage for 60 hours, i.e. if electric power supply is restored to the equipment within this space of time, the calibrated state will be preserved.
- ❑ Do not place further objects onto the balance. This will falsify the result of measurement.

For further details: Refer to Balance CPWplus-75 User Manual

17.2.2 Technical Data

Balance CPWplus-75			
Type		CPWplus - 75	
Tare (unladen state)		0 kg (gross weight = net weight)	
Configuration			
Parameter	**Value**	**Comment**	**Display**
Automatic turn off	Off	Factory setting	Pr off
Background illumination	Automatic	Factory setting	bL 1

Balance CPWplus-75			
Type		CPWplus - 75	
Tare (unladen state)		0 kg (gross weight = net weight)	
Configuration			
Parameter	**Value**	**Comment**	**Display**
Unit of measure	kg	The weight can only be indicated in kg	kg on lb off oz off lb/oz off
Address	0	Factory setting	Add 0
Baud rate	9600 baud	Factory setting	b9600
Serial parameter	8 bits, no parity	Factory setting	PAr 1
Transmission mode	No data output	Factory setting	trn 1
Hold function	Off	Factory setting	
Filter	Fast	Fastest possible setting	Fi 3
Zero tracking	Maximal	Great weights	ZE0 8
Stability span		Factory setting	StA 1
Stability finding		Factory setting	StR 1

17.2.3 Safety Notes

The general safety notes contained in → *chapter 2* will be binding in all cases.

17.2.4 Operation

Preparing a program start

❑ Balance: check display (→ *section „Lab balance display check")*)

Lab balance display check

Check the balance display. It should indicate a value greater than 0.

If the display is blank, the balance had been turned off or the host equipment in shutdown state for a longer period of time (battery discharged). The balance must be calibrated before the next equipment program session can be triggered in such cases (→ *refer to "Taring of the Lab Balance" on page 155*).

Check for value on display. On noticing a deviation from the nominal value (→ *refer to "Calibration of Lab Balance" on page 155*), empty the waste box. If the value is still different from the nominal value thereafter, the balance needs to be calibrated.

Taring of the Lab Balance

If the balance had been turned off ("On/Off" pushbutton was actuated or host equipment in "Off state" for an extended period of time), the balance needs to be gauged again.

1. Empty the waste box completely.
1. Clear the weighing surface (deposit waste box in a side location).
2. Turn balance on.
   ✓ **Displays indicates "0.00" - balance is calibrated**
3. Place waste box onto balance again.

Calibration of Lab Balance

Calibration means that the balance is gauged to a nominal value. This nominal value is identical with the weight of the waste box in unladen state. If the balance is found to display a deviating value, after the waste box has been emptied, it must be calibrated.

1. Empty the waste box completely.
2. Actuate pushbutton "Tare/Zero" and keep it depressed for 4 seconds.
   ✓ **"CAL" showing on the display**
3. Actuate pushbutton "Print/Hold".
   ✓ **"Lxx" showing on the display**
4. At this point you may enter the nominal value ("Tare/Zero" will change the value at the blinking numeral, "Print/Hold" will change between the numerals.
5. To save the nominal value, press "Unit".
   ✓ **The lab balance is in calibrated state.**

17.2.5 Fault Removal

Refer to User Manual

17.2.6 Spare Parts

Refer to User Manual

Balance CPWplus-75

Name	Manufacturer	Ordering number
Rechargeable battery	Saite Power	BT-6M4.0AC (6V4.0AH)

17.3 Signal Tower for Status Display

17.3.1 Technical Description

The signal tower is used to indicate various operating states of a CyBio equipment unit. The signal tower's configuration settings are maintained in the CyBio control software of the particular equipment unit. For relevant details, you may consult the CyBio control software description.

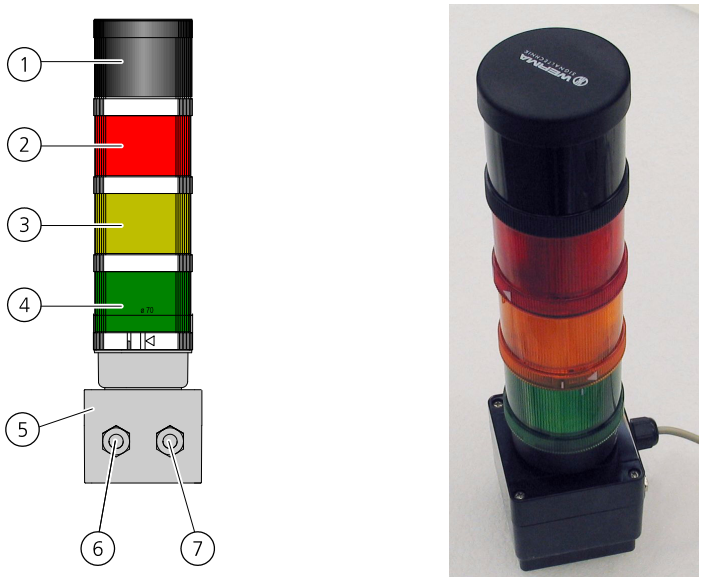


Fig. 102: Signal tower (sample configuration)

1 Horn (unused in the given equipment unit)
2 Red signal segment
3 Yellow signal segment
4 Green signal segment
5 Interface box
6 Terminal for 24V supply voltage
7 RS-232 terminal

Terminal

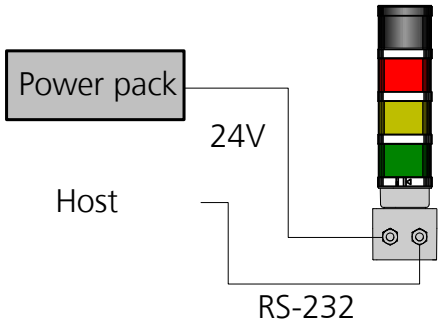


Fig. 103: Connection diagram of signal tower

The signal tower is supplied with 24V operating voltage by the power pack. Operation control is via a RS-232 interface. The control cable is connected to the host equipment's PC.

Control

Operation control of the signal tower is accomplished by CyBio control software of the host equipment.

CyBio control software provides the possibility to adapt configuration settings for the signal tower to the specific user requirements.

Up to four positions of the signal tower can each be assigned to a given signal color or a defined operating state. Each optical signal can be assigned to an acoustic signal that will be triggered concurrently with the optical signal.

Optical & acoustic error messages

The signal tower reports faulty conditions by optical and acoustic means.

Signal-to-error-state assignments can be made in CyBio control software tools. The default setting of optical signals in relationship to their corresponding operating states is in accordance with standard EN 60204-:

Signal	Meaning	Comment
White	None	System/equipment initialized
Horn	Potentially dangerous condition	Coupled with "Red" signal
Red	Potentially dangerous condition	Immediate action required
Yellow	Abnormal or imminent critical condition	Monitoring / intervention by operator required
Green	No error; system/equipment running	No action required

For a description of further acoustic messages or optical displays (e.g. incubators) you should refer to the documentation that is included in delivery of the particular component.

17.3.2 Technical Data

Signal tower	
Designation/Type	WERMA
Phys. dimensions	82(W) x 322(H) x 107(D) mm (without mech. fasteners)
Weight:	About 2.5 kg (without mech. fasteners)
Operating voltage	100...240V, 50/60 Hz (24 VDC mains adapter plug)

17.3.3 Safety Notes

The general safety notes contained in → *chapter 2* will be binding in all cases.

17.4 Protective Enclosures for Equipment

17.4.1 Examples of CyBio Equipment Enclosures

An enclosure is a separating protective device to prevent physical injury in the range of automated motion of equipment parts, e. g. robots. An enclosure without an automatic door monitoring facility will not interfere with the equipment control program. For this reason, door or windows may not be opened as long as the equipment is operating. Warning labels (→ *item 3*, *Fig. 104*) are to alert to automated motion of equipment components. The emergency stop button (→ *item 2*, *Fig. 104*) at an enclosure may be used to shut the equipment down in the event of danger. Signal towers (→ *item 1*, *Fig. 104*) indicate the current state of the equipment.

CAUTION

Beware of minor physical injury from mechanically moving equipment parts!

Do not open windows and doors before the equipment has come to a standstill. Make sure that all windows and doors are closed at the moment a system program session is launched.

Example of an enclosure without door monitoring device:

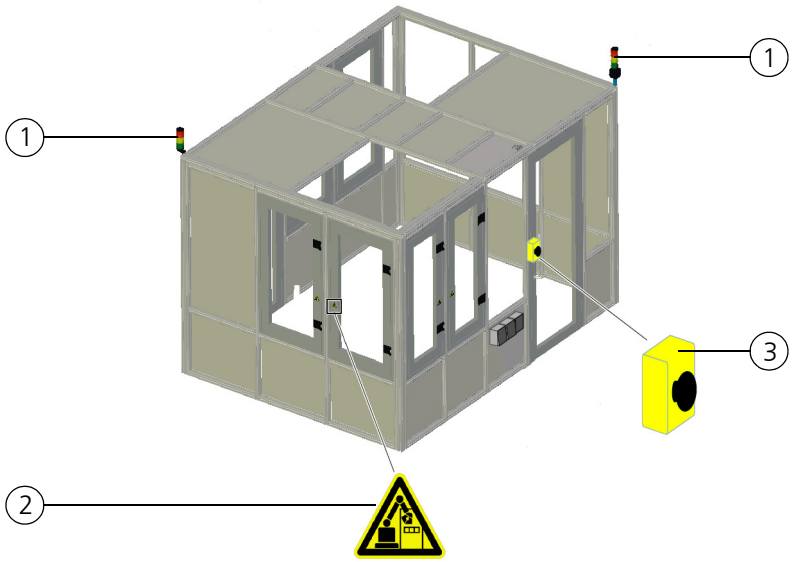


Fig. 104: Enclosure without door monitoring device but with emergency stop button

1 Signal tower
2 Emergency stop button
3 Warning label - robot active in automated mode

All monitored doors must be closed for the robot to carry out controlled action in automated mode.

Example of an enclosure with active door monitoring device

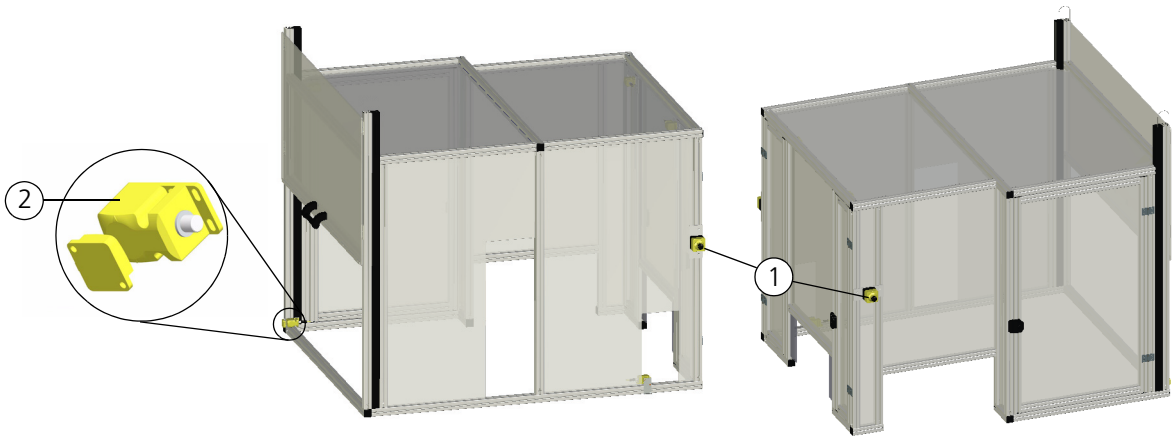


Fig. 105: Enclosure with monitored doors and emergency stop buttons

1 Emergency stop button
2 Safety switch

A safety circuit monitors all windows and doors for open and closed state. The safety circuit will shut down equipment motion if:

- ❑ a window or door in the enclosure has been opened
- ❑ an emergency stop button at the enclosure has been actuated.

As the safety circuit is triggered a corresponding error message is output to the equipment program. The program session cannot be resumed, unless the error source has been removed and the subsequent query been acknowledged.

The safety circuit provides a "safety stop" function according to DIN EN ISO 10218-1.

17.4.2 Safety Notes

The general safety notes contained in → *chapter 2* will be binding in all cases.

17.5 Reservoir Filling Station with Cavro® Pumps

17.5.1 Technical Description

Setup

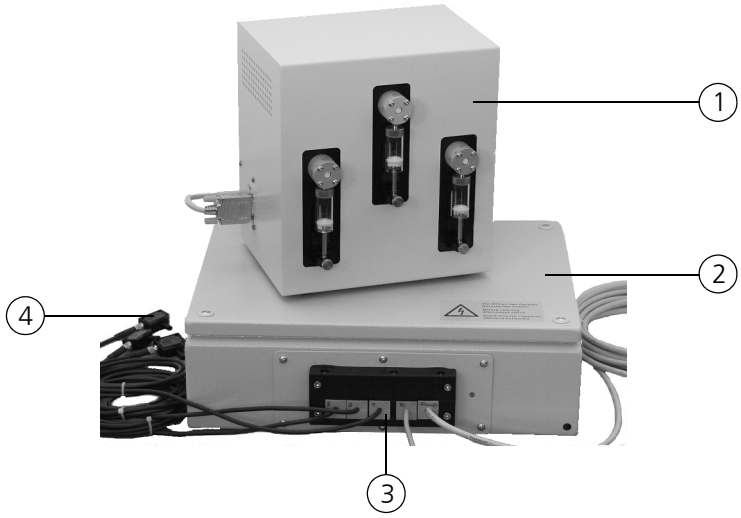


Fig. 106: Components of reservoir filling station

1 Pump module
2 Control module
3 Interfaces
4 Fill level sensors

The pump controller consists of two modules:

- ❑ Control module (voltage supply, signal preprocessing and conversion)
- ❑ Pump module (enclosure with up to 3 Cavro® pumps and valves)

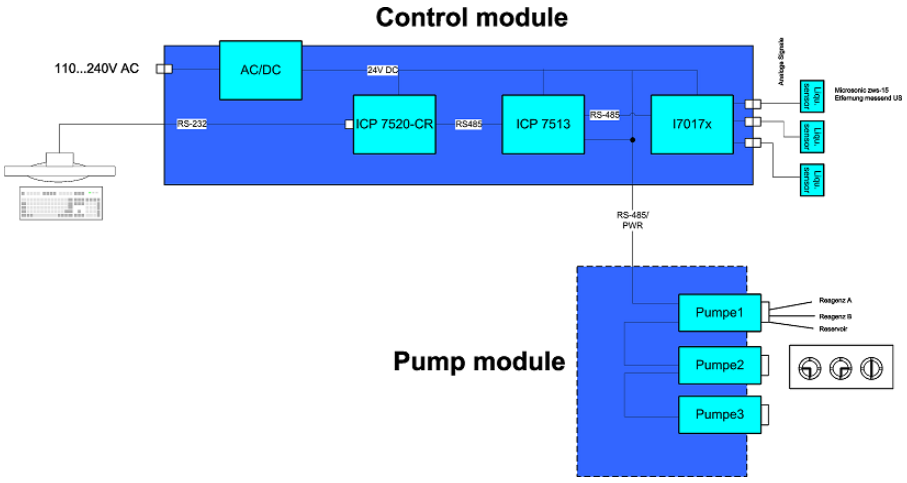


Fig. 107: Setup view of pump control

The control module may be installed in a remote location from the pump module (e. g. below work top).

Interface points of controller module

Terminal	Description	Design type
Pumps	Control cable for pump module (pump operating voltages, control signals)	DSUB HD 15 connector
PC	Interface cable for PC control	DSUB 9 connector
1	Cable for connection of fill level sensor 1	M8 cable jack, four-pole
2	Cable for connection of fill level sensor 2	M8 cable jack, four-pole
3	Cable for connection of fill level sensor 3	M8 cable jack, four-pole
Power inlet	Terminal for line power connection	IEC plug with fuse insert and power switch

Function

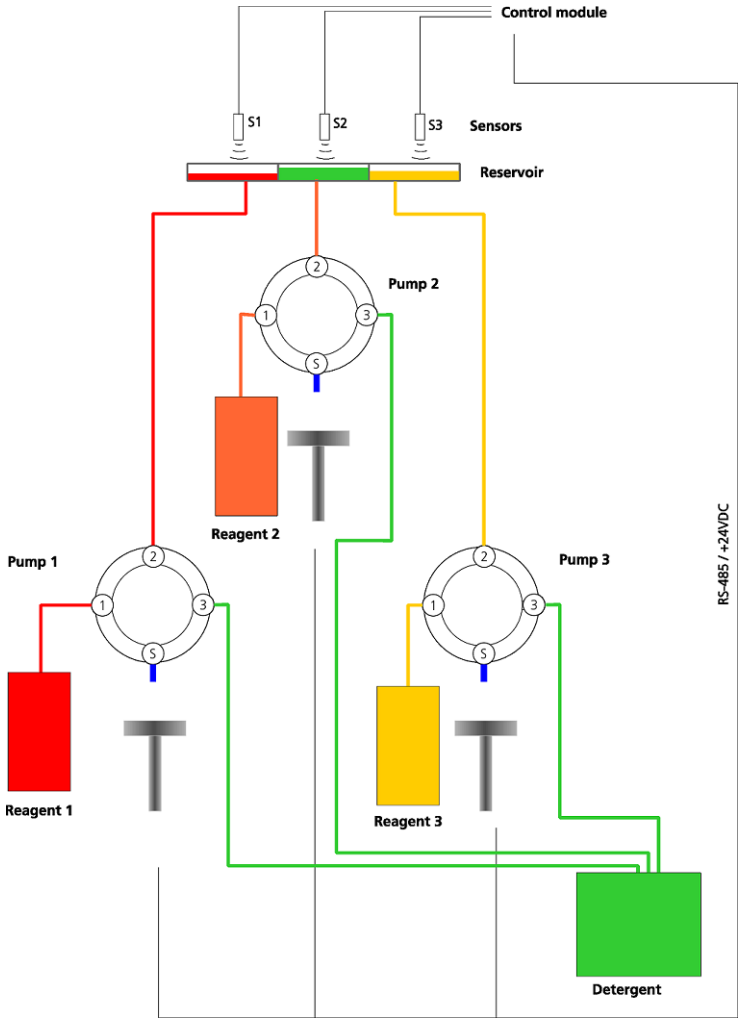


Fig. 108: Pump operation control - functional diagram (example)

The pumps of the pump module are able to fill a maximum of three different reservoirs or reservoir chambers. Each pump has a distributor valve to switch between two media (in the given example a reagent and a detergent).

Each pump has its assigned fill level sensor to monitor the reservoir for normal fill level.

Pump	Assigned sensor
1	1
2	2
3	3

Pump operation control and queries for sensor status are accomplished via a serial interface by CyBio control software. Inside the control module RS-232 signals are converted into RS-485 signals (module I-7520 CR; → *Fig. 107*). The I-7513 module functions as a RS-485-Hub. One segment of the RS-485 network contains the A/D converter module for sensors with an analog output; a second segment contains the three pumps whose addresses are set via an address switch.

IO-module	Address in RS-485 network
I-7017R	1

Pump	Address	Address switch	Jumper J1
1	0x35	4	Uninstalled
2	0x36	5	Uninstalled
3	0x37	6	1-2; 3-4

For further details, refer to XCalibur Pump User Manual

Installation

WARNING

Life-threatening danger due to electric shock!

The enclosure of the control module may not be opened by anyone other than authorized expert personnel and only after the line power cord has been removed.

1. Remove top cover from control module (take care of connected PE-cable).
2. Use M8 screws to fix the control module (mounting template → *see fig. 109*) e. g. to the frame of the worktable.
3. Reconnect PE-cable to enclosure again.
4. Mount enclosure top cover.
5. Mount sensors (note: sensors must be positioned vertically above liquid surface level).
6. Connect sensor cables to sensors.
7. Install RS-232 cable up to PC interface point and connect cable.
8. Install line power cable and connect cable to control module or the line power

socket.

9. Install pump module (or screw it on,→ *see fig. 110*).
10. Lay control cables from control module to pump module and connect cables.
11. Connect tubes to pump valves and install tubes.
12. Complete pumps (mount syringes).

    ✓ **The control module and pump module are completely mounted.**

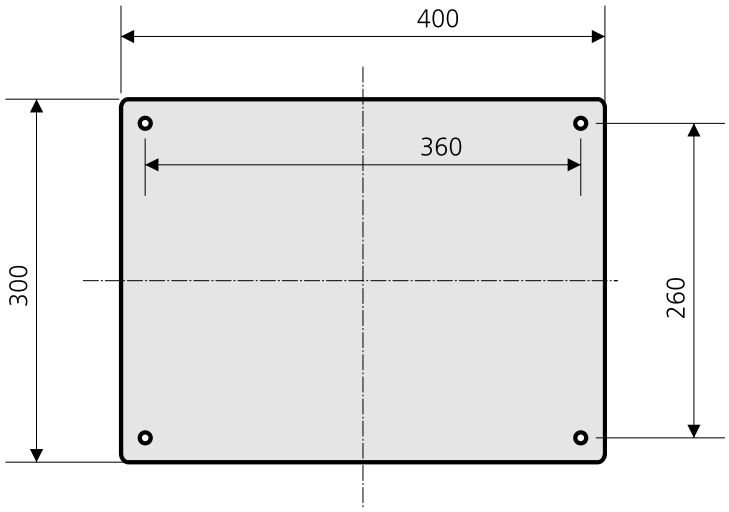


Fig. 109: Bottom of control module (installation template)

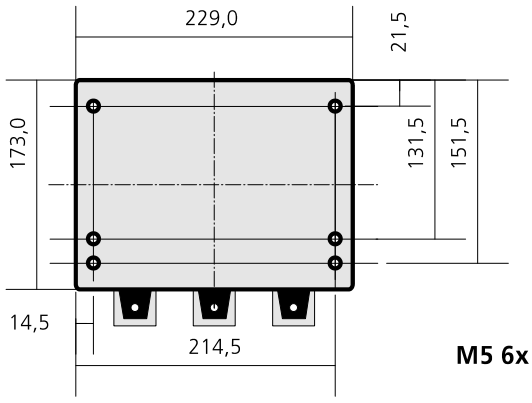


Fig. 110: Bottom of pump module (installation template)

17.5.2 Technical Data

General	
Type	Reservoir filling station (OL3486-25-150)
Pump type	Cavro® XCalibur
Fill level sensors	3 microsonic zws-15/CU/QS ultra-sonic sensor (distance measuring) Measuring distance: 15...140 mm

Dimensional & weight details	
Phys. dimensions (WxHxD)	Control module: (400 x 120 x 300) mm Pump module: (200 x 200 x 200) mm
Weight:	Control module: 7 kg Pump module: 5 kg

Operating data	
Operating voltage	110...240 V AC 50/60Hz
Inlet fuse	1 A
Interface	RS-232
Pump volume	5 ml
Valve type	3-port distribution

17.5.3 Safety Notes

The general safety notes contained in → *chapter 2* will be binding in all cases.

- ❑ There is danger of electric shock! The control module's enclosure may not be opened by anyone other than authorized expert personnel and only after the line power cord has been removed.
- ❑ Beware of pinching impacts by mechanically moving parts. Do not place your hands or fingers into the pump rod motion range (→ *see fig. 111*)!

Fig. 111: Pump rod area, danger zone

17.5.4 Operation

NOTICE
The pump must not be allowed to run in dry state (not more than a few cycles)!

Starting Up

1. Actuate main power switch at the control module.
   ✓ **The LED at the control input of the pump module will light.**
2. Trigger CyBio control software session at the PC.
3. Trigger script for pump operation control.

Software interface

The sensors and pumps are energized via a common RS-232 interface. For interfaces, the following settings are valid:

Baud rate	9600
Data bits	8
Parity	N
Stop bits	1
DTR	No
DTS	No

Sensor control

NOTE
Also refer to A/D-module I-7017 User Manual (query of individual channels)

The sensors output a proportional voltage signal in the range of 0 to +10 V.

For as-delivered calibration state, the distance can approximately be calculated according to this formula:

$I = V_S / 0.79 + 1.5$

I: distance in cm

V_S = signal voltage in V

It may be more convenient to record and process volume-related calibration graphs depending on the reservoir size and the sensor distance.

It is also possible to vary the measuring range of a sensor. Relevant details can be found in the sensor data sheets. In such cases it is also necessary to adapt signal evaluation procedures accordingly (e. g. through acquisition of calibration graphs and adaption of calculation algorithm).

Sensor assignments at A/D module I-7017

Channel	Sensor
0	1
1	2
2	3

Examples

- ❑ Query for module 1 / channel 0 (sensor 1)

#010 (CR LF)

Returns the signal voltage value of sensor 1 (format as per preset mode)

- ❑ Query for module 1 / channel 1 (sensor 2)

#011 (CR LF)

Returns the signal voltage value of sensor 2 (format as per preset mode)

For further details, consult module I-7017 User Manual.

Pump operation control

Addressation & jumper settings

Pump	Address (ASCII characters)	Address switch	Jumper J1
1	0x35 ("5")		
2	0x36 ("6")		
3	0x37 ("7")		

Protocol

The DT protocol format is applied (refer to Cavro® XCalibur pump User Manual).

Example

- ❑ Initialization of pump 1

/5Z1R (CR LF)

Example

- ❑ Initialization of pump 2

/6Z1R (CR LF)

Shutting down

1. Actuate power switch at the control module.
   ✓ **The LED at the control input of the pump module will extinguish.**

17.5.5 Maintenance & Care

Maintenance & inspection schedule		
Maintenance & care item	**Periodicity**	**Comment**
Rinse pumps thoroughly with distilled or deionized water	After each use or in case of major idle periods	Refer to Cavro® XCalibur Pump User Manual
Check for leakage, by visual inspection	Daily	Refer to Cavro® XCalibur Pump User Manual
Clean - remove any residual liquid	Daily	Refer to Cavro® XCalibur Pump User Manual
Clean fluid path	Weekly	Refer to Cavro® XCalibur Pump User Manual
Tubing, syringe seals and valves	As necessary	Refer to Cavro® XCalibur Pump User Manual

17.5.6 Accessories & Spare Parts

Name	**NOTE**
Pump with valve	XC 3+ 1/4-28 232/485 P/N 20738323 (Tecan)
3-port distribution valve, single item	P/N 20736615 (Tecan)
Syringe, 5 ml	P/N 20725593 (Tecan)
Sensor	zws-15/CU/QS P/N 18 004 (microsonic)
zws 15 sound pipe	P/N 50 162 (microsonic)

17.6 Barcode Readers

The following barcode readers can be used in equipment from CyBio AG:

Barcode reader	Microplate scan direction	Host equipment unit
Barcode reader DS 2100-2014	Short side	CyBi®-Well, CyBi®-Well vario, CyBi®-WellFlex, CyBi®-WellFlex vario, CyBi®-8plus1, CyBi®-DiluS*pro*
Barcode reader DS 2100-1000	Long side	CyBi®-Well, CyBi®-Well vario, CyBi®-WellFlex, CyBi®-WellFlex vario, CyBi®-8plus1, CyBi®-DiluS*pro* (without enclosure)
Barcode reader DS 2100-2014	Short side	CyBi®-Well + tip changer, CyBi®-Well vario + tip changer
Barcode reader DS 2100-1000	Short side	CyBi®-Well, CyBi®-Well vario with 10-place rotary table
Barcode reader NLV 2101	Short side Long side	CyBi®-Well, CyBi®-Well vario, CyBi®-WellFlex, CyBi®-WellFlex vario, CyBi®-8plus1, CyBi®-DiluS*pro*, CyBi®-Print vario, – Optimized for detection of narrow barcode labels at CyBi®-Print vario

17.6.1 Datalogic DS 2100 Barcode Reader

Safety labeling

Fig. 112: Warning label at barcode reader

Warning label	Meaning	Comment
	Warns of laser radiation at the barcode reader	Do not look into the laser beam!

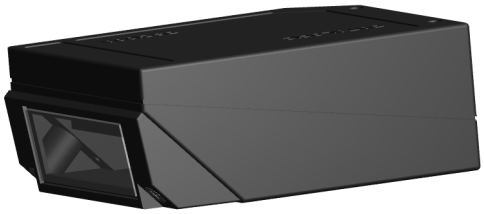


Fig. 113: Datalogic DS 2100 barcode reader

The barcode reader reads barcode labels on a microplate. A microplate can be identified based on its barcode pattern. Operation control is accomplished by an extra module (e. g. stacker, extension module) or by the PC that will also process the barcode readings.

CAUTION

Beware of eye injury due to laser light exposure!

Do not look directly into the laser beam! The barcode reader is a laser class 2 device.

NOTE

For detailed information, you are referred to the special barcode reader user documentation.

17.6.2 Opticon NLV-2101 Barcode Reader

Fig. 114: Opticon NLV-2101 barcode reader

The barcode reader takes barcode readings from microplates. A given microplate can be identified based on its barcode pattern. Its operation control is accomplished by an extra module (e. g. stacker, extension module) or by the host PC that will also process the barcode readings.

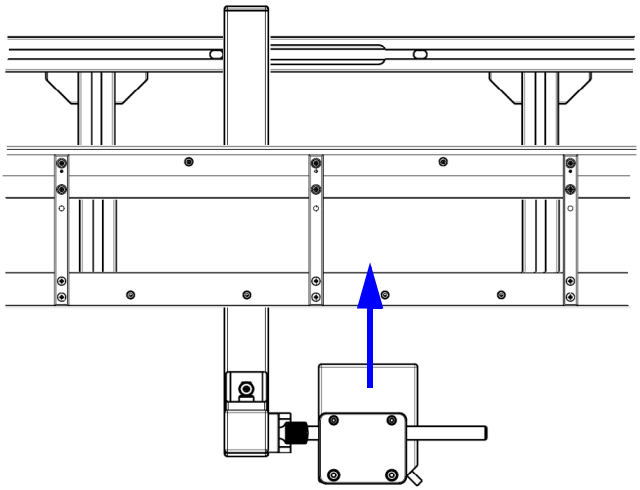
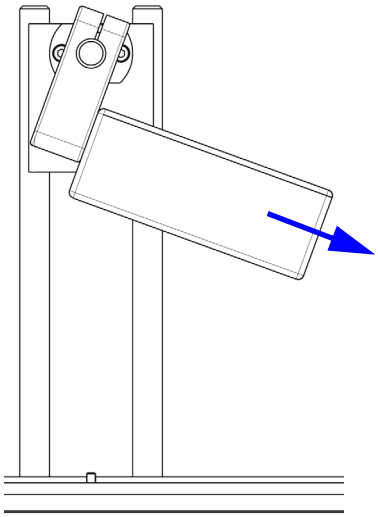
NOTE

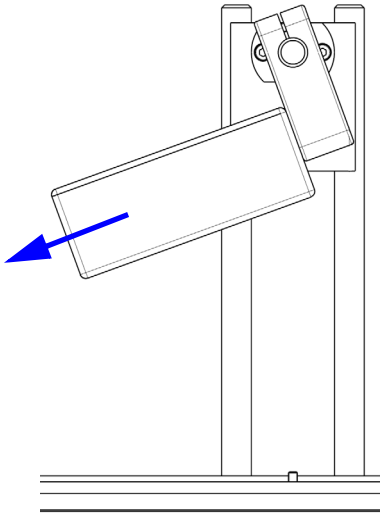
The Opticon NLV-2101 barcode reader works with LED lightsources. There is no danger of laser light exposure.

NOTE
For detailed information, you are referred to the special barcode reader user documentation.

17.6.3 Possible Installation Versions

The following view table shows examples how a barcode reader can be mounted to an equipment unit:

Scan direction	Schematic view
Barcode is scanned on the long side of a microplate (top view)	
Barcode is scanned on the short side of a microplate, beginning left (front view)	

Scan direction	Schematic view
Barcode is scanned on the short side of a microplate, beginning right (front view)	

CyBio Assortment of Adapters

A 1 CyBio Assortment of Adapters

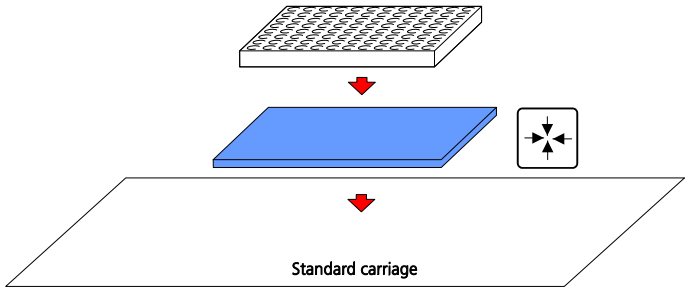
- These adapters are included in the product portfolio of CyBio AG.
- All adapters are maintained (as relevant and appropriate) in the adapter database of CyBio® Composer control software.

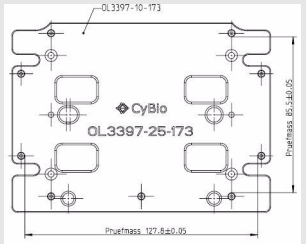
A 1.1 M1 - Standard Microplate Adapter

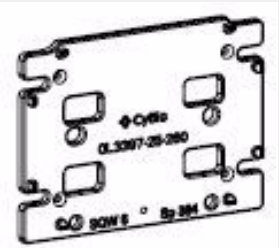
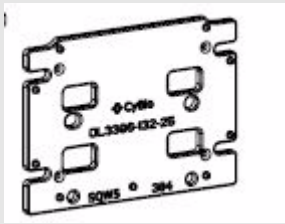
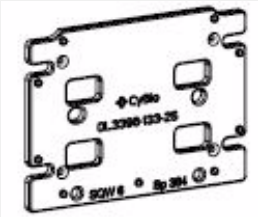
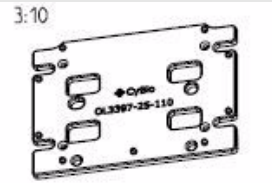
Accessory class M1

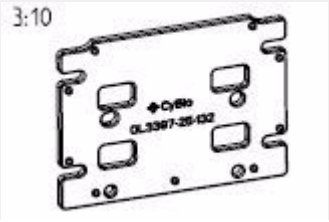
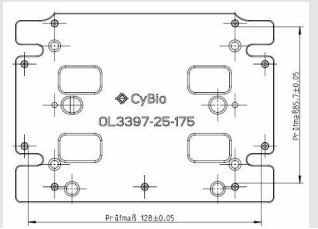
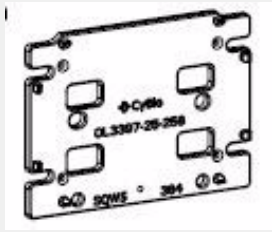
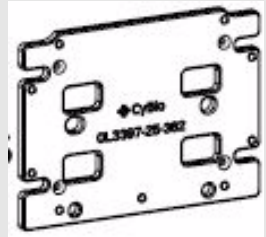
Description Adapts microplate to transporting carriage / standard case

View



Drawing number	Name	Comment	Entry no. in adapter database	Max. foot-print (mm)	Heig ht (mm)	MP type	
OL3397-25-173	Adapter 1536 corning		19	(85.5 x 127.8)	6		

Drawing number	Name	Comment	Entry no. in adapter database	Max. footprint (mm)	Height (mm)	MP type	
OL3397-25-260	Adapter automation standard	Special intercepting pins (area) for greater pick-up tolerance on robotic transfer		(85.5 x 127.9)	6		
OL3396-132-25	Adapter SQW5/384		3	(85.8 x 127.8)	6		
OL3396-133-25	Adapter SQW6/384		4	(85.5 x 127.9)	6		
OL3397-25-110	SW adapter standard/96		5	(86 x 128.4)	6		

Drawing number	Name	Comment	Entry no. in adapter database	Max. foot-print (mm)	Heig ht (mm)	MP type	
OL3397-25-132	Adapter		6	86.6 x 128.15	6		
OL3397-25-175	Adapter 1536/ HB3		20	(85.7 x 128)	6		
OL3397-25-258	Adapter auto-mation wide	Special intercepting pins (with area-like tip), for greater tolerance (refer to max. foot-print)		(85.8 x 127.8)	6		
OL3397-25-362	Adapter auto-mation cone	Especially suitably for robotic transfer (con.-shaped center-align-ment pins with mini-mal shaft)	4	(85.5 x 127.9)	6		

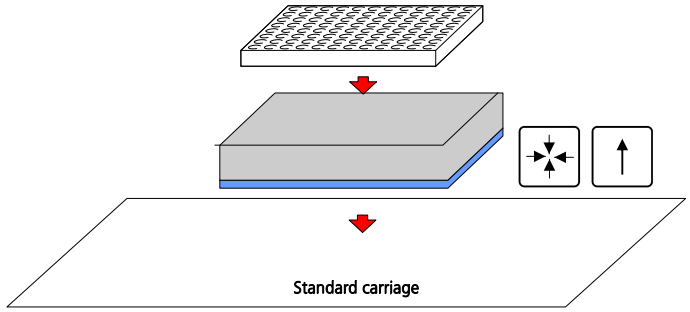
Drawing number	Name	Comment	Entry no. in adapter database	Max. foot-print (mm)	Height (mm)	MP type	
OL3397-25-120	Collar adapter	Safety function: An incorrectly placed plate is kept in an inclined position by the collar so it can be identified as misplaced - necessitates detector (mechanical / electronic)		(85.78 x 128.06)	6		

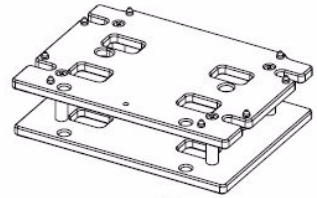
A 1.2 M2 - Microplate Height Adapter

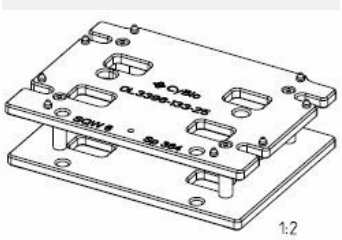
Accessory class M2

Description Adapts microplate to transporting carriage / with vertical offset

View



Drawing number	Name	Comment	Entry no. in adapter database	Max. foot-print (mm)	Height (mm)	MP type	
OL3396-110-23	Height adapter STD 96, complete		10	(86 x 128.4)	36		

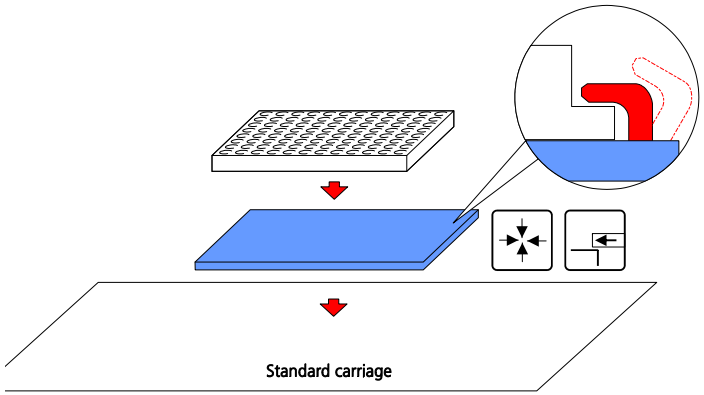
Drawing number	Name	Comment	Entry no. in adapter database	Max. foot-print (mm)	Height (mm)	MP type	
OL3397-25-133	Height adapter SQW6/384, complete		7	(85.5 x 127.9)	36		

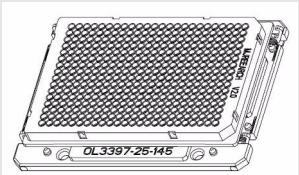
A 1.3 M3 - Microplate Claw Adapter

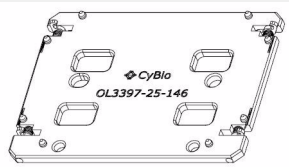
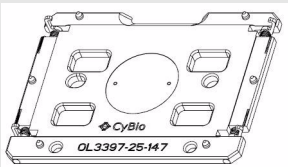
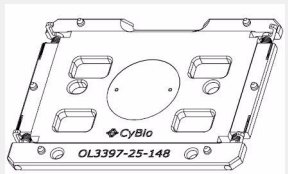
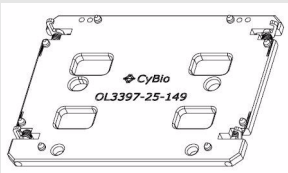
Accessory class M3 Claw adapter

Description Claws lock the microplate to the adapter; the base plate's weight keeps the MP on the carriage (e.g. for pipetting of a pierced microplate)

View



Drawing number	Name	Comment	Entry no. in adapter database	Max. foot-print (mm)	Height (mm)	MP type	
OL3397-25-145	Adapter MSP-3842	Claw = 4.05 mm	15	(85.9 x 127.66)	6	Microseal 384-well PCR plates #MSP-3842 (BIO-RAD) Up to 3.5 mm edge stips	

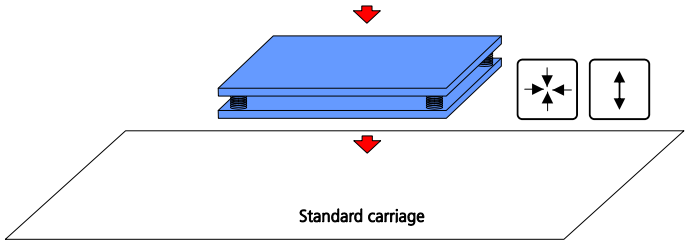
Drawing number	Name	Comment	Entry no. in adapter database	Max. foot-print (mm)	Height (mm)	MP type	
OL3397-25-146	Adapter G384Deep PP	Refer to MP type, claw = 3.05 mm	16	(85.6 x 127.8)	6	Greiner 384 PP Deepwell Up to 2.5 mm edge strip	
OL3397-25-147	Adapter special 384	Claw = 7.05 mm	17	(85.5 x 127.9)	6	Up to 6 mm edge strip	
OL3397-25-148	Adapter special 384	Claw = 7.05 mm	18	(85.2 x 127.7)	6	Up to 6 mm edge strip	
OL3397-25-149	Adapter for mother plates	Claw = 7.05 mm		85.2/4/6 x 127.8	6	MP type REMP 384 DTBR Up to 6 mm edge strip	

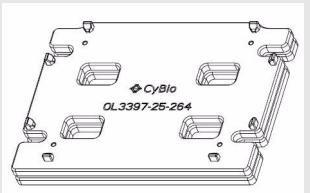
A 1.4 M4 - Spring-Loaded Microplate Adapter

Accessory class M4

Description Facilitates MP transfer, e.g. from gripper with Z-tolerance, fine alignment for dry pipetting mode

View



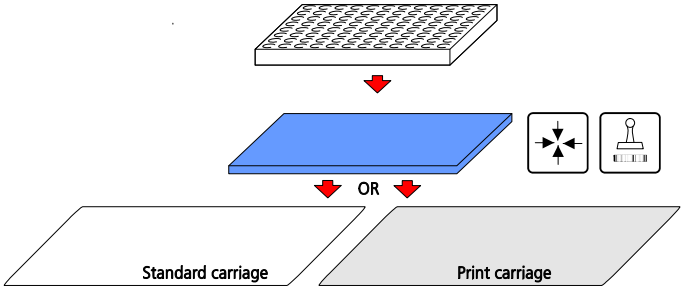
Drawing number	Name	Comment	Entry no. in adapter database	Max. foot-print (mm)	Heig ht (mm)	MP type	
OL3397-25-264	Spring-loaded (soft touch) adapter		22	(85.5 x 127.9)	14...1 2		

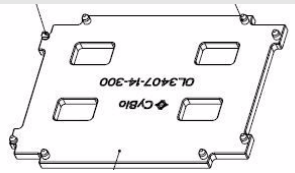
A 1.5 M5 - Microplate Print Adapter

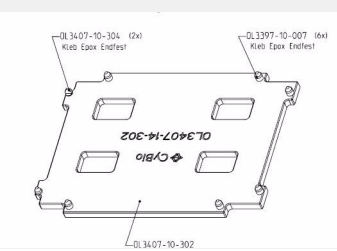
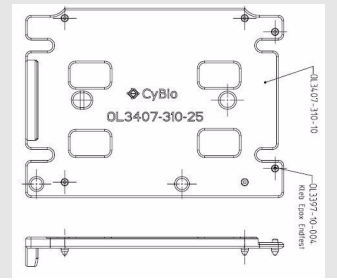
Accessory class M5

Description Labels microplates on a) CyBi®-Print vario or b) CyBi®-Well transporting unit (see "Comment" field")

View

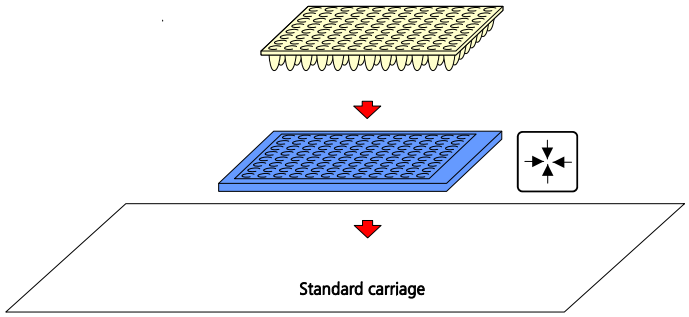


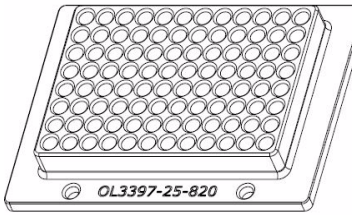
Drawing number	Name	Comment	Entry no. in adapter database	Max. foot-print (mm)	Heig ht (mm)	MP type	
OL3407-14-300	Microplate adapter for la-beling	Adapts to CyBi-Print vario carriage		(85.5 x 127.8)	5		

Drawing number	Name	Comment	Entry no. in adapter database	Max. foot-print (mm)	Height (mm)	MP type	
OL3407-14-302	Print adapter	Adapts to CyBi-Print vario carriage		(85.6 x 128.1)	5		
OL3407-310-25	Adapter 96 Print	Adapts to carriage of CyBi-Well transport-ing unit	21	(86 x 128.4)	6		

A 1.6 M6 - PCR Plate Adapter

Accessory class	M6
Description	Adapts border less PCR microplates to transporting carriage
View	



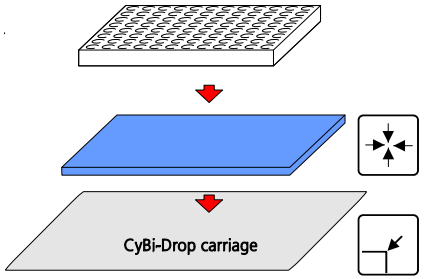
Drawing number	Name	Comment	Entry no. in adapter database	Max. foot-print (mm)	Height (mm)	MP type	
OL3397-25-820	PCR plate carrier		n/a	n/a	n/a	PCR	

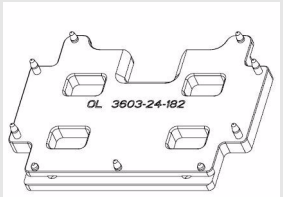
A 1.7 M7 - Fixation Adapter Plate

Accessory class M7

Description Adapts microplates to carriage of the CyBi®-Drop; fixation is accomplished with mechanical clamps (elements at carriage)

View



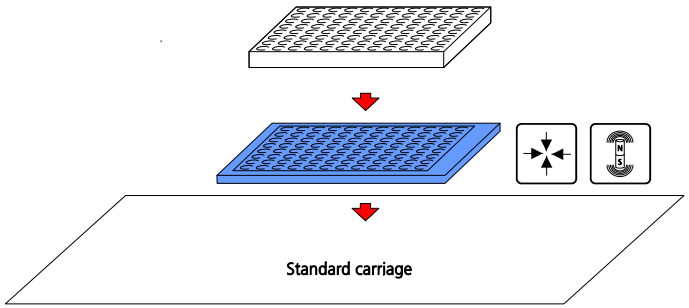
Drawing number	Name	Comment	Entry no. in adapter database	Max. foot-print (mm)	Height (mm)	MP type	
OL3603-24-182	Fixation adapt-er	1536/HB3	9	85.7 x 128	10	1536	

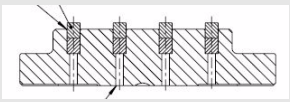
A 1.8 MM - Magnetic Adapter

Accessory class MM

Description Adapts microplates to transporting carriage; additional function: permanent magnets
Application: magnetic-particle-based cleaning up (cells, DNA, proteins,.etc.)

View



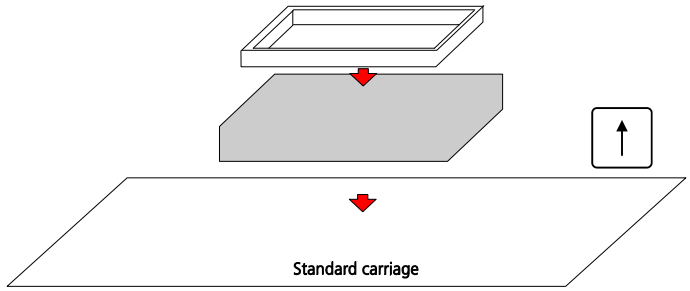
Drawing number	Name	Comment	Entry no. in adapter database	Max. foot-print (mm)	Heig ht (mm)	MP type	
OL3397-25-822	Magnetic adapter		n/a	n/a	n/a	Standard MP, with U or V bottom	

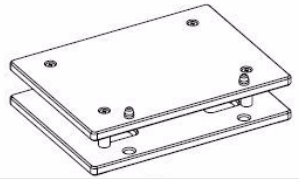
A 1.9 R - Reservoir Height Adapter

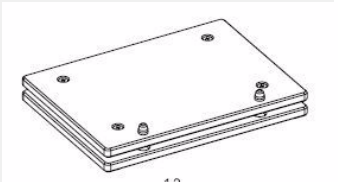
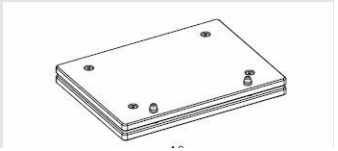
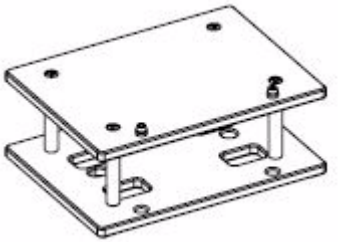
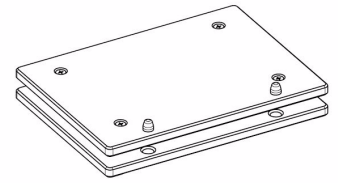
Accessory class R

Description Provides vertical offset for CyBio reservoirs on transporting carriage

View



Drawing number	Name	Comment	Entry no. in adapter database	Max. foot-print (mm)	Height (mm)	MP type	
OL3396-190-28	Reservoir height adapter	for deepwell applica-tions with reservoir fill-ing station	11		30 mm		

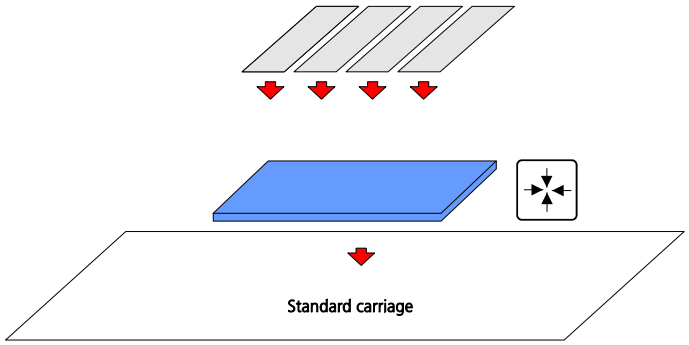
Drawing number	Name	Comment	Entry no. in adapter database	Max. foot-print (mm)	Height (mm)	MP type	
OL3396-190-29	Reservoir height adapter		12		16 mm		
OL3396-190-30	Reservoir height adapter		13		14 mm		
OL0051-25-965	Reservoir height adapter				52 mm		
OL3396-190-31	Reservoir height adapter				19 mm		

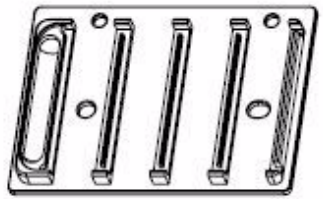
A 1.10 G - Glass Carrier Adapter

Accessory class G

Description Adapts glass carriers (slides) to transporting carriage

View



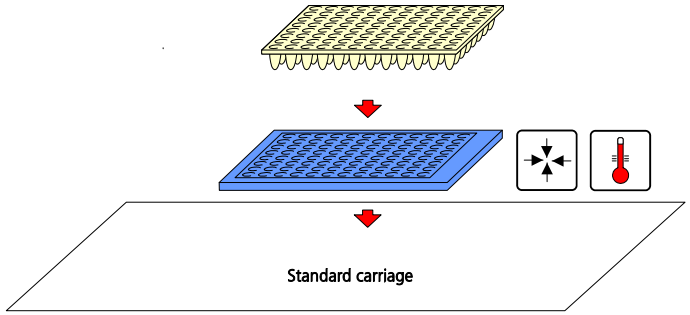
Drawing number	Name	Comment	Entry no. in adapter database	Max. foot-print (mm)	Height (mm)	MP type	
OL3397-25-270	Adapter for object carrier/6-channel/Histo Lab		n/a			SL	

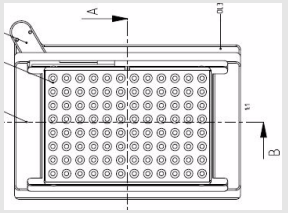
A 1.11 H - Heating & Cooling Adapter

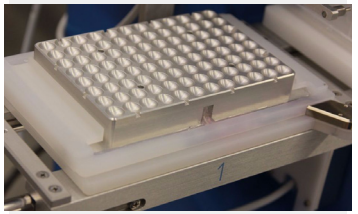
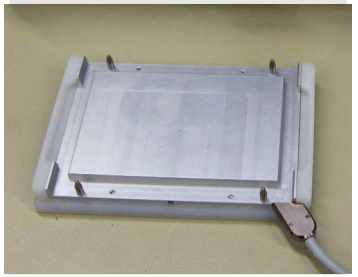
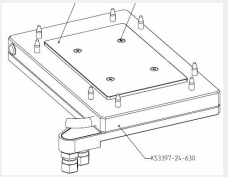
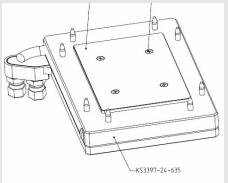
Accessory class H

Description Adapts microplates to transporting carriage; additional function: heating and cooling

View

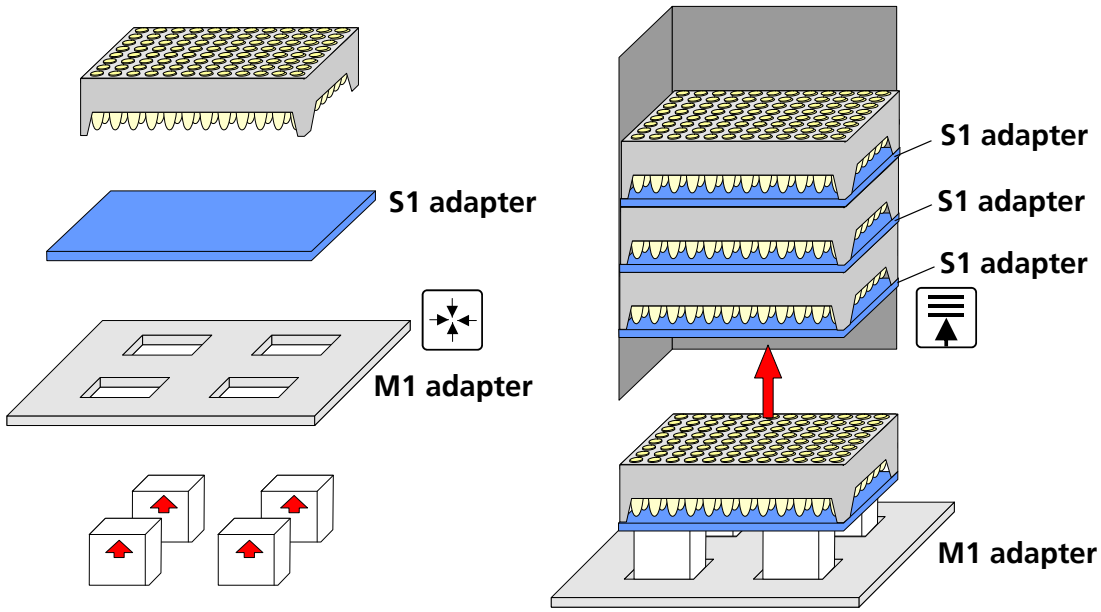


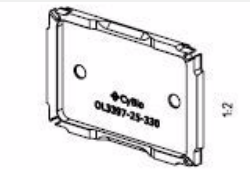
Drawing number	Name	Comment	Entry in adapter database	Max. foot-print (mm)	Heig ht (mm)	MP type	
OL3396-262-24	Heating adapt-er PCR	only combined with temperature control-ler/OL3396-266-24	n/a			PCR	

Drawing number	Name	Comment	Entry in adapter database	Max. footprint (mm)	Height (mm)	MP type	
OL3396-272-24	Round bottom heating adapter	only combined with temperature controller/OL3396-266-24	n/a			Round bottom MP	
OL3396-259-24	Flat bottom heating adapter	only combined with temperature controller /OL3396-266-24	n/a			Flat bottom MP	
KS3397-27-630	Cooling adapter right	only combined with reagent cooling system		86 x128.4	19.5	Flat bottom MP	
KS3397-27-635	Cooling adapter left			86 x128.4	19.5	Flat bottom MP	

A 1.12 S1 - Stack Supporting Adapter, Single-Part

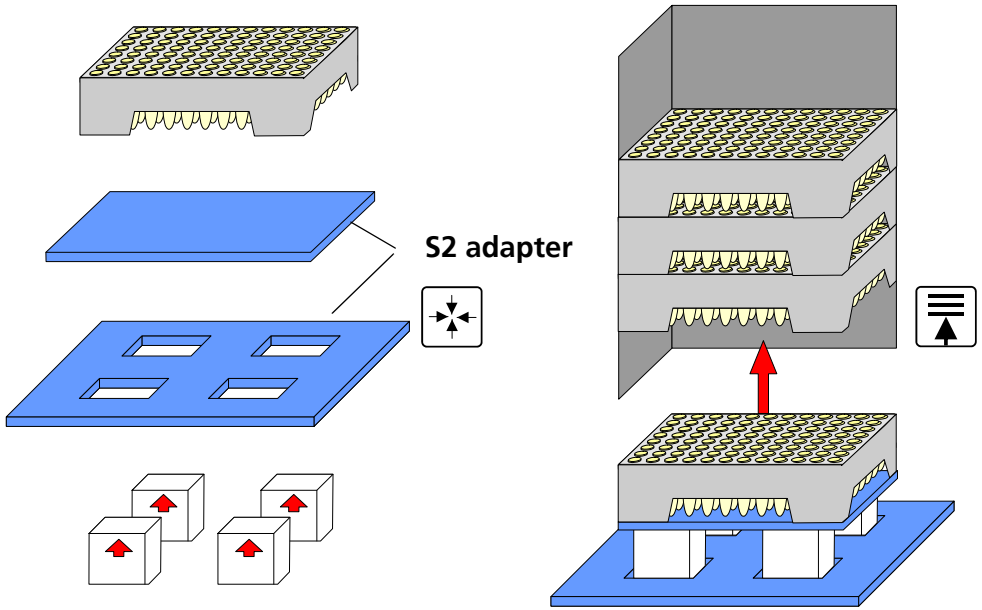
Accessory class	S1
Description	Facilitates stackpiling of units (microtube racks, filter plates, etc.) that are incompatible with stacker fingers and stack locking device. Adapter consists of a permanent adapter plate that remains with the unit. A necessary pre-condition for using an S1 adapter is the availability of a M1 type adapter (→ *refer to page 176*)
View	

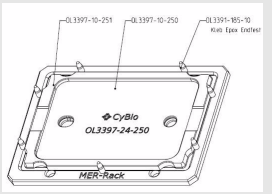
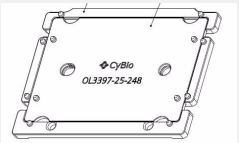
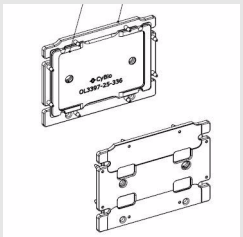
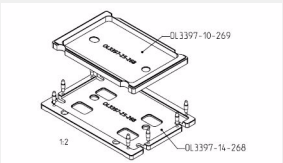


Drawing number	Name	Comment	Entry no. in adapter database	Max. foot-print (mm)	Height (mm)	MP type	
OL3397-25-262	Micronic tube rack adapter	Only for combined use with a 6 mm adapter; refer to "Description"	24	Depends on selected M1 adapter type	1.5	Micronic LoBo-Rack 96 (MP51004)	
OL3397-25-330	Co-stacking adapter	Only for combined use with a M1 adapter; refer to "Description"		n/a	0	Micronic Tube Rack (Traxis Rack Dwg. 3743-P-003-1)	

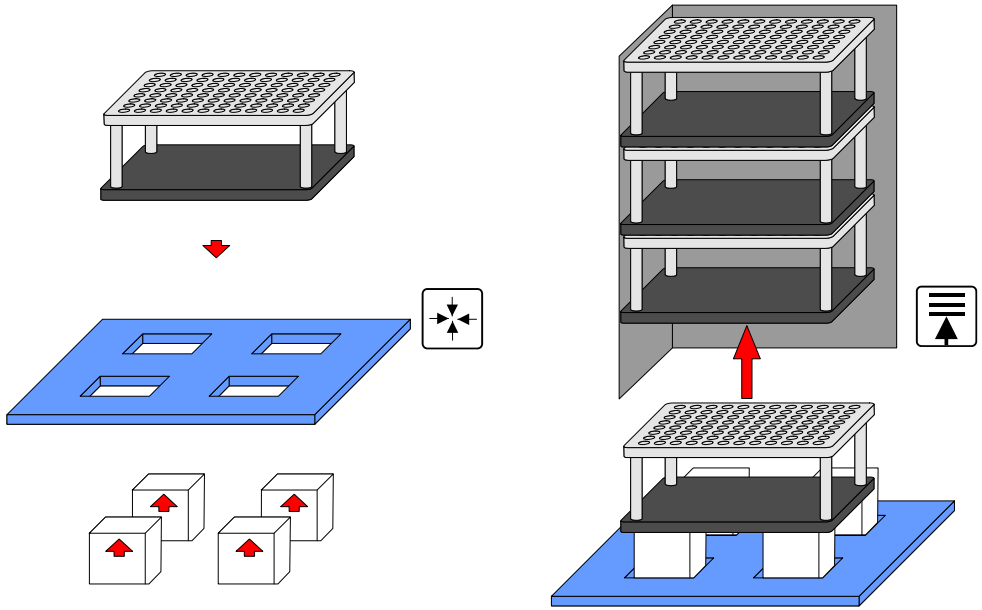
A 1.13 S2 - Stack Supporting Adapter, Two-Part

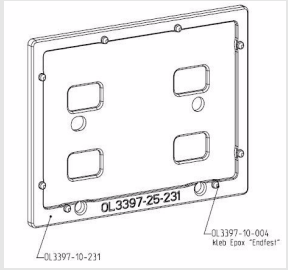
Accessory class	S2
Description	Facilitates stacking of units (microtube racks, filter plates, etc.) that are incompatible with stacker fingers. Adapter consists of a base plate and temporary adapter plate that remains on the base plate on completion of a stacking process.
View	



Drawing number	Name	Comment	Entry no. in adapter database	Max. foot-print (mm)	Heig ht (mm)	MP type	
OL3397-24-250	Micronic:stack adapter		14	90 x 128.8	4	TR	
OL3397-25-248	Stack adapter (similar to OL3396-102-24)			85.8 x 128	6		
OL3397-27-335	Adapter, two-part for mi-cronic racks (1x)			85.3 x 127.7		Micronic RoBo-Rack 96 (M51001)	
OL3397-25-268	Adapter for PCR strips & carriers	INNO-TRAIN		n/a	n/a	PCR strips & carriers	

A 1.14 Stack Adapter for 8/1-Channel Accessories

Accessory class	S3	Stacking adapter for 8/1-channel accessories (tips, reservoirs)
Description	Facilitates stacking of units (accessories to CyBio 8/1-channel pipettors like tip and reservoir holders). Adapter consists of a permanent adapter plate that remains on the transporting carriage. Accessory units can only be stacked in a specially designated stacker. For adaptation of accessory units to transporting carriage without a stacker, only a M1 adapter (→ *refer to page 176*) is required.	
View		

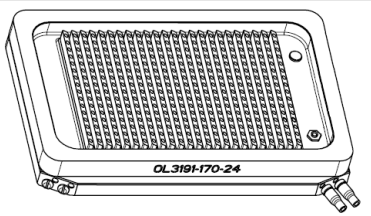
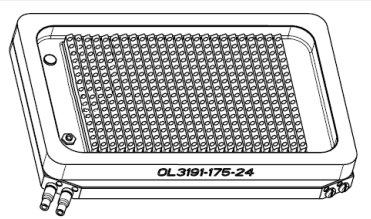
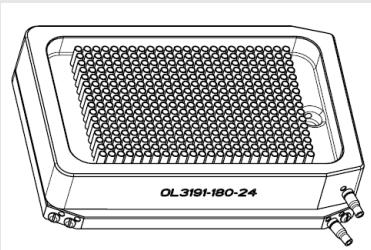
Drawing number	Name	Comment	Entry no. in adapter database	Max. foot-print (mm)	Height (mm)	MP type	
OL3397-25-231	DiluS stacker adapter		1	86 x 128.4	3.5	8/1-racks	

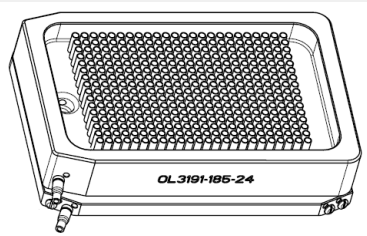
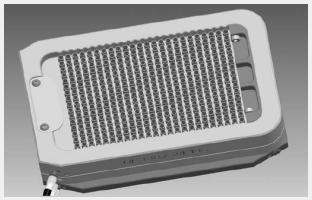
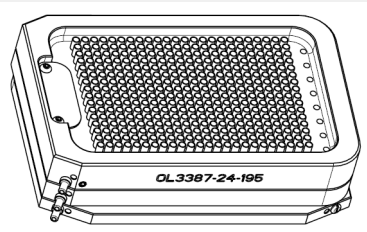
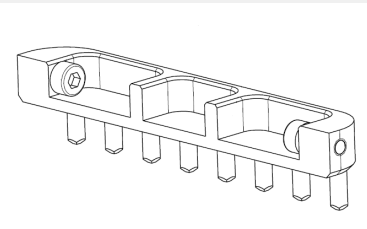
CyBio Assortment of Tip & Capillary Washing Troughs & Reservoirs

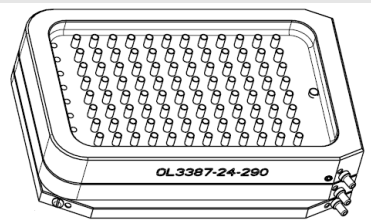
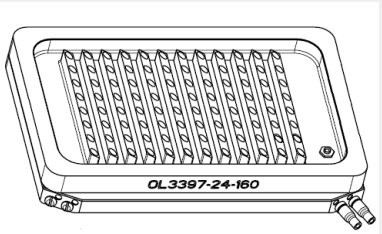
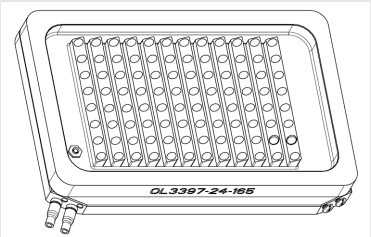
A 2 CyBio Assortment of Tip & Capillary Washing Troughs & Reservoirs

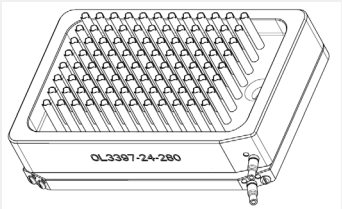
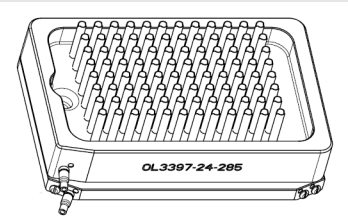
- ❑ Tip & capillary washing troughs and reservoirs are included in the product portfolio of CyBio AG.
- ❑ All tip & capillary washing troughs are registered and maintained (as necessary) in the adapter database of CyBio® Composer CyBio control software.

A 2.1 Tip & Capillary Washing Troughs

Drawing	Name	Comment	Orientation	Entry no. in SW database	Material	96	384 SIM	SW / DW	View
OL3191-170-24	TWS	Tip washing trough 384	right	ID 63	PEEK, EPDM		x	SW	
OL3191-175-24	TWS	Tip washing trough 384	left	ID 63	PEEK, EPDM		x	sw	
OL3191-180-24	TWS	Tip washing trough 384	right	ID 68	PEEK		x	dw	

Drawing	Name	Comment	Orientation	Entry no. in SW database	Material	96	384 SIM	SW / DW	View
OL3191-185-24	TWS	Tip washing trough 384	left	ID 68	PEEK, stain-less steel		x	dw	
OL3387-24-190	CWS	Capillary washing trough 384, with vacuum suction device	right	ID 69	PEEK		x		not available
OL3387-24-195	CWS	Capillary wash station 384, with vacuum suction device <u>Accessory:</u> Sealing comb –Seals suction holes –Inflow tube must connect to waste 	left,	ID 69	PEEK, stain-less steel		x		 

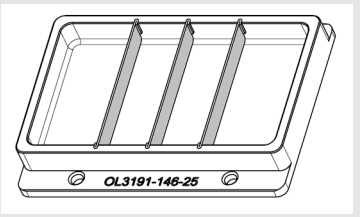
Drawing	Name	Comment	Orientation	Entry no. in SW database	Material	96	384 SIM	SW / DW	View
OL3387-24-290	CWS	Capillary wash station 96, with vacuum suction device	right	ID	PEEK, stainless steel	x			
OL3397-24-160	TWS	Tip wash station 96	right	ID 64	PEEK	x		sw	
OL3397-24-165	TWS	Tip wash station 96	left	ID 64	PEEK	x		SW	

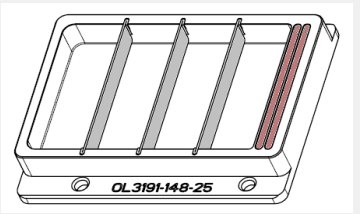
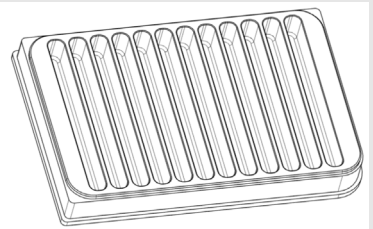
Drawing	Name	Comment	Orientation	Entry no. in SW database	Material	96	384 SIM	SW / DW	View
OL3397-24-280	TWS	Tip wash station 96	right	ID 67	PEEK, stain-less steel	x		dw	
OL3397-24-285	TWS	Tip wash station 96	left	ID 67	PEEK, stain-less steel	x		dw	

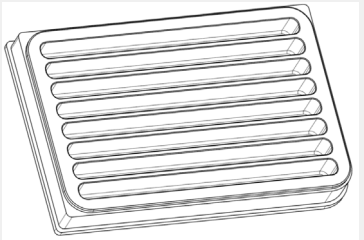
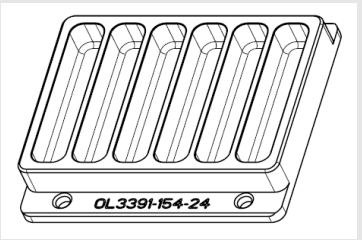
A 2.2 Assortment of Reservoirs

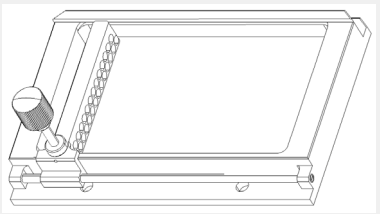
NOTE

Reservoirs with a bottom thickness of 6mm are assigned to code ID 104 in the database of CyBio control software.

Drawing	Name	Comment	96 channels	384 channels	Entry no. in SW database	Material	96 partitioning	384 partitioning	SW/DW	stackable	View
OL3191-146-25	Reservoir	Baffles, volume at 4 mm below edge = 95 ml	x	x	ID 104	PTFE, stain-less steel			sw	–	

Drawing	Name	Comment	96 channels	384 channels	Entry no. in SW database	Material	96 partitioning	384 partitioning	SW/DW	stackable	View
OL3191-148-25	Reservoir 22+1+1	Baffles		x	ID 104 (manual positioning motion required!)	PMMA, stain-less steel		1—22 +23 +24	SW	–	
OL3391-148-22	Column reservoir	Adapter required (OL3397-25-110) Volume per column = 2 ml	x		(manual positioning motion required!)	PTFE	1+2+... +12		sw	x	

Drawing	Name	Comment	96 channels	384 channels	Entry no. in SW database	Material	96 partitioning	384 partitioning	SW/DW	stackable	View
OL3391-148-23	Line reservoir	Adapter required (OL3397-25-110) Volume per line = 3 ml			(manual positioning motion required!)	PTFE	A+B+... +H		sw	x	
OL3391-154-24	Special reservoir		x		(manual positioning motion required!)	PTFE	(1–2) +(3–4) +(5–6) +(7–8) +(9–10) +(11-12)		sw		

Drawing	Name	Comment	96 channels	384 channels	Entry no. in SW database	Material	96 partitioning	384 partitioning	SW/DW	stackable	View
OL3396-410-24	MTP stir-rer set	Cell mix function	x	x					sw		

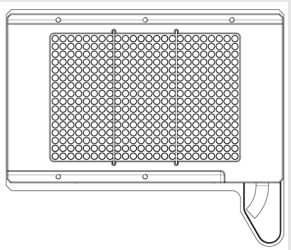
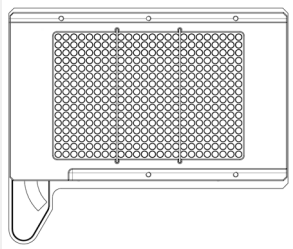
NOTE

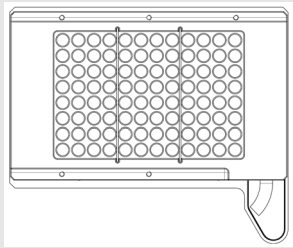
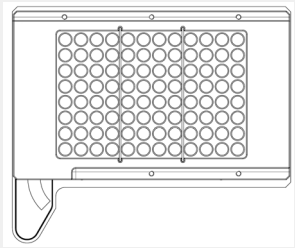
Further reservoirs available on request!

For reservoirs, the following height adapters are available (refer to → *page 175* at seq.):

- ❑ OL3396-190-28
- ❑ OL3396-190-29
- ❑ OL3396-190-30
- ❑ OL0051-25-965

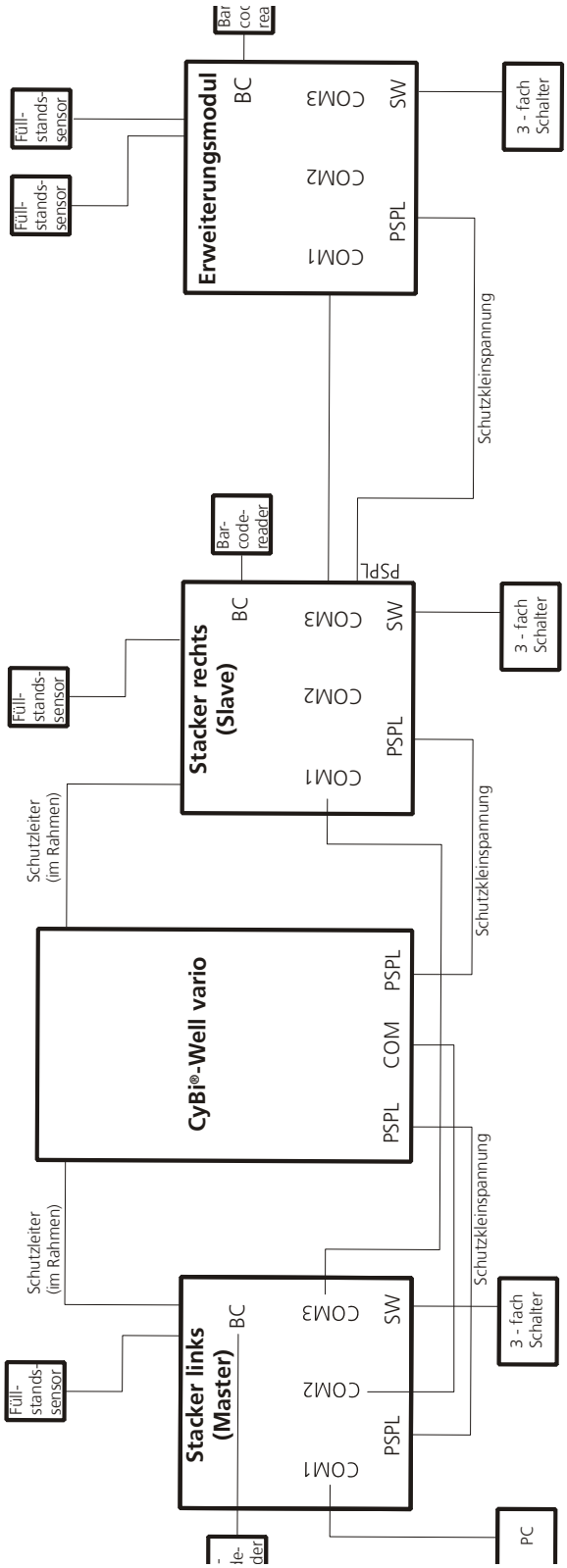
A 2.3 Cooling Reservoirs

Drawing	Name	Comment	Orientation	Entry no. in SW database	Material	96	384 SIM	SW / DW	View
KS3397-24-600	Cooling reservoir	Baffles; only combined with reagent cooling system	right	130	Aluminium with Halar coating		x	sw	
KS3397-24-605	Cooling reservoir	Baffles; only combined with reagent cooling system	left	130	Aluminium with Halar coating		x	sw	

Drawing	Name	Comment	Orientation	Entry no. in SW database	Material	96	384 SIM	SW / DW	View
KS3397-24-608	Cooling reservoir	Baffles; only combined with reagent cooling system	right	131	Aluminium with Halar coating	x		sw	
KS3397-24-610	Cooling reservoir	Baffles; only combined with reagent cooling system	left	131	Aluminium with Halar coating	x		sw	

A 3 Cabling Diagram for CyBi®-Well Systems

CyBi®-Well system with stackers, extension module and barcode reader



A 4 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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