

LB 925
Crocodile miniWorkstation

Operating Manual
84024BA2

Rev. No.: 02, 07/2018

Not for use in in-vitro diagnostic (IVD) procedures.

The information in this guide is subject to change without notice.

DISCLAIMER

TO THE EXTENT ALLOWED BY LAW, BERTHOLD TECHNOLOGIES AND/OR ITS AFFILIATE(S) WILL NOT BE LIABLE FOR SPECIAL, INCIDENTAL, INDIRECT, PUNITIVE, MULTIPLE, OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING FROM THIS DOCUMENT, INCLUDING YOUR USE OF IT.

This instrument is not designed or intended for use with installations or equipment in hazardous environments. Servicing of the instrument must only be performed by Berthold Technologies Field Service Engineers or service staff authorized by Berthold Technologies.

Please contact our Service Center at service@berthold.com if you have any operational issues.

Berthold Technologies GmbH & Co. KG

Calmbacher Str. 22
75323 Bad Wildbad, Germany
www.berthold-bio.com

Telephone +49 7081 177-0
Fax +49 7081 177-100
bio@berthold.com

Table of Content

1. Preface	7
1.1 Contact information.....	7
1.2 Typographical Conventions.....	8
1.3 Revision History	10
1.4 Intended Purpose	10
1.5 Safety Instructions and Precautions.....	12
2. Getting Started	17
2.1 Unpacking and Check of Shipment.....	17
2.2 Setup and Installation of Hardware	17
2.2.1 Installation of the Acrylic Cover	18
2.2.2 Connecting Cables	19
2.2.3 Operating conditions	19
3. Hardware Description.....	20
3.1 Microplate holder	20
3.2 Internal Waste Container.....	21
3.3 Dispenser	22
3.4 Shaking Function.....	23
3.5 Sample Incubation	23
3.6 Washer	23
3.7 Reader (5-in-one only)	24
4. Software.....	25
4.1 Software Installation and connection	25
4.2 Commissioning.....	27
4.3 Check Installation.....	28
4.4 The Main Window.....	28
4.5 Setup an Assay	29
4.5.1 Edit an incubation step	30
4.5.2 Edit a shaking step	31

4.5.3 Edit a washing step	32
4.5.4 Edit a Dispense Step.....	33
4.5.5 Edit Measure (5-in-one only).....	34
4.5.6 Edit a Manual Step	35
4.6 Run an Assay	36
4.7 Measurement Units (5-in-one only)	38
4.8 Crocodile Result Viewer	38
5. Performance and Quality Control	39
5.1 Performance Checks	39
5.1.1 Washer.....	39
5.1.2 Dispenser	40
5.1.3 Shaker	40
5.1.4 Incubator	40
5.1.5 Reader (5-in-one only)	41
5.2 Quality control measurements.....	41
6. Maintenance	42
6.1 Important information	42
6.2 Cleaning	43
6.2.1 Chemical resistance of materials.....	43
6.2.2 Cleaning of Surfaces.....	44
6.2.3 Cleaning the Liquid Paths.....	44
6.2.4 Cleaning the Washer Manifold.....	46
6.2.5 Cleaning the Dispenser Tips	47
6.2.6 Cleaning the internal Waste Container	47
6.3 Decontamination	48
6.4 Maintenance	49
6.4.1 Changing the Dispenser Lines.....	49
7. Troubleshooting	51
8. Technical Data	56
8.1 Accessories.....	58

9. Preparing Crocodile for Transport.....	59
10. Customer Reply and Decontamination Form.....	60
11. Index	63

1. Preface

1.1 Contact information

BERTHOLD TECHNOLOGIES GmbH & Co.KG

Calmbacher Straße 22
D-75323 Bad Wildbad
Germany

Sales and Customer Support

Internet: www.berthold-bio.com
Phone: +49 (0) 7081-177-0
Fax: +49 (0) 7081-177-100
E-Mail: bio@berthold.com

Central Customer Service

Phone: +49 (0) 7081-177-111
Fax: +49 (0) 7081-177-339
E-Mail: service@berthold.com

1.2 Typographical Conventions

In order to make our manual more user-friendly, we have inserted the following typographical conventions throughout this manual:








	Actions are symbolized by
•	Enumeration is symbolized by numbers or
< > [] → 	Software buttons Menu and Option titles in the software Special note On screenshots: Submenu or information of special importance
	Caution - General warning, risk of danger
	Caution – risk of electric shock
	Caution - corrosive
	Caution - biohazard risk
	Caution – hot surfaces

Table 1-1:
Typographical
Conventions

These symbols appear on the instrument:







	This instrument bears the CE mark
	Manufacturer
SN	Serial number
	Consult instructions for use
	Caution - General warning, risk of danger.
	Caution - biohazard risk
	No domestic waste. The electronic product must not be disposed of in domestic waste.

Table 1-2:
Symbols on the
instrument

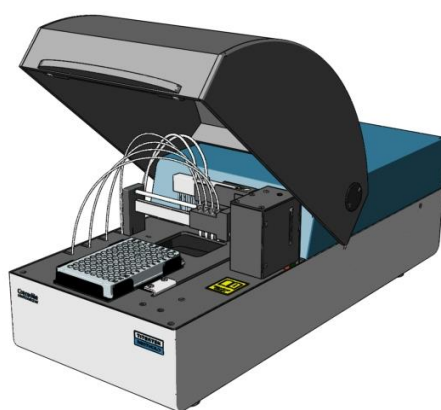
1.3 Revision History

Version	Changes
Crocodile-e-2011-09-short	First issue
Crocodile-e-2016-05	Combined manual version for Crocodile-5-in-one and 4-in-one (non-IVD). Revision of all chapters
84024BA2 rev02, 07/2018	Version identification according to BERTHOLD TECHNOLOGIES' standard. Style sheet changed. Software protection system revised.

1.4 Intended Purpose

The **Crocodile** miniWorkstation has been specifically designed to automate assay applications in 96 well format. The instrument is a multi-function device that performs single function- or combined function protocols which have been designed and validated by the user. Crocodile 5-in-one and 4-in-one may be used for protocols combining the washer-, dispenser-, shaker- and/or incubator function. The 5-in-one version is additionally equipped with a reader to automate colorimetric ELISA assays. Due to the small footprint Crocodile can be set up in any lab workplace. Crocodile is operated using special Windows software.

Figure 1-1:
Crocodile
miniWorkstation



The Crocodile miniWorkstation combined with Crocodile Control Software may be used for the following purposes:

- **Veterinary medicine**, e.g. immunoassays, microbiology, clinical chemistry.
- **Food industry**, e.g. development and quality control in production.
- **Bioanalytical research**, e.g. at universities and pharmaceutical industry
- **Binding assays**, e.g. for sample preparation (without read out).



The system may not be used for purposes other than those described in the “Intended Purpose”.



Certification:

This instrument bears the CE mark, based on conformity to current EC legislation.

1.5

Safety Instructions and Precautions

Please adhere to the following safety instructions and precautions before and during operation of the system or putting the instrument into service:

1. The instruments have been tested by the manufacturer and are supplied in a condition that allows safe and reliable operation. The manufacturer guarantees safe operation of the equipment, both electrically and mechanically, if the user follows the instructions set forth in this manual.
2. The person, responsible for bringing the instrument to market, has to assure that the safety instructions and precautions in this manual are communicated to the user.
3. Only qualified trained personnel may operate the instrument.
4. It is strongly recommended that all users read this manual and the accompanying documents prior to use. These documents include information and warnings that have to be observed by the user to ensure safe operation of the instrument.
5. It is the operator's responsibility to adhere to regulations on the installation and/or operation of sample measuring systems that are required by local legislation in the country of its installation.
6. The user must ensure that the instruments are set up and installed in such a way that their function is not impaired. Please refer to the Crocodile installation description.
7. Only accessories supplied with the instrument or delivered by Berthold Technologies for work with this instrument may be used for operation.
8. Do not connect the power cord near liquids to avoid electric shock and burning. The power cord must never become wet!

9. The power supply must be connected to a wall outlet complying with local regulations of the country of its installation and providing voltage and current according to the specification of the system.
10. **Berthold Technologies** assumes no liability for any damages, including those to third parties, caused by improper installation, use or handling of the device. The instruments are live and improper handling may cause damage.
11. The instrument may only be used for the designated application. Please refer to the Intended Use Statement and the Constraints.
12. The user must assure that assays are validated with the system prior to first use.
13. Some assays, assay components or specimen may pose a biohazard, a risk for infection or other kinds of danger for the user. Always refer to the assay's package insert for adequate safety precautions and recommendations for assay performance and temperature range. Wear appropriate protective equipment such as laboratory coats or chemically resistant rubber gloves and act carefully to avoid chemical burn, contamination and potential infection.
14. The instrument must be decontaminated before repair work or service to avoid contact of the service personnel with potential biohazard material.
15. Only service engineers authorized by Berthold Technologies may carry out service and repair work. Before continued use, reassemble and check the instrument according to instructions in the service manual.
16. For servicing use only parts qualified by Berthold Technologies.
17. Turn the instrument off prior to disconnecting the power cord.

18. Always disconnect the power cord before opening the instrument for service or modifications.
19. All instruments supplied and all additional devices must be grounded. Use three-prong, grounded plugs.
20. The user may only perform the maintenance work described in this manual.
21. The tests and maintenance work recommended by the manufacturer should be performed to make sure that the operator remains safe and that the instrument continues to function correctly.
22. If you think that the instrument has become unsafe to use, switch it off and disconnect it from the power supply.
23. Avoid spilling liquids on the outer surface, the plate carrier and other parts of the instrument. Wipe up all spills immediately and decontaminate the surfaces in cases of biohazard spilled liquids.
24. If liquid gets inside the instrument, disconnect the power cord immediately. Do not operate the instrument if internal components have been exposed to liquids, since they create a potential for electric shock and burning. Have the instrument cleaned by an authorized service center.

The information in this manual complies with the actual state of knowledge at the publication date. When Crocodile is operated in compliance with the instructions in this manual, there are no known risks for the user, the environment or the quality of the measurement results. However, the user should be aware of situations that could result in serious damage. Always read the safety instructions and precautions carefully!



The user must assure that the whole system of Crocodile miniWorkstation, software and assay is subject to a continuous risk analysis done by the user.

Storage conditions

Before delivery or if the instrument is not used for a longer period of time, store it in the original cardboard box in a dry dust-free environment and protected from direct sunlight and significant temperature fluctuations!

Storage temperature:

5-40°C up to 75% humidity (at 30°C), non-condensing

Transport conditions

-25° to +60°C, up to 75% humidity, non-condensing.

Transport in original cardboard box and free of liquids.

Quality control

It is considered good laboratory practice to run known internal quality standards or laboratory samples as well as reagent kit controls, attendant to the measurement runs, according to instructions and specific recommendations included in the package insert of the reagent kit or the standard laboratory protocol for the test to be conducted. Samples should be obtained, treated and stored following the instructions and recommendations of the kit insert.

To ensure proper operation of the system, it is recommended to operate Qualification Procedures at defined time intervals and to use high quality equipment.

Berthold Technologies offers Validation Tools for the Crocodile miniWorkstation, including the IQ/OQ/PQ Qualification Package and the Absorbance TestPlate.

A failure in the performance of Quality Control checks could result in erroneous test data.

Return shipment

If the instrument has to be returned to Berthold Technologies for servicing or inspection, we recommend that you use the original cardboard box. Refer to chapter 9 for details. Always decontaminate the instrument according to the description in the decontamination form in chapter 8. Fill out this decontamination form before return shipment. Berthold Technologies will not accept instruments without filled out decontamination forms for repair or inspection.

**Disposal**

Decontaminate the instrument before disposal! The Crocodile contains electronic parts. To prevent environmental pollution please dispose of the instrument and the corresponding accessories according to local legislation. The electronic product must not be disposed of in domestic waste.

**Disposal of potential biohazard and chemical waste**

Please dispose chemical or potential biohazard waste carefully and according to local legislation. It is recommended to treat potential biohazard waste by autoclaving.

2. Getting Started

2.1 Unpacking and Check of Shipment



The Crocodile miniWorkstation and the acrylic cover are shipped in a cardboard box containing foamed inserts to protect the instrument and the cover from damage. Also included is an accessory box. Carefully unpack the instrument and the accessories.

The instrument is heavy and slightly awkward to lift, use extreme care when unpacking.

- ☐ Ensure that the shipment is complete and shows no sign of transportation damage.
- ☐ Refer to the Accessories Check pasted on the cardboard box to check that all accessories are included.

Should the instrument or instrument parts be damaged in any way, please inform the shipping agent or the manufacturer immediately.

The cardboard box and the foamed inserts should be stored for future shipment or service. Refer to chapter 9 for details.

2.2 Setup and Installation of Hardware

The Crocodile miniWorkstation must be set up carefully on a level workspace in a dry, fairly dust-free room and protected from direct sunlight and significant temperature fluctuations. Due to its dimensions the instrument is space effective.

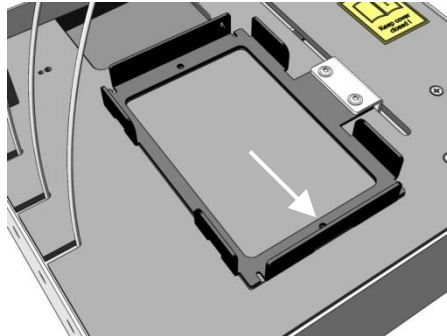
The system must be set up a distance from the wall or other devices to allow disconnecting the power supply from mains at any time. Do not set up next to a radiator or near air conditioning.

- ☐ Remove the transport lock screw that fixes the microplate holder on the surface of the Crocodile.

- ❑ Store the transportation lock screw for subsequent use. The transportation lock screw should be installed again any time the instrument is in transport to another location.

Figure 2-1:

Mounting position of the transportation lock screw



2.2.1

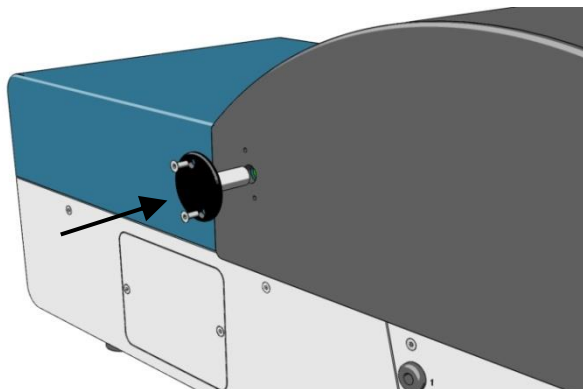
Installation of the Acrylic Cover

The acrylic cover is shipped as a single component and must be installed prior to use.

- ❑ Install the acrylic cover as shown in the drawing below using the two cover-pins and fix them with 2 screws each at the right and left side of the cover. Rotate cover-pins anti-clockwise while inserting. Handle with care!

Figure 2-2:

Installation of the acrylic cover

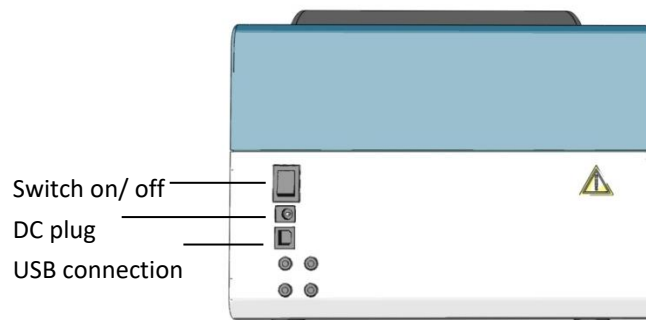


- ❑ To prevent introduction of dust/dirt, open the cover only for loading, unloading and cleaning.

2.2.2 Connecting Cables

- ❑ Cable connections are located at the rear of the instrument below the power switch. Use the provided power supply and cables only.

Figure 2-3:
Crocodile
miniWorkstation
rear view



- ❑ For connecting the Crocodile miniWorkstation to PC, use the supplied USB cable and refer additionally to chapter 4.1 Software Installation.

2.2.3 Operating conditions

Operation Temperature: 10° C - 35° C up to 75% humidity (non-condensing)

Operation outside the specified temperature and humidity range may cause results to fall outside the specified range.

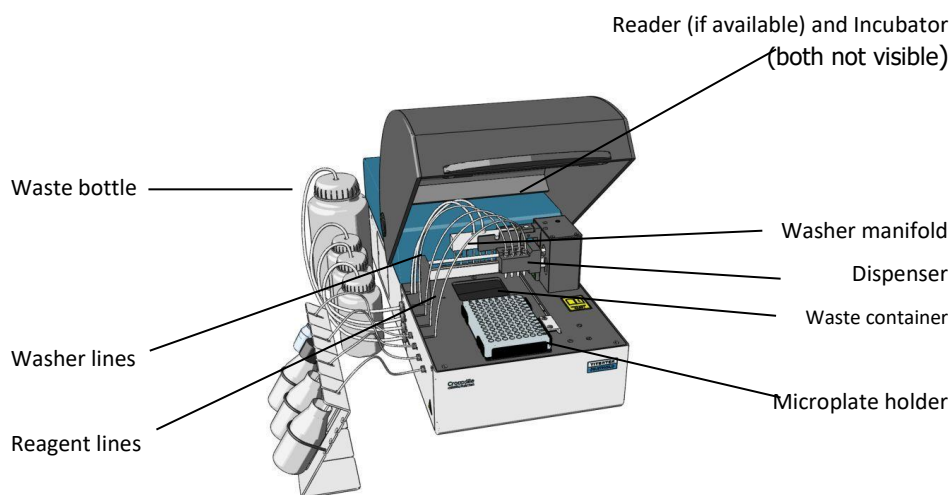
The system can be operated up to 2000 m above sea level.

3. Hardware Description

The **Crocodile** miniWorkstation is a compact desktop unit which has been specifically designed to automate assay applications in 96 well formats. The Crocodile 5-in-one is equipped with all necessary components required for running an ELISA Assay (washer, dispenser, shaker, incubator and reader). Crocodile 4-in-one is a model without reader. Due to its small footprint, Crocodile can be set up in any lab workplace.

Figure 3-1:

System overview



3.1

Microplate holder

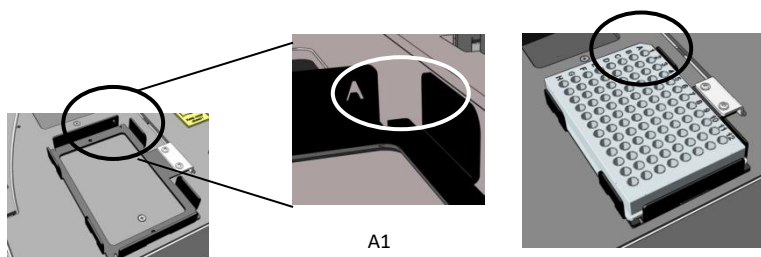
All 96- well microplates in standard format can be run on the **Crocodile miniWorkstation**. The microplate is placed on a mobile microplate holder located on top of the instrument. The software controls the movement of the microplate holder. Always keep the microplate holder free of dust and dirt. In emergencies (power failure), the plate holder may be moved manually.

Loading/Unloading the microplate

The microplate holder is marked with A1 on the right back side. Place the microplate on to the plate transport such that

the digits on the microplate are located on the back right side – from the user's perspective.

Figure 3-2:
Microplate

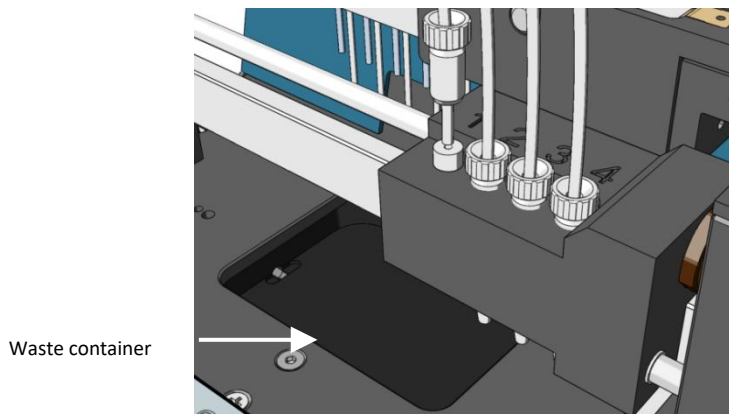


3.2

Internal Waste Container

The **Crocodile** miniWorkstation is equipped with a built-in waste container for priming and washing the dispenser and washer lines.

Figure 3-3:
Waste
container and
dispenser unit

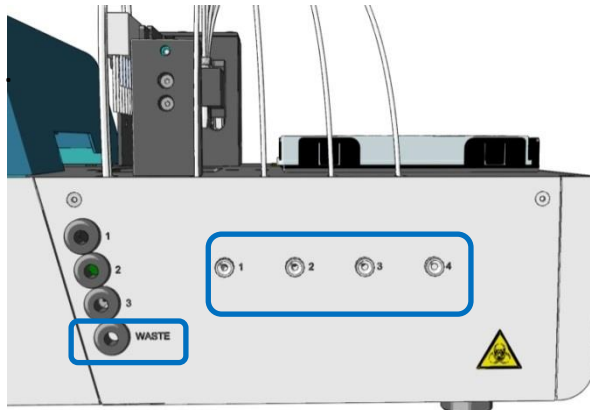


The liquids are exhausted automatically after each priming or washing step. The waste line must be connected to the waste outlet, marked with **Waste**, at the instrument's side. Always connect the waste line to the external waste bottle prior to use!

3.3 Dispenser

The **Crocodile** includes four integrated dispensers, each equipped with an independent pump.

Figure 3-4:
Position of the 4
dispenser inlets
and 1 waste
outlet at the
instrument's side



The dispenser pumps are numbered to correspond with the dispensers at the detection optics

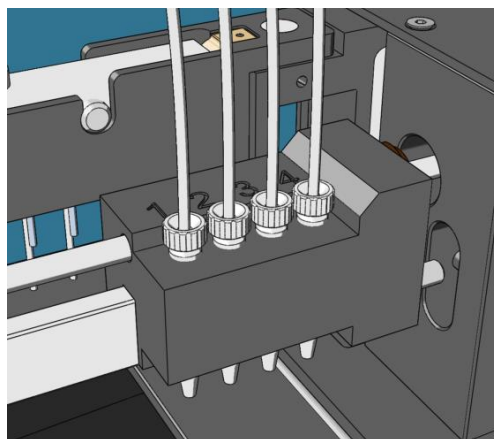


Figure 3-5:
Dispensers

The dispenser tips are preinstalled and ready to be used. The dispensers must be cleaned and maintained occasionally to be fully functional. Check the fittings for tightness from time to time. If a connection is leaking, it has to be replaced. Refer to chapter 6.4 for instructions.

3.4 Shaking Function

The **Crocodile miniWorkstation** features a shaking mode with independent linear motion from 5 – 20 Hz. The function is controlled by software.

3.5 Sample Incubation

The **Crocodile** miniWorkstation includes an incubation chamber and provides a heating function from ambient +4°C up to 55°C. This function is controlled via software.

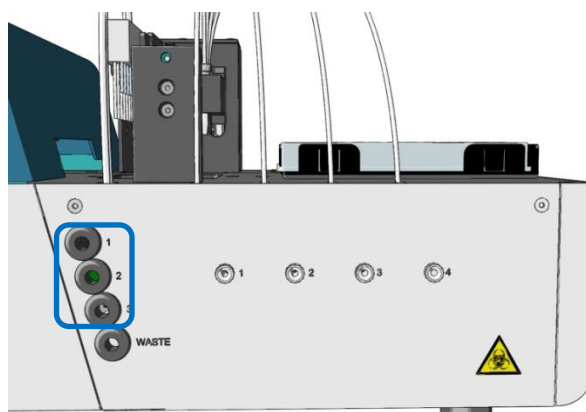
When working with these functions, microplates with flat bottoms are strongly recommended to achieve optimum heat transfer.

The microplate can be heated, but not cooled.

3.6 Washer

It is possible to connect up to 3 wash buffers to the inlets 1-3 at the side of the instrument.

Figure 3-6:
Position of washer
inlets 1-3

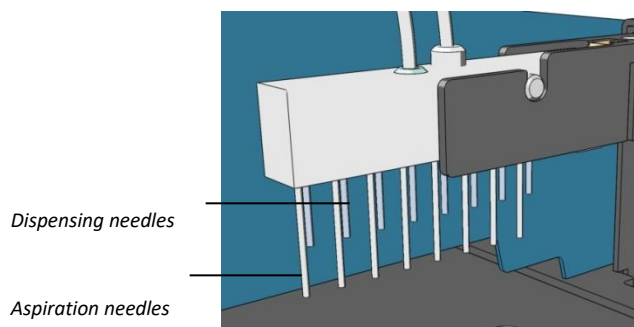


The washer manifold is built up of 8 pairs of separate dispensing needles (short needles) and aspiration needles

(long needles). The 8 way manifold can dispense in a range between 50 and 1000 μ l.

Figure 3-7:

Dispensing and aspiration needles at the washer manifold



3.7

Reader (5-in-one only)

The reader has a dynamic range between 0-3.0 OD. The spectral range is from 400 – 690 nm. Pre-installed filters for mono and bi-chromatic reading are: 405; 450; 492; 620 nm. There are 8 independent photometric reading channels. An additional channel is used for regulation of the lamp.

The plate holder with the microplate moves into the reader unit, positioning the wells to be counted exactly below the reader. The wells are automatically measured column by column (A1 to H1, A2 to H2 ... A12 to H12)

The reader is not accessible to the user. Therefore, only authorized service agents may clean the measurement chamber.

4. Software

Windows based software carries out operation and control of the **Crocodile** miniWorkstation. This software, which features clearly structured menus and intuitive user guidance, has been designed specifically for this field of application.

The standard software package contains all necessary driver software and consists of the following parts:

- ☐ Crocodile control software (CCS): for protocol management and instrument control.
- ☐ Crocodile Report viewer: for view and storage of the assay report with results and export as Excel, Word, pdf or HTML document.

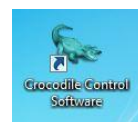
It is possible to use the qualitative and quantitative data reduction package MikroWin (lite or advanced version) additionally, which is optional and has to be ordered separately. The MikroWin software is protected by a USB dongle.

The description of the MikroWin module is not part of this manual.

4.1 Software Installation and connection

The Crocodile miniWorkstation is operated via Crocodile Control Software, delivered on a data carrier. **Install the Software according to the instructions and before connecting the instrument to PC.**

- ☐ Connect the data carrier to your computer and double click and run the “setup_XXXXg_CCS_X.X.exe”. Follow the installation wizard for installation of the CCS. The Crocodile Control Software icon will appear on your desktop after installation.
- ☐ Double-click the CCS icon. The software will open and show a registration form



Software Registration

Use the Crocodile control software within the trial period of 30 days after first run without registration. A prompt to enter a registration password will appear each time the software is started until the registration password is entered.

Registration Form

Registration of Crocodile Control Software

BERTHOLD
TECHNOLOGIES

This unregistered version of the Crocodile Control Software will run for 30 days after first run.
Please register before that time to enable unlimited use.

Days left: 30

Run now, register later...

System ID: CCS-400220

Step 1: Obtain Password

E-mail Web Fax

Step 2: Enter Password

Please enter your registration information here:

Name:

Company:

Password:

Register Now Cancel

User may close the [**Registration Form**] dialog box by clicking **<Run now, Register Later>** and continue working with the software. The remaining days of the trial period are decremented.

Enter the password within 30 days to enable unlimited use.

Password request:

- ☐ Request the password via E-Mail, Fax or Web. Press the respective E-Mail, Web or Fax button, insert the required information in the predefined mail, fax form or web registration form and forward it to BERTHOLD TECHNOLOGIES.

- ☐ Alternatively request the password via the BERTHOLD TECHNOLOGIES homepage. Please provide the System ID of the PC. The number is printed in red in the registration dialog of the software.

Registration procedure

Owner will receive the registration password from BERTHOLD TECHNOLOGIES.

- ☐ When the **[Registration Form]** dialog box appears, enter the user's name, the company name and the provided password. Click **<Register Now>**. Upon entry of the correct password, continue using the software. The **[Registration Form]** dialog box will not appear again.

If MikroWin software has been ordered:

- ☐ The MikroWin software is protected by a USB dongle. Install the software before connecting the USB dongle to the computer. The installation will copy the necessary USB drivers required during USB device detection. To use all the functions it is necessary to attach this protection system to your computer after the software is installed. The USB-Dongle is directly connected to a free USB port of the computer.

4.2

Commissioning

As described above the instrument must not be connected to a PC during software installation. Please observe the following sequence to establish the system for error-free operation:

- ☐ Disable the Power Save Mode of your PC before using Crocodile Control Software!
- ☐ Connect the instrument to a PC via USB cable.

- ☐ Connect the instrument to the mains using the provided cables and switch on. Do not use any other than the provided cables.
- ☐ Double-click the software icon of the Crocodile Control Software on the desktop. The main window will appear. All functions of the software will now be available.

4.3

Check Installation

- ☐ To check the installation, open [Select Assay] in the Main window and start Assay1<read only>. If necessary, refer to chapter 4.6 for details.
- ☐ Assay1<read only> will start running all hardware components to ensure operation.

4.4

The Main Window

The Main Window contains the following menus:

[Help]: information about [Program Activation] and [About Crocodile Control Software]

[Options]: information on Assay-, Overlay- and Data Directory

[Assay Setup]: use this menu to setup assay protocols.

[Instrument]: allows changing the plate carrier position [Move to insert position] and the [Incubator settings...] independently from a protocol.

[Maintenance]: contains the maintenance menus for the [Dispenser...] and the [Washer...] and information about the [Instrument configuration...].

[Select Assay]: provides a list of assays to perform

4.5 Setup an Assay

The **[Assay Setup]** menu provides several functions to program an assay according to your needs.

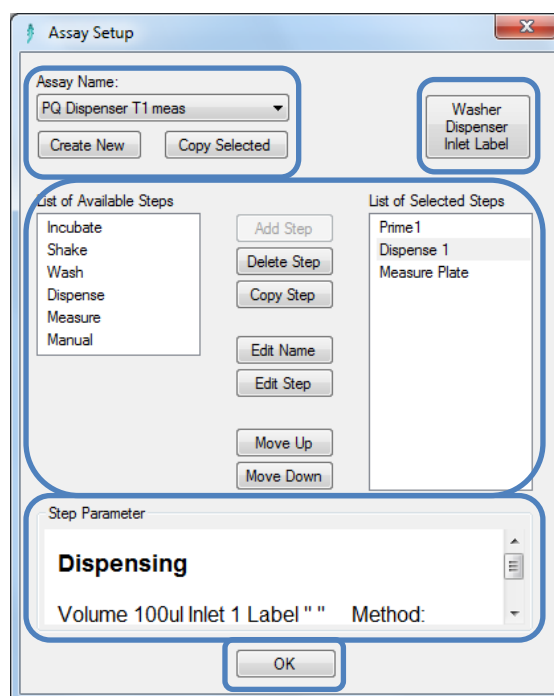
[Assay Name]

- ☐ Select, copy or create a new assay.

[Washer Dispenser Inlet Label]

- ☐ Define buffer and reagent positions. The information will be listed in the result report of the assay.

Recommendation for Dispenser: For best results, use the same substrate inlet (e.g. inlet 3) and the same stop solution inlet (e.g. inlet 4), in all assays, and set the labels accordingly.



Configure the Assay:

- ☐ Click on a step in the [List of Available Steps]
- ☐ Click on the button <Add Step>. The selected step will appear in the [List of Selected Steps]. Every selected step can be deleted or copied by using the buttons <Delete Step> or <Copy Step>.

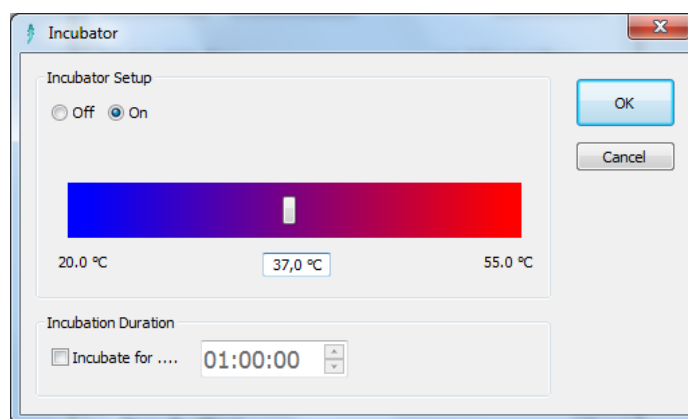
Configure the Assay Steps:

- ☐ Every step in the [List of Selected Steps] must be configured using <Edit Name> and <Edit step>. Click on a step and on the respective button afterwards to rename the step or to open a submenu for editing. For details about editing steps refer to chapter 4.5.1 - 4.5.6.

Step Parameter:

When a step in the [List of Selected Steps] is highlighted, its parameters are shown in the sub window [Step Parameter].

- ☐ Confirm all entries with<OK> to save the assay.

4.5.1**Edit an incubation step**

- ☐ Switch on the incubator.
- ☐ Set the temperature using the bar or edit the [temperature dialog box].



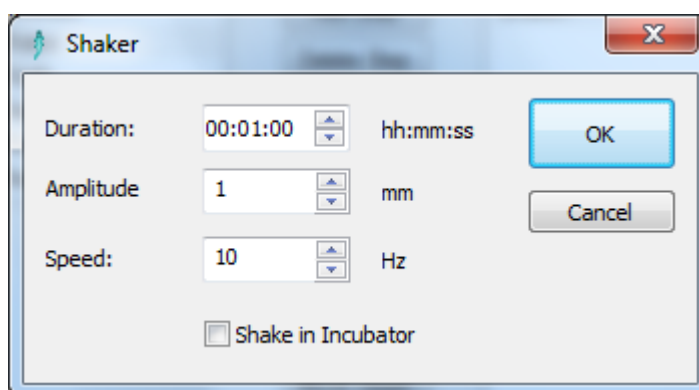
- ☐ For a defined **[Incubation Duration]** tick the check box **[Incubate for...]** and set the time **[hh:mm:ss]**.
- ☐ Confirm your settings with **<OK>**.

If a temperature higher than 45°C is set, a warning icon will appear.

For assays containing an incubation step it is recommended to add an additional incubator step at the end of the assay, which switches off the incubator.

4.5.2

Edit a shaking step



- ☐ Insert your settings for **[Duration]**, **[Amplitude]** and **[Speed]** into the Shaker dialog box.
- ☐ For shaking inside the incubator tick the respective check box.
- ☐ Confirm your entries with **<OK>**.

4.5.3

Edit a washing step

Washer

Wash Process: Standard

Cycles: 1

Dispense Settings

Inlet: Wash Solution 1 Volume: 100 µl

Depth: 1300 / 0

Aspiration Settings

Depth: 1300 / 0 Delay: 1 s Wait: 100 ms

☐ Sweep Mode Enabled

Sweep Settings

Diameter: 4 mm Speed: 2 mm/s

Select Columns:

	1	2	3	4	5	6	7	8	9	10	11	12
A												
B												
C												
D												
E												
F												
G												
H												

Washing is one of the most important steps in colorimetric ELISAs. Therefore it is strongly recommended to optimize washing steps for the microplate used and according to the description in the assay insert.

- ☐ Select a **[Wash Process]** and the number of **[Cycles]** for this process. The list contains self-declaring processes for priming, dispensing, aspiration or clearance of the system.

Additionally, 3 wash processes combining Aspiration (Asp) and Dispense (Disp) are available.

The following sequences will be performed for 1 Cycle:

Standard:

For every selected column: Asp / Disp / final cycle: Asp

Overflow wash:

For every selected column: Asp and Disp simultaneously

Soak wash:

Disp all columns / Asp all columns

- ❑ Select an **[Inlet]** and optimize **[Dispense Settings]** and **[Aspiration Settings]** according to your needs. Take special care in optimizing the **<Depth>** for the aspiration of your specific microplate.

The default setting of the Manifold Depth for the Dispense step usually needs no adjustment, but the default setting of the Plate Adjustment for the Dispense step needs to be optimized, to define the optimal horizontal position for the dispensing of wash buffer.

The **[Manifold Depth]** and the **[Plate Adjustment]** of the **[Aspirate Settings]** differ for each microplate type due to their different physical dimensions. For optimal washing results, the settings must be defined for each microplate type on every Crocodile instrument.

To check your settings click **<Test Depth>**. Lift the microplate holder on its left side to check if there is sufficient space between aspiration needle and microplate well bottom. For minimal residual volume the needle should not touch the bottom and the distance between the needle and the bottom should be around 1-2 mm. If necessary, re-adjust.

Click **<Apply>** to save your entries.

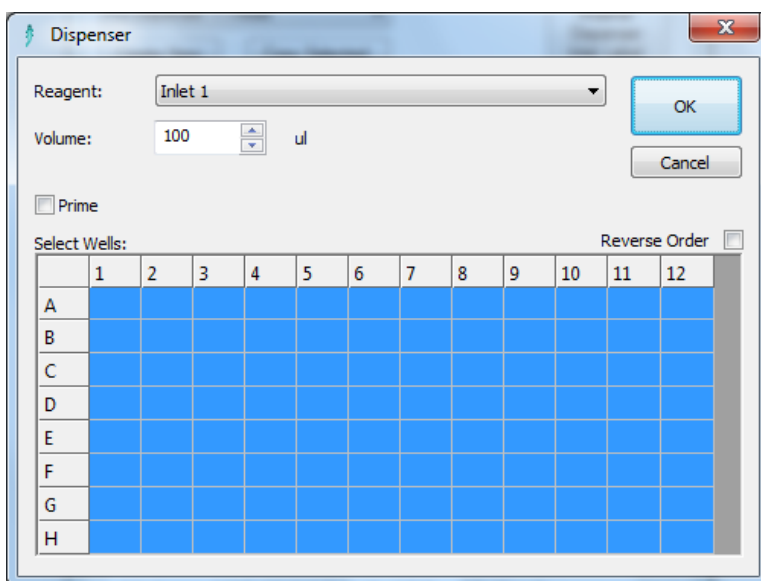
- ❑ For good washing results it is recommended to enable the **[Sweep Mode]** and optimize the settings for **[Speed]** and **[Diameter]** for your plate.
- ❑ By default the whole microplate is processed. If necessary, select only the columns needed.
- ❑ Confirm your entries with **<OK>**.

4.5.4

Edit a Dispense Step

Four dispensers are available. Before use of a dispenser it has to be primed.

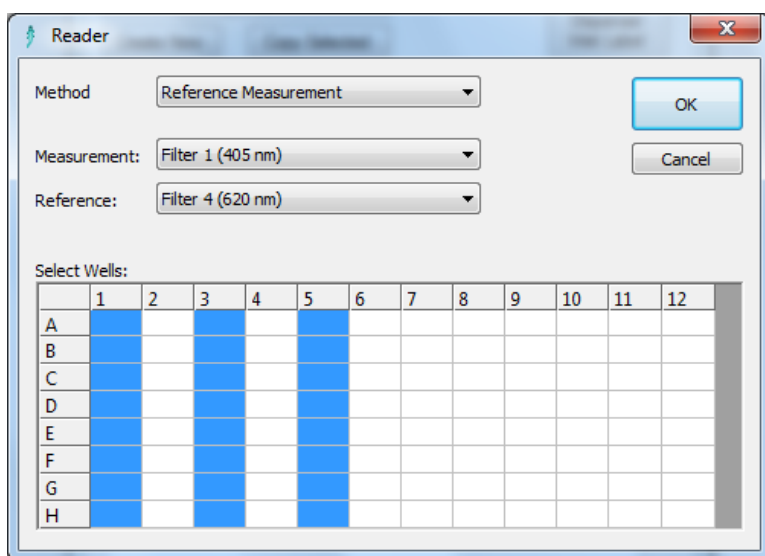
- ❑ Select a **[Reagent]** inlet and set the **[Volume]**
- ❑ For Priming tick the check box **[Prime]**.



- ☐ For dispensing select the columns, if necessary. By default the whole microplate is processed.
- ☐ For reverse dispensing tick the check box **[Reverse Order]**.
- ☐ Confirm your entries with **<OK>**.

4.5.5

Edit Measure (5-in-one only)



The Measure step must always be defined, because no filter is pre-set.

- ☐ Choose between **[Single Wavelength]** and **[Reference Measurement]** (two measurements) in the **[Method]** drop-down list box.

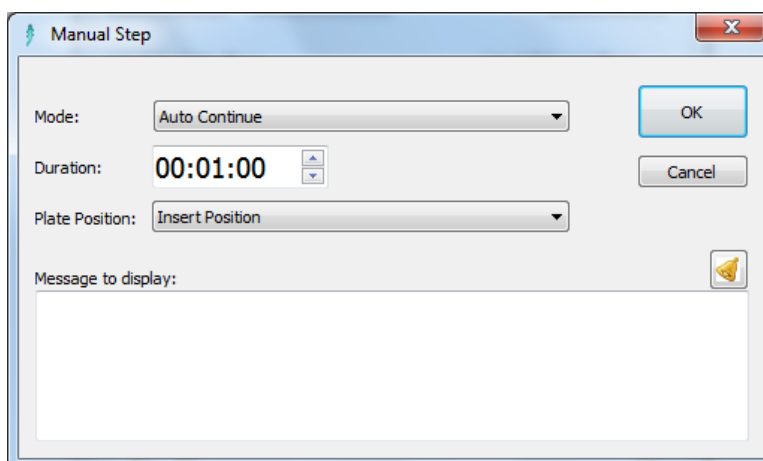
- ☐ Choose a filter from the list of available optical filters in the **[Measurement]** drop-down list box.
- ☐ If you have selected **[Reference Measurement]**, select the optical filter for the reference measurement.
- ☐ By default the whole microplate is processed. If necessary, select only the columns needed.
- ☐ Confirm your entries with **<OK>**.

4.5.6

Edit a Manual Step

The Crocodile Control Software allows manual steps of an individual **[Duration]** and a selected **[Plate Position]**.

- ☐ Select **[Auto Continue]** or **[User Continue]**, set the **[Duration]** time and select the **[Plate Position]**.



[Auto Continue] After a certain period, which is selected in the Duration drop-down box, the next assay step will be executed.

[User Continue] The system will not continue with the next assay step before the user clicks **<Continue>** which will temporarily replace the Abort box during an assay run.

- ☐ Tick the alarm clock icon to open the **[Alert Configuration]** menu.

If a Manual step with User Continue mode has been selected, the calculated end time of the assay may be exceeded, depending on the additional delay which is introduced by the user during the assay run.

4.6

Run an Assay

- ❑ Start at the Main Window and click [**Select Assay**]. A list of stored assays will be shown to select the assay to be performed.

The next screen will be the **Plate Identification / Meta Data** screen.

Plate Identification / Meta Data

Plate Identification

Plate ID: 20110412 Training

OK

Cancel

Assay Meta Data

Training

Washer Meta Data

Inlet 1: Buffer 1

Inlet 2:

Inlet 3:

Dispenser Meta Data

Inlet 1: Reagent exp Date

Inlet 2:

Inlet 3: TMB exp Date

Inlet 4: Stopp exp Date

- ❑ Enter the [**Plate ID**] and, optional, information about the assay and the reagents to be used and confirm with <OK>
- ❑ Buffers and reagents defined in the <**Washer Dispenser Inlet Label**> of the Assay will occur as [Meta Data] on the left side.
- ❑ The [**Plate Overlay**] allows selecting wells, different from the settings in the protocol. Confirm with <OK>.

Please note: It is not allowed to extend the number of wells compared to the protocol settings, but only to reduce them. If the number of wells is not the same for all steps of a protocol, it is recommended to avoid any changes at this point. In this case do not select any wells here and confirm with **<OK>**. The protocol will now be performed according to the assay setting.

- ☐ Press the button **[Start]** to start the assay. Crocodile will perform the defined steps and show the progress on the screen.

After the run, the measurement data will be stored as an .ewdat file and can be transferred for inspection and further calculation to the **Crocodile Result Viewer** or **MikroWin** at any time.

For the standard software package:

- ☐ Click **<Report>** to open the Crocodile Result Viewer and see assay and OD values. Transfer data to Excel, Word, pdf or HTML for further calculation.



If MikroWin software is installed and running:

- ☐ Click **<MikroWin>** to start the import of data to MikroWin.



If MikroWin is installed, but not running, the Crocodile Result Viewer is available.

- ☐ Click **<Report>** to transfer data for inspection and further calculation.

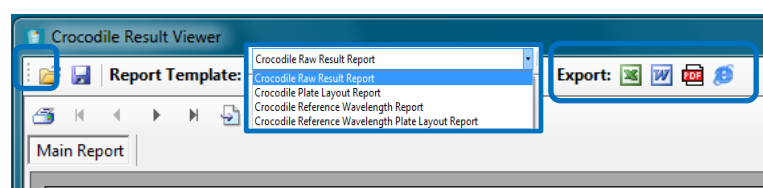
4.7 Measurement Units (5-in-one only)

The Crocodile miniWorkstation with Crocodile Control Software obtains O.D. values as measurements results. This does not directly represent the analytical result of an analysis. It is subject to further data evaluation.

It is in the responsibility of the user to evaluate clinical results out of these O.D. values by use of an adequate calculation method, selected in accordance to the needs of the assay performed. Please refer to the kit insert for recommendations. The whole system of Crocodile miniWorkstation, assay, PC software and evaluation method, both PC based or manually, must be validated by the user.

4.8 Crocodile Result Viewer

- ❑ Click **<Report>** directly after the run. The Crocodile result Viewer program starts immediately and shows the complete Assay Report.
- ❑ Alternatively, open the program **[Crocodile result Viewer]** and import a file (*.ewdat) from the assay directory (see **[Main window] / [Options]** for information).



- ❑ The report can be configured individually.
- ❑ **Export** and save the assay report with results as Excel, Word, PDF or HTML document.

5. Performance and Quality Control

5.1 Performance Checks

Performance checks are necessary for every part of the miniWorkstation and particular instrument functions in defined time intervals. Please view the chapter on Software before programming the respective protocols with the Crocodile Control Software. It is recommended to use the same set of protocols every time the performance checks are carried out. In cases of failure repeat the checks and refer to the troubleshooting list.

5.1.1 Washer

The washer manifold provides 2 functions, a dispenser and a suction function, which have to be checked separately. For these checks it is necessary to **determine the instrument specific optimized depth for your specific microplate for dispensing and aspiration prior to the check.**

Use the Crocodile Control Software and set up a protocol with the following settings:

- ☐ Prime washer inlet 1 with distilled water: 8 cycles; volume: 1000µl. Total priming volume for the inlet will be 64ml.
- ☐ Program a washer dispense step that dispenses 200µl of distilled water to row 1-4 of a microplate using inlet 1.
- ☐ Repeat the priming and the dispense step for inlet 2 and 3. Inlet 2 is used for dispense in row 5-8 and inlet 3 for row 9-12.
- ☐ Program a manual step, followed by an aspiration step with the following settings for the whole microplate.
 - Aspirate only / 1-2 cycles
 - Enable sweep mode: 4-5mm diameter; 2-3mm/s speed
- ☐ Perform the protocol with an empty microplate. Use the manual step to visibly inspect the fluid volumes to be

equal in all wells. The residual volume after aspiration depends on your individual settings and should be approximately equal.

5.1.2 Dispenser

Every dispenser must be checked separately. Dispense 3 rows/ dispenser as a minimum.

- ☐ Weigh an empty 96 well microplate and note the weight.
- ☐ Program a protocol for a dispenser, that primes first with 2000µl and dispenses 100µl of distilled water to each selected well afterwards. Operate the protocol with the empty plate and distilled water.
- ☐ Weigh the microplate after dispensing, then, and subtract the empty weight to get the weight of the dispensed water.
- ☐ Divide this value by the number of dispensed wells, to get the weight per well.
- ☐ Expected weight: 100mg +- 2mg (2%) per well

5.1.3 Shaker

- ☐ Program and operate a protocol with your individual shaker settings.
- ☐ The shaker function is checked visually.

5.1.4 Incubator

- ☐ Switch on the incubator and program an incubator protocol for heating up to 40°C.
- ☐ View the temperature increasing to make sure that the incubator works well.
- ☐ Do not forget to switch off the incubator afterwards.

5.1.5

Reader (5-in-one only)

- ☐ Set up a protocol for measurement of a whole plate at 450nm.
- ☐ Measure an empty plate tray.
- ☐ Expected O.D. <0.01

5.2

Quality control measurements



It is considered good laboratory practice to run known internal quality standards or laboratory samples as well as reagent kit controls, attendant to the measurement runs, according to instructions and specific recommendations included in the package insert of the reagent kit or the standard laboratory protocol for the test to be conducted. Samples should be obtained, treated and stored following the instructions and recommendations of the kit insert.

To ensure proper operation of the system, it is recommended to operate Qualification Procedures in defined time intervals and to use high quality equipment. Berthold Technologies offers **Validation Tools** for the Crocodile miniWorkstation, including the IQ/OQ/PQ Qualification Package and the Absorbance TestPlate. **A failure in the performance of quality control checks could indicate a risk of error in test data.**

6. Maintenance

Crocodile miniWorkstation is very easy to service. Cleaning, decontamination and replacing the dispenser lines as necessary are the only required maintenance steps.

6.1 Important information



- ☐ The frequency of maintenance and cleaning must match the actual frequency of usage to prevent accelerated aging and abrasion. Some or all of the procedures can be performed more frequently than presented in the maintenance schedule (Table 6-1).



- ☐ Refer additionally to the safety instructions and precautions in chapter 1.
- ☐ It is recommended to wear appropriate protective equipment such as laboratory coats or chemically resistant rubber gloves and to act carefully to avoid chemical burn, contamination and potential infection. Take special care while handling with the dispenser and washer system.
- ☐ Follow the instructions described below. For cleaning and decontamination refer additionally to the recommendations in the package insert of your test kit.
- ☐ In case of questionable measurement results, please follow the steps listed below to ensure the instrument is functioning properly.
- ☐ Before service or shipping any instrument back to Berthold Technologies, the instrument has to be decontaminated. Refer to the Decontamination Form in chapter 8 for further instructions.



No fluid should ever enter the instrument! If this happens, during normal operation or maintenance, disconnect the device from the mains and call for service!

Recommended Maintenance Schedule:

	Daily/ before/ after use	Weekly/ As needed	Yearly/As needed	Before Storage/ Shipment
Clean external surface		✓		✓
Clean microplate holder		✓		✓
Clean/Empty Dispenser System	✓			✓
Clean/Empty Washer Dispenser	✓			✓
Clean/Empty Aspiration path	✓			✓
Clean/Empty internal Waste Container/Waste Tubing	✓			✓
Decontaminate instrument			✓	✓
Clean/Empty Reagent Bottles / Waste Container	✓			✓
Replace liquid tubing			✓	

Table 6-1: Maintenance schedule**6.2 Cleaning****6.2.1 Chemical resistance of materials**

The following materials are used in Crocodile:

- Housing: Steel panel, varnished
- Cover: Acrylic
- Base plate: Aluminium, black varnished
- Microplate holder: Aluminium, anodized and PVC

- Waste container: PVC black
- Black metal parts: anodized
- Metal parts: stainless steel, nickel-plated
- Washer system: Hydrex 202 Polyurethane rigid, Stainless steel, PP, Peek, rubber-FFPM, PVDF, HNBR, Hostaform, EPDM, Neoprene, PVC
- Dispenser system: PTFE (Teflon), Kel-F, PVC, Peek, EPDM

The surfaces, all materials of the pump systems and the provided waste and liquid containers are tested to be resistant against chemicals commonly used in colorimetric ELISAs and the specified solutions for cleaning and decontamination.

6.2.2

Cleaning of Surfaces

The instruments surfaces can be cleaned using a damp cloth. If necessary, use a mild detergent. Use cotton swabs to clean the corners of the microplate holder.

6.2.3

Cleaning the Liquid Paths



To avoid the growth of bacteria and algae the liquid paths of dispenser and washer must be cleaned daily after use.

It is recommended to use the Maintenance function in the Main window or the protocols Rinse Dispenser <read only> and Rinse Washer <read only> or to set up a protocol for every dispenser and the washer with settings according to your needs.

Cleaning of dispenser and the washer–dispenser unit:

Before and after daily use:

- ☐ Flush all reagents out of the liquid paths with distilled water. Refer, too, to the kit insert of your assay and follow the instructions. It is recommended to use a minimum volume of 4ml per dispenser and 80ml for the washer dispenser. Distilled water may remain inside the tubing overnight. For longer breaks use the sequence below:

Before and after long breaks:

- ☐ Distilled water / 70% isopropanol / empty and dry the lines by pumping air
- ☐ Recommended volume for every dispenser:
2ml per sequence step
- ☐ Recommended volume for the washer-dispenser unit: 8-10 cycles of 1000µl up to 80ml in total (10ml per needle) per sequence step.

Cleaning of the washer aspiration path:

- ☐ For cleaning the washer aspiration path set up a washer protocol with an [Aspirate only] function for 6 microplate columns as a minimum. Do not forget to optimize the aspiration depth for your microplate. Fill the respective number of columns of a microplate with 300µl of the solutions listed below and perform the protocol. Use the following solutions consecutively:

Before and after daily use:

- ☐ Distilled water
- ☐ Distilled water may remain inside the tubing overnight. For longer breaks use the sequence below:

Before and after long breaks:

- ☐ Distilled water / 70% isopropanol / empty and dry the lines by pumping air

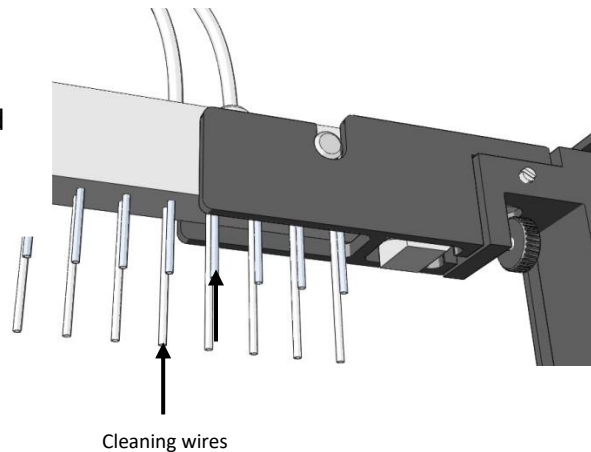
6.2.4

Cleaning the Washer Manifold

If the washer needles are clogged, they may be cleaned using the provided cleaning wires. The washer manifold has to be dismantled for cleaning the needles. Dismantling of the washer manifold is only recommended when the needles are clogged and not as a regularly performed maintenance step. Cleaning wires of 2 different sizes are provided to clean the needles. Use the smaller cleaning wire for the aspiration needles and the bigger one for the dispensing needles.

- ☐ Switch off the instrument and disconnect it from the mains.
- ☐ Take the manifold carefully out of the fixture.
- ☐ Insert the cleaning wires from below to dislodge the clogging.
- ☐ Reassemble the washer manifold carefully and rinse with distilled water afterwards, using the software priming function for the washer.

Figure 6-1:
Cleaning of the
washer manifold



6.2.5

Cleaning the Dispenser Tips

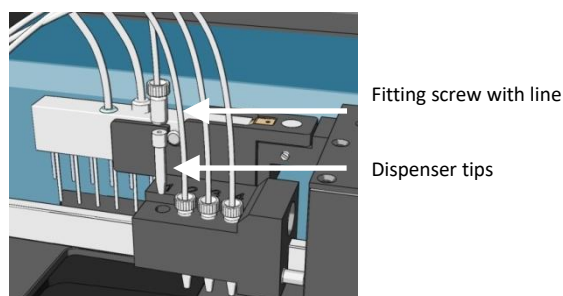


If the dispenser tips are clogged, they may be cleaned using the provided cleaning wires. The dispenser tips are not disposable tips, but can be reused after cleaning. Use the bigger cleaning wire for the dispenser tips.

- ☐ If it is necessary to take out the dispenser tips for cleaning, follow the description in chapter 6.4.1 to unscrew the lines at the dispenser and press the dispenser tips out from below.

Figure 6-2:

Dismounting of
dispenser lines and
tips



- ☐ Soak the dispenser tips with distilled water or 70% isopropanol. Use the cleaning wires to dislodge the clogging.
- ☐ Reassemble the dispenser after cleaning and rinse with distilled water afterwards.

6.2.6

Cleaning the internal Waste Container



- ☐ Wipe out the internal waste container with a damp cloth and a mild detergent. If necessary use 70% Isopropanol. Use cotton swabs to clean the corners and the extraction hose.

6.3

Decontamination

In cases of biohazard spillage, other kinds of pollution or before service or reshipment, all accessible parts of the instrument must be decontaminated.

- ☐ All outer surfaces, including the microplate holder, the washer manifold and the dispenser surfaces, must be decontaminated by wiping with 70% isopropanol.
- ☐ Take special care in doing the decontamination of the washer needles and the dispenser tips. Wipe the needles and tips multiple times with 70% isopropanol and let it evaporate.
- ☐ Decontaminate the liquid and aspiration paths of dispenser and washer by following the instructions for cleaning, but leave the Isopropanol in the lines for approximately 10 minutes. Wipe the outside of all lines with 70% isopropanol multiple times.
- ☐ Follow the description for cleaning the internal waste container and the extraction hose, but wipe out with 70% isopropanol afterwards multiple times and let it evaporate.
- ☐ If necessary, decontaminate the reagent bottles and container with 70% Isopropanol.

Refer also to the Decontamination Form in chapter 8.

6.4

Maintenance

6.4.1

Changing the Dispenser Lines

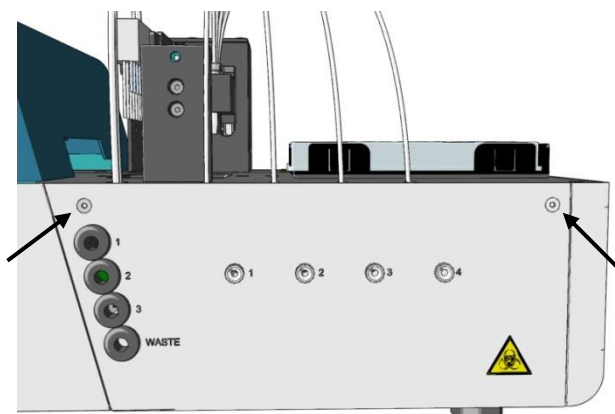


If a tubing connection is faulty or if you want to replace a dispenser tubing, operate as follows:

- ☐ Empty the dispenser lines.
- ☐ Turn the instrument off and disconnect it from the mains.
- ☐ Open the drawer at the side of the instrument. Unscrew the screws with the provided Allen key only.

Figure 6-3:

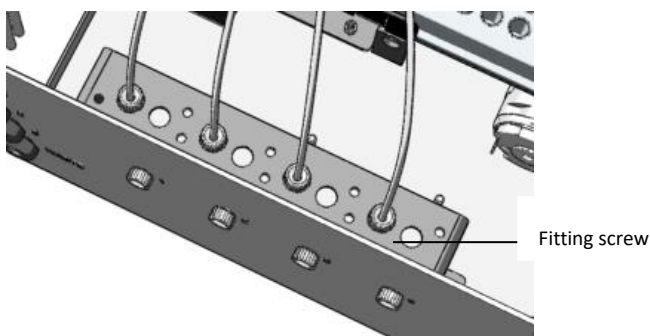
Drawer at the side of the instrument



- ☐ Pull out the drawer carefully to make the tubing connections at the dispenser pumps accessible.
- ☐ Unscrew the respective tubing's fitting screw.

Figure 6-4:

Fitting screw at the dispenser pump



- ❑ Unscrew the tubing's fitting screw with the respective number at the dispenser.

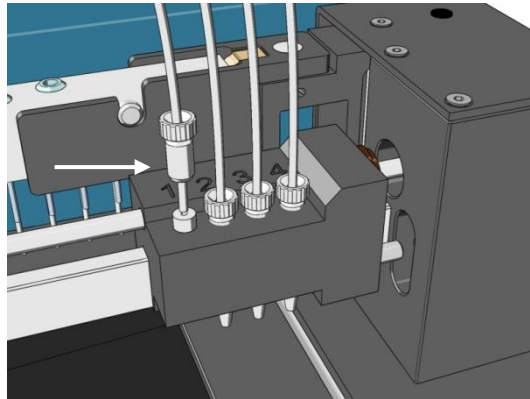


Figure 6-5:

Fitting screw at the dispenser

- ❑ A Dispenser Tubing Set comes with the instrument and provides tubing for the dispenser lines. Turn the fitting screw of the new line into the thread at the dispenser and finger-tighten it. Do not use any tools.
- ❑ Connect the other end of the tubing to the corresponding pump and reassemble the drawer at the side.

7. Troubleshooting

In cases of malfunction or unexpected measurement values refer to the troubleshooting list and/or contact your local distributor or Berthold Technologies. **The lists contains troubleshooting items for Crocodile 5-in-one and 4-in-one (without reader).**

Problem	
→Possible Cause	Solution
Dispenser is not working	
→Dirt in the pumping system	Clean the dispenser daily according to the description in chapter Maintenance.
Inefficient washing	
→Manifold is not parallel to the microplate	Check the manifold is in the right position and adjust the angle if needed.
→Dispense or Aspiration needle is blocked	Use the cleaning wire to get rid of the dirt in the needles. Rinse the washer afterwards.
→Washing seems to be not good enough	Optimize (increase) the height of the dispense step. Use the soak wash program. Increase the delay time in the wash settings. Increase the number of wash cycles.
No signal or weak signal	
→Omission of key reagent	Check that all reagents have been added in the correct order
→Incorrectly prepared, incomplete or wrong substrate	Make sure that the substrate selected is appropriate for the enzyme conjugate (such as pNPP for alkaline phosphatase and OPD or TMB for peroxidase). Make sure that fresh H ₂ O ₂ is added if necessary.
→Washes too stringently	Reduce the number of Wash Cycles. Reduce the volume of washing buffer. Choose another wash protocol. Eliminate or reduce detergent concentration in washing buffer.
→Incubation times inadequate	Incubation times should be appropriate for the system. Typical substrate development times vary from 10-30 minutes.
→Substrate or conjugate	Test conjugate and substrate for activity.

is no longer active or is weak	
→ Enzyme inhibitor present	Sodium azide will inhibit peroxidase reactions.
→ Plate reader settings not optimal	Verify the wavelength and filter settings in the plate reader.
→ Incorrect assay temperature (too cold)	Use recommended incubation temperature. Bring substrates and micro titer plate to room temperature before use.
→ Excessive kit stress has occurred	Check the record to see how many times the kit has cycled from the refrigerator. Check to see if the kit was left out too long or at extreme temperatures
→ Inadequate volume of substrate	Check that correct volume is dispensed Check if the dispenser tubes were filled with reagent. Check if there was enough priming. Check for leakages in the dispense path (air bubbles in the tubing: tubing is not correctly tightened) Check if the dispense path is blocked: flush the dispense path. Clean the needle with the cleaning wire, if needed.
→ Assay plates were compromised or previously used	Be sure to refrigerate plates in sealed bags with a desiccant to maintain stability. Prevent condensation from forming on plates by allowing them to equilibrate to room temperature while in packing. If partial plates are used, be sure to label used wells to prevent reuse; cover them with sealing tape and use the remaining wells as soon as possible. Do not share partially used plates with other plates. Include a desiccant in the storage box.
→ Blocking protein included in the coating solution	Omit blocking protein from coating solution.
→ Dispenser lines were not cleaned before use	Clean dispense path
→ Microbiological contamination of the washer system	Clean and decontaminate the washer system according to the description in the chapter Maintenance. If necessary change the tubing.
High background	

→ Cross-Reactivity	Detection antibody cross-reacting with coating antibody. Run appropriate controls.
→ Poor quality water was used to wash the plates or to prepare the wash solution	Check the water quality. If it is questionable, try an alternative water source, such as bottled distilled water.
→ Substrate solution has deteriorated	Make sure that the substrate is colorless prior to addition to the plate. Priming is recommended to be done directly before the dispense step.
→ Non-specific binding of antibodies	Use appropriate blocking buffer.
→ Concentration of conjugated second antibody too high	Perform dilutions to determine optimal working concentration.
→ Incorrect assay temperature	Check that the incubation temperature was correct. Use the Assay report to check the temperature. Adjust the Assay protocol.
→ Microbiological contamination of the washer system	Clean and decontaminate the washer system according to the description in the chapter Maintenance. If necessary, change the tubing.
→ Inadequate washing	Ensure all wells are filled with wash buffer and are being aspirated completely. Check the washer dispenser functionality: flush the wash head, clean the dispense needles with the cleaning wire, if needed. Check the washer aspiration functionality: Clean aspiration needles with the cleaning wire, if needed. Optimize the aspiration settings.
→ Contaminating enzymes present in sample	Test sample with substrate alone to check for contaminating enzyme activity.
→ Reagents were intermixed, contaminated or prepared incorrectly.	Ensure that the correct reagents were used, that working solutions were prepared correctly and that contamination has not occurred.
→ Wash system contained an alternate	Be sure each unique wash solution is properly labeled. Prime the system thoroughly when

wash solution	switching wash solutions.
Uneven color development	
→ Incomplete washing of wells	<p>Ensure all wells are filling with wash buffer and are being aspirated completely.</p> <p>Check the washer dispenser functionality: flush the wash head, clean the dispense needles with the cleaning wire if needed.</p> <p>Check the washer aspiration functionality: Clean aspiration needles with the cleaning wire, if needed.</p> <p>Optimize the aspiration settings.</p>
Unexpected or irregular results	
→ Wells not completely aspirated	<p>Completely aspirate wells between steps.</p> <p>Check the washer aspiration functionality: Clean aspiration needles with the cleaning wire, if needed.</p> <p>Optimize the aspiration settings.</p>
→ Pipetting error, poor dilution series	Check pipetting technique and double-check calculations
→ Reagents poorly mixed/ not at room temperature before the assay starts.	Be sure that reagents are thoroughly mixed and at the right temperature before the Assay starts.
→ Poor or variable adsorption of reagents to plate	<p>Check choice of coating buffer, usually PBS, pH 7.4 or carbonate-bicarbonate buffer, pH 9.6. Try extending incubating time. Consider different plates.</p> <p>Check homogeneity of samples.</p>
→ Omission of reagents	Be sure that reagents were prepared correctly and added in the correct order.
→ Excessive time was taken to add samples and controls to the assay plate	Be sure to have all materials set up and ready to use quickly. Dispense controls and samples onto the plate at the same time.
→ Dilution error	Check pipetting technique and double-check calculations.
→ Technique problem	Proper mixing of reagents and wash steps are

	critical. System Errors: e.g. power failure.
→ Inappropriate ELISA plate used	Appropriate plates must be used
→ Reagents were expired or intermixed from a different lot number	Verify the expiration date and the lot number of the reagents.
→ Sample evaporated	Incubator temperature too high and /or sample volume too low and/or incubation time too long. Optimize incubator temperature, incubation time and sample volume for your system. refer to your assay insert for recommendations.
→ Wrong temperature used during assay performance	Perform the performance check to ensure that the incubator is working well. Check the temperature in the software settings to be correctly set. Use the recommended incubation temperature for your procedure. Bring reagents and microplate to room temperature before use.
Disruption of processing	
→ Automatic sequence control disrupted by outer radiation or electrical burst	Repeat process. Contact your local distributor or Berthold Technologies for help.

Table 7-1: Troubleshooting list

8. Technical Data

Specifications for the Crocodile miniWorkstation:

Sample Format	96-well microplate in solid or strip format (ANSI/SLAS standard)
Dimensions (W x D x H)	26,3 x 62,6 x 25,8 cm; 10.4 x 24.6 x 10.2 inch
Weight	14,8 kg; 32 lbs
Power Requirements	Desktop power supply and power cord. 100-240Vac; 24Vdc/3,3A The workstation must be operated with the provided power supply
Storage Conditions	5° C - 40° C up to 75% humidity (non-condensing)
Transport Conditions	-25° to +60°C, up to 75% humidity (non-condensing), in original cardboard box and free of liquids.
Operating Conditions	10° C - 35° C up to 75% humidity (non-condensing) The system can be operated up to 2000 m above NN.
Interface	USB
Tubing	Chemically inert PTFE tubing and connections (PTFE; KEL-F; glass; PS) easily changeable liquid handling system and tips. Minimal dead volume due to short reagent lines.

Incubator

Temperature range	Ambient +4°C-55°C;
Temperature uniformity	+/- 1° C across plate at 37° C
Incubation time	Programmable
Temperature monitoring	Yes

Reader

Dynamic range	0 – 3.0 OD at 450 nm; 0 - 2.5 OD at 405 nm
Spectral range	400 – 690 nm (pre-installed filter: 405, 450, 492, 620 nm)
Filter slots	8
Reading channels	8 plus reference channel
Precision	<1,5% CV (0.01 – < 0.5 OD) <1% CV (0.5 – < 2.0 OD). <1.5% CV (2.0 – 3.0 OD).
Accuracy	+/- 0.01 OD or 2.5% (whichever is greater)

Dispenser

Type	4 independent precision pumps
Volume range	10-2000 µl in increments of 5 µl
Precision	<2% CV at 100 µl
Accuracy	<5% at 100 µl
Dead Volume	700 µl
Reagent Support	multi-format racks

Shaker

Shaking	Independent linear motion 5-20 Hz; Amplitude: 1-2mm
---------	---

Washer

Manifold configuration	8 way manifold with 2 parallel needles.
Dispense-volume range	50 – 1000 µl
Wash mode	Standard, Overflow Wash, Soak Wash, 2-Point Aspiration, Sweep mode.
Wash cycles	variable

Soak time	variable
Waste container	Input connector for users' external bottle, any size
Liquid container	Liquid container: up to 3 different wash solutions

PC Software

Platform/Required Hardware	Windows® compatible computer, Pentium-like processor, 1 GB RAM or higher recommended, Two free USB ports, CD drive
Operating System	Windows 7 (32 Bit and 64 Bit) Windows 8 (32 Bit and 64 Bit) Windows 10 (32 Bit and 64 Bit) Win XP is no longer supported.
Additional Software	MS Excel TM (optional)

8.1

Accessories

IQ/OQ/PQ Qualification Package.

Procedures for Installation and Operational Qualification, guidelines for Performance Qualification and periodic maintenance, Design Qualification Form, CD ROM.

Absorbance TestPlate

For validation of 96-well microplate absorbance reader. Incl. certificate and short reference guide.

For spare parts please contact your local distributor or service@berthold.com

9. Preparing Crocodile for Transport

If it should become necessary that Crocodile has to be serviced please observe the following instructions for shipping it to your local distributor or Berthold Technologies:

1. Clean and decontaminate all parts of the Crocodile miniWorkstation according to the description in chapter 6.2 and refer to the decontamination form in chapter 8.
2. Clean and disconnect waste tubing.
3. Turn Crocodile off and disconnect the power cable.
4. Move microplate holder manually to the front position and fix it with the lock screw. Refer to chapter 2.2.
5. Dismount the acrylic cover prior to transport and shipment.
6. For safe shipment put the Crocodile, the acrylic cover and the accessories box into the original cardboard box and seal it.
7. **If the original cardboard box is not available, please contact service@berthold.com.**
8. Before return, please contact your local distributor or Berthold Technologies for shipping instructions.

10. Customer Reply and Decontamination Form

Send the filled out Customer Reply Form and the Confirmation of Decontamination to

BERTHOLD TECHNOLOGIES GmbH & Co.KG

Service Department
Calmbacher Straße 22
D-75323 Bad Wildbad
Germany

Central Customer Service

Phone: +49 (0) 7081-177-111

Fax: +49 (0) 7081-177-339

E-Mail: service@berthold.com

or your local representative.

Blank forms can be found overleaf.

Repair Order / Maintenance Order

Delivery note

Page 1 / 2

Berthold Technologies GmbH & Co KG
Service Department
Calmbacher Strasse 22
75323 Bad Wildbad

Central Customer Service:
Phone: +49 (0)7081 177-111
Fax: +49 (0)7081 177-339
E-Mail: service@Berthold.com
www.Berthold.com

1 Your Details:

Company/Department:

First name - Last name:

Address:

Postal Code - City

Phone:

Fax:

Email:

Date, signature:

Instrument or component:

Serial no.:

Description of failure
or note:

Please describe the malfunction
as accurately as possible

Your order number:

Estimates desired:

☐

Repair Release up to the amount of:

EUR

[cont. on page 2](#)



Importen Notes:




- 1 Fill out the delivery note completely (this page). If you have your own order, it must be placed in the package.
- 2 Please fill out overleaf decontamination certificate completely.
- 3 Pack equipment / assembly group securely for transport and attach this sheet in a document pouch on the outside of the package.

A contractual relationship is only entered with your signature, after receipt of the order and subsequent order confirmation. The "General Terms of Delivery for Products and Services of the Electrical Industry" apply (berthold.com/AGB).

Confirmation of Decontamination

Page 2 / 2

In compliance with legal regulations and to protect our employees and operating equipment we need the completed and signed decontamination certificate before your order can be processed.

2	Instrument or component has come into contact with:	 radioactive substances	 chemical reagents	 contagious biological material
	Please mark with a cross:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Medium	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Concentrate	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Harmless	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Means of decontamination applied: <input type="text"/>				
<p>I hereby confirm that the instrument or component specified above was decontaminated / cleaned using the appropriate method. <input type="checkbox"/></p> <p>I hereby confirm that the instrument or component specified above has not come into contact with any hazardous or contagious samples or reagents. <input type="checkbox"/></p> <p>I hereby confirm that the instrument or component specified above has not been activated by radiation. <input type="checkbox"/></p>				
3	Instrument or component for safe transport and this sheet in a document pouch attached outside of the package.			

Attention!

Should the declaration not be received within one week, we have to return the instruments unrepaired freight forward (for safety reasons). We appreciate your understanding for this measure, which is necessary to protect our employees.

With best regards

Your Berthold Technologies Service-Team

11. Index

Acrylic cover	18	Performance checks	39
Check shipment	17	Preface	7
Cleaning	43	Preparing for transport	59
Cleaning dispenser tips	47	Quality control	15, 41
Cleaning of surfaces	44	Reader	24
Cleaning washer needles	46	Return shipment	16
Contact information	7	Safety Instructions and Precautions	12
Customer reply form	60	Sample Incubation	23
Decontamination	48	Setup Site	17
Decontamination form	60	Shaking	23
Decontamination of surfaces	44	Software	25
Decontamination washer needles ..	48	Software Installation	25
Dispenser	22	Software registration	26
Disposal	16	Storage conditions	15
Exchange dispenser lines	49	System description	20
Getting started	17	Technical Data	56
Hardware Installation	17	Transport conditions	15
Heating	23	Transportation lock screw	17
Intended Purpose	10	Troubleshooting	51
Maintenance	42	Typographical conventions	8
Maintenance schedule	43	Unpacking	17
Measurement chamber	24	USB port	58
Measurement Units	38	Washer	23
Microplate holder	20	Waste Container	21
Operating Conditions	19		
Password request	26		