



LB 925
Crocodile miniWorkstation

Operating Manual

84024BA2

Rev. No.: 03, 04/2020

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.com/en/bioanalytic/

Telephone +49 7081 177-0

Fax +49 7081 177-100

bio@berthold.com

Table of Content

1. Preface	7
1.1 Contact information	7
1.3 Symbols on the instrument	8
1.4 The Operating Manual	8
1.4.1 Validity of the operation manual	8
1.4.2 Copyright.....	9
1.4.3 Warnings, notes and symbols used in this manual	9
1.5 Intended Use	10
2. Important information	12
2.1 Safety Instructions.....	12
2.2 Consignes de Sécurité	15
2.3 Sicherheitshinweise.....	18
2.4 Further instructions.....	21
3. Installation	23
3.1 Unpacking and Check of Shipment	23
3.2 Setup and Installation of Hardware	23
3.3 Installation of the Acrylic Cover	24
3.4 Connecting Cables	25
3.5 Operating conditions.....	25
4. Hardware Description	26
4.1 Microplate holder.....	26
4.2 Internal Waste Container.....	27
4.3 Dispenser	28
4.4 Shaking Function	29
4.5 Sample Incubation.....	29
4.6 Washer	29
4.7 Reader (5-in-one only)	30
5. Software	31
5.1 Software Installation and connection	31
5.2 Commissioning and installation check.....	33
5.3 The Main Window	33

5.4	Setup an Assay	34
5.4.1	Edit an incubation step	35
5.4.2	Edit a shaking step	36
5.4.3	Edit a washing step	36
5.4.4	Edit a Dispense Step	38
5.4.5	Edit Measure (5-in-one only)	39
5.4.6	Edit a Manual Step.....	39
5.5	Run an Assay	40
5.6	Measurement Units (5-in-one only)	42
5.7	Crocodile Result Viewer	42
6.	Performance and Quality Control.....	43
6.1	Performance Checks	43
6.1.1	Washer	43
6.1.2	Dispenser	44
6.1.3	Shaker	44
6.1.4	Incubator.....	44
6.1.5	Reader (5-in-one only).....	44
6.2	Quality control measurements	45
7.	Cleaning and Maintenance.....	46
7.1	Important information.....	46
7.2	Cleaning.....	47
7.2.1	Chemical resistance of materials.....	47
7.2.2	Cleaning of Surfaces	48
7.2.3	Cleaning the Liquid Paths	48
7.2.4	Cleaning the Washer Manifold	51
7.2.5	Cleaning the Dispenser Tips.....	51
7.2.6	Cleaning the internal Waste Container	52
7.3	Decontamination	52
7.5	Maintenance	54
7.5.1	Changing the Dispenser Lines.....	54
8.	Troubleshooting	56
9.	Technical Data	61
9.1	Crocodile miniWorkstation:.....	61
9.2	External Power Supply	63

9.3	Accessories	63
10.	Preparing Crocodile for Transport	64
11.	Warranty and Technical Issues	65
11.1	Special spare parts	65
11.2	Warranty statement.....	65
11.3	Customer service.....	66
11.3.1	Return Shipment to Berthold Technologies	66
12.	Index	68

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.com/en/bioanalytic/

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

1.3 Symbols on the instrument

These symbols appear on the instrument:




	This instrument bears the CE mark
	Manufacturer
	Caution - General warning, risk of danger.
	Caution - biohazard risk
	No domestic waste. The electronic product must not be disposed of in domestic waste.
	Keep cover closed! The cover must be closed before start of any operation.

Table 1-1: Symbols on the instrument

1.4 The Operating Manual

1.4.1 Validity of the operation manual

The operating manual is valid from the delivery of the Berthold product to the user until its disposal. Version and release date of this operating manual can be found in the bottom of each page.

Read these instructions thoroughly and completely before working with the product. We have tried to compile all information for safe and proper operation for you.

The manufacturer reserves the right to make changes to this operating manual at any time without stating reasons.

However, should questions arise which are not answered in this manual please contact BERTHOLD, bio@berthold.com.

Revision History of the manual

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#02, 07/2018	Version identification according to BERTHOLD TECHNOLOGIES' standard. Style sheet changed. Software protection system revised.
84024BA2#03, 04/2020	Revision of safety instructions, maintenance description and technical data Information on return shipment updated

1.4.2 Copyright

This operating manual contains copyright-protected information. None of the chapters may be copied or reproduced in any other form without prior authorisation from the manufacturer.

1.4.3 Warnings, notes and symbols used in this manual

This manual uses the following typographical conventions:

DANGER



Indicates an imminent, major hazard, which will certainly result in serious injuries or even death if the hazard is not avoided.

CAUTION

Refers to a **potentially dangerous** situation, which can result in medium or minor physical injuries or damages to property, if it is not avoided.

NOTICE

If this information is not observed, deterioration in the operation and/or property damage may occur.

IMPORTANT

Sections marked with this symbol point out important information on the product or on handling the product.


□	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

Table 1-2: Typographical Conventions used in the manual

1.5 Intended Use

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.

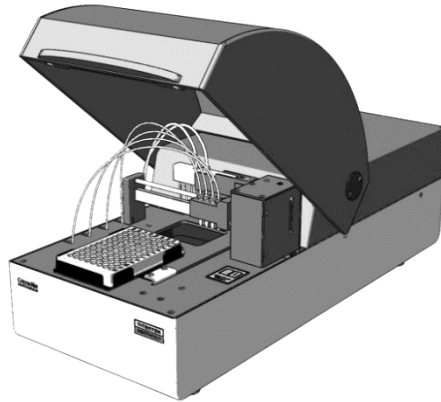


Figure 1-1 Crocodile miniWorkstation

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).

CAUTION



The system may not be used for purposes other than those described in the "Intended Use".



Certification:

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

2. Important information

2.1 Safety Instructions



CAUTION



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

- 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 user follows the instructions set forth in this manual.
- The person, responsible for bringing the instrument to market, has to assure, that the safety instructions and precautions of this manual are communicated to the user.
- Only trained qualified personnel may operate and maintain the instrument.
- It is strongly recommended that all users read this manual and the enclosed documents before use. The operating instructions contain information and warnings to be observed by the user to ensure safe operation of the device.
- If legal regulations exist for the installation and/or use of sample measuring instruments in the country of installation, the installer and the operator are responsible for observing these regulations.
- 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 LB 925 installation description.
- Only accessories, in particular desktop power supply, power supply cable and data connection cable if any, supplied with the instrument or by Berthold Technologies for working with this instrument may be used for operation.
- Never connect the power cord near liquids to avoid electric shock or fire. Do not get the power cord wet!
- The power supply may only be connected to a wall outlet that complies with the local regulations of the country of installation and supplies voltage and current as specified in the system specification.
- All supplied instruments and accessories must be grounded. Use three-pole, grounded plugs.

- Berthold Technologies assumes no liability for any damages, including damages to third parties, caused by improper installation, use or handling of the equipment. The instruments are live and improper handling can lead to damage.
- The instrument may only be used for the intended application. Please read the information on the Intended Use and the restrictions.
- Always close the acrylic cover before start of any operation to avoid injury, e.g. of the fingers, caused by moving parts.
- The user must assure that assays are validated with the system prior to routine use.
- Some chemical test systems, test components or samples may potentially present a biohazard, infection risk or other type of hazard to the user. Also, be careful when handling glass vessels. Always follow the safety precautions as specified in the test system enclosure, e.g., for performance and temperature range. Wear appropriate protective equipment, such as lab coats or chemical gloves, and work responsibly to avoid injuries such as chemical burns, or contamination and potential infection.
- Explosive and flammable substances must not be used with the instrument.
- When handling cleaning and decontamination agents, the safety instructions of the reagent supplier must be followed. Wear appropriate protective equipment. Also, read chapter 7 of this manual.
- The user may only carry out the maintenance work described in the Maintenance chapter. The user must not open the housing of the instruments.
- The inspections and maintenance recommended by the manufacturer should be carried out to ensure that the user remains safe and that the instrument continues to function correctly.
- If you determine that the operational safety of the device, parts of the device or parts of the accessories is impaired, e.g. due to a defective power supply unit, defective insulation sheath of cables, overheating or leaking pumps, these must no longer be used. Switch off the unit, disconnect the entire system from the mains and contact the Service.
- Avoid splashing liquids on the outer surfaces, the plate holder, or other parts of the instrument. Wipe away all splashes immediately and decontaminate surfaces in case of splashes of biohazardous liquids. Refer to Chapter 7 for details.

-   CAUTION: The liquids and test components processed with the device may pose a hazard, e.g. a potential biohazard. For this reason, the reagent inlets and the waste outlet on the side are marked with these combined labels.
- If liquid may have got inside the device, pull out the mains plug immediately. Never operate the instrument if internal components may have been in contact with liquids, as this may result in electric shock or fire. Have the unit cleaned by an authorized service center.
- Prior to repair or maintenance, the instrument must be cleaned and decontaminated to prevent service personnel from coming into contact with potentially biohazardous materials or other hazards.
- All service and maintenance work beyond the scope of this manual may only be carried out by service technicians authorized by Berthold Technologies. Before further use, the instrument must be reassembled and inspected in accordance with the instructions in the service manual.
- Only parts specified by Berthold Technologies may be used for maintenance work.
- Switch off the instrument before disconnecting the plug.
- Always disconnect the plug before opening the device for maintenance work or modifications.

2.2 Consignes de Sécurité

ATTENTION



Suivez les instructions et précautions de sécurité avant et pendant l'utilisation du système ou la maintenance de l'appareil.

- Les appareils sont contrôlés avec garantie- usine et livrés dans des conditions de fonctionnement sûres. Le fabricant garantit le bon fonctionnement des appareils, électriquement que mécaniquement, si l'utilisateur suit les instructions de ce manuel.
- La mise sur le marché doit garantir que les consignes de sécurité et les mesures de précaution contenues dans ce manuel d'instructions sont communiquées à l'utilisateur.
- Les appareils ne peuvent être utilisés et entretenus que par du personnel spécialisé formé à cet effet.
- Il est fortement recommandé à tous les utilisateurs de lire ce mode d'emploi et les documents qui l'accompagnent avant toute utilisation. Le mode d'emploi contient des informations et des avertissements à respecter par l'utilisateur pour garantir un fonctionnement sûr de l'appareil.
- S'il existe des prescriptions légales pour l'installation et/ou l'utilisation d'appareils de mesure d'échantillons dans le pays d'installation, l'installateur et l'exploitant sont responsables du respect de ces prescriptions.
- L'utilisateur doit s'assurer que l'équipement est configuré et installé de manière à ce que son fonctionnement ne soit pas altéré. Veuillez lire les instructions d'installation du LB 925.
- Seuls les accessoires, en particulier le bloc d'alimentation de table, le câble d'alimentation et le câble de connexion de données, le cas échéant, fournis avec l'instrument ou par Berthold Technologies pour travailler avec cet instrument peuvent être utilisés pour le fonctionnement.
- Ne connectez jamais le câble d'alimentation à proximité de liquides afin d'éviter tout risque d'électrocution ou d'incendie. Le câble d'alimentation ne doit pas être mouillé!
- Le bloc d'alimentation ne doit être branché qu'à une prise électrique conforme aux réglementations locales du pays d'installation de l'appareil et fournissant la tension et le courant spécifiés dans les spécifications du système.
- Tous les instruments et accessoires fournis doivent être mis à la terre. Utiliser des fiches tripolaires mises à la terre.

- Berthold Technologies n'assume aucune responsabilité pour tout dommage, y compris à des tiers, résultant d'une installation, d'une utilisation ou d'une manipulation inappropriées de l'équipement. Les appareils sont sous tension et une mauvaise manipulation peut causer des dommages.
- L'appareil ne doit être utilisé que pour l'application prévue. Veuillez lire les informations sur l'utilisation prévue et les restrictions.
- Fermez toujours le couvercle en acrylique avant le début de toute opération afin d'éviter toute blessure, par exemple aux doigts, causée par des pièces mobiles.
- L'utilisateur doit s'assurer que les systèmes de test chimique sont validés avec le système avant leur utilisation en routine.
- Certains systèmes d'essai chimique, composants d'essai ou échantillons peuvent potentiellement présenter un danger biologique, un risque d'infection ou un autre type de danger pour l'utilisateur. Soyez également prudent lorsque vous manipulez des récipients en verre. Respectez toujours les consignes de sécurité spécifiées dans l'enceinte du système d'essai, par exemple en ce qui concerne les performances et la plage de température. Porter l'équipement de protection approprié, comme un sarrau de laboratoire ou des gants de protection contre les produits chimiques, et travailler de façon responsable pour éviter les blessures comme les brûlures chimiques, la contamination et les infections potentielles.
- Les substances explosives et inflammables ne doivent pas être utilisées avec l'appareil.
- Lors de la manipulation des produits de nettoyage et de décontamination, les consignes de sécurité du fournisseur de réactifs doivent être respectées. Porter un équipement de protection approprié. Lisez également le chapitre 7 de ce manuel
- Seul le travail de maintenance décrit dans ce manuel peut être effectué par l'utilisateur. L'utilisateur ne doit pas ouvrir le boîtier de l'instrument.
- Les vérifications et la maintenance recommandées par le fabricant doivent être effectuées pour garantir la sécurité de l'utilisateur et le bon fonctionnement de l'instrument.
- Si vous constatez que la sécurité de fonctionnement de l'appareil, de parties de l'appareil ou d'accessoires est compromise, par exemple en raison d'un bloc d'alimentation défectueux, d'une gaine isolante défectueuse des câbles, d'une surchauffe ou de fuites de pompes, vous ne devez plus les

utiliser. Mettre l'appareil hors tension, débrancher l'ensemble de l'installation du réseau et contacter le service après-vente.

- Évitez d'éclabousser les surfaces extérieures, le porte-plaque ou d'autres parties de l'instrument. Essuyer immédiatement toutes les éclaboussures et décontaminer les surfaces en cas d'éclaboussures de liquides biologiques dangereux. Reportez-vous au chapitre 7 pour plus de détails.



- **ATTENTION:** Les liquides et les composants d'essai qui sont traités avec l'appareil peuvent présenter un danger, par exemple un risque biologique potentiel. C'est pourquoi les entrées de réactifs et la sortie de déchets sur le côté sont marquées de ces étiquettes combinées.
- Si du liquide a pu pénétrer à l'intérieur de l'appareil, débranchez immédiatement la fiche secteur. N'utilisez jamais l'appareil si des composants internes ont pu être en contact avec des liquides, car cela pourrait provoquer un choc électrique ou un incendie. Faites nettoyer l'appareil par un centre de service agréé.
- Avant toute réparation ou entretien, l'instrument doit être nettoyé et décontaminé afin d'éviter que le personnel d'entretien n'entre en contact avec des matériaux potentiellement dangereux ou d'autres dangers.
- Tous les travaux d'entretien et de maintenance qui dépassent le cadre de ce manuel ne peuvent être effectués que par des techniciens de service qui ont été formés et autorisés par Berthold Technologies. Avant toute utilisation ultérieure, l'instrument doit être réassemblé et testé conformément aux instructions du manuel de service.
- Pour les travaux de maintenance, seules les pièces spécifiées par Berthold Technologies peuvent être utilisées.
- Eteignez l'appareil avant de débrancher la fiche.
- Débranchez toujours la fiche avant d'ouvrir l'appareil pour des travaux d'entretien ou des modifications.

2.3 Sicherheitshinweise

CAUTION



Befolgen Sie die folgenden Sicherheitshinweise und Vorsichtsmaßnahmen bevor und während Sie das System benutzen oder das Gerät warten.

- Die Geräte sind werksgeprüft und wurden in betriebssicherem Zustand ausgeliefert. Der Hersteller garantiert einen sicheren Betrieb der Geräte, sowohl elektrisch als auch mechanisch, wenn der Anwender den in diesem Handbuch dargelegten Anweisungen folgt.
- Der Inverkehrbringer muss sicherstellen, dass die Sicherheitshinweise und Vorsichtsmaßnahmen aus dieser Bedienungsanleitung an den Anwender kommuniziert werden.
- Die Geräte dürfen nur von geschultem Fachpersonal betrieben und gewartet werden.
- Es wird allen Anwendern dringend empfohlen, diese Bedienungsanleitung und die Begleitdokumente vor Benutzung zu lesen. Die Bedienungsanleitung enthält vom Anwender zu befolgende Informationen und Warnhinweise, die den sicheren Betrieb des Gerätes zu gewährleisten.
- Bestehen für die Errichtung und/oder den Betrieb von Probenmessgeräten im Land der Installation gesetzlich vorgeschriebene Regelungen, so liegt es in der Verantwortung des Errichters und Betreibers, diese einzuhalten.
- Der Anwender muss dafür sorgen, dass die Geräte so aufgestellt und installiert werden, dass ihre Funktion nicht beeinträchtigt wird. Lesen Sie bitte die Installationsanweisung des LB 925.
- Zum Betrieb darf nur Zubehörteile, insbesondere Tischnetzteil, ggf. Netzversorgungskabel und Datenverbindungskabel, verwendet werden, die mit dem Instrument oder von Berthold Technologies für die Arbeit mit diesem Instrument geliefert wurde.
- Schließen Sie das Netzkabel niemals in der Nähe von Flüssigkeiten an, um einen elektrischen Schlag und Brand zu vermeiden. Das Netzkabel darf nicht nass werden!
- Das Netzteil darf nur an eine Steckdose angeschlossen werden die den lokalen Vorschriften des Landes der Geräteinstallation entspricht und Spannung und Strom entsprechend den Angaben in der Spezifikation des Systems liefert.

- Alle gelieferten Instrumente und alle Zusatzgeräte müssen geerdet werden. Verwenden Sie dreipolige, geerdete Stecker.
- Berthold Technologies übernimmt keinerlei Verantwortung für Schäden, einschließlich Schäden gegenüber Dritten, die durch unsachgemäße Installation, Gebrauch oder Handhabung der Geräte hervorgerufen werden. Die Geräte sind stromführend und unsachgemäße Handhabung kann zu Schäden führen.
- Das Gerät darf nur für die vorgesehene Anwendung benutzt werden. Bitte lesen Sie die Angaben zum Verwendungszweck und zu den Einschränkungen.
- Vor dem Betrieb muss die Acylglashaube geschlossen werden, um Verletzungen z.B. der Finger durch bewegliche Teile zu vermeiden.
- Der Anwender muss sicherstellen, dass chemische Testsysteme vor dem routinemäßigen Gebrauch mit dem System validiert werden.
- Einige chemische Testsysteme, Testkomponenten oder Proben können potentiell eine biologische Gefährdung, ein Infektionsrisiko oder eine andere Art von andere Gefährdung für den Anwender darstellen. Seien Sie auch vorsichtig beim Umgang mit Glasgefäßen. Halten Sie immer die Sicherheitsmaßnahmen, wie sie in der Beilage des Testsystems angegeben sind, ein, z.B. bezüglich Durchführung und Temperaturbereich. Tragen Sie angemessene Schutzausrüstung, wie Laborkittel oder Chemikalien- Schutzhandschuhe und arbeiten Sie verantwortungsvoll, um Verletzungen wie z.B. chemische Verätzung, oder Kontamination und potentielle Infektion zu vermeiden.
- Explosive und brennbare Substanzen dürfen nicht mit dem Gerät verwendet werden.
- Bei Umgang mit Reinigungs- und Dekontaminationsmitteln müssen die Sicherheitshinweise des Reagenzienlieferanten befolgt werden. Tragen Sie entsprechende Schutzausrüstung. Lesen Sie außerdem Kapitel 7 dieses Handbuches.
- Der Anwender darf nur die im Kapitel Maintenance beschriebenen Instandhaltungsarbeiten durchführen. Der Anwender darf das Gehäuse des Instruments nicht öffnen
- Die vom Hersteller empfohlenen Prüfungen und Instandhaltungsarbeiten sollten durchgeführt werden um sicherzustellen, dass der Anwender weiter ungefährdet ist und das Instrument weiterhin korrekt funktioniert.

- Wenn Sie feststellen, dass die Betriebssicherheit des Geräts, von Teilen des Geräts oder von Teilen des Zubehörs beeinträchtigt ist, z.B. durch Defekt des Netzteils, defekte Isolationshülle von Kabeln, Überhitzung oder undichte Pumpen, dürfen diese nicht mehr verwendet werden. Schalten sie das Gerät ab, trennen sie das ganze System vom Netz und kontaktieren Sie den Service.
- Vermeiden Sie das Spritzen von Flüssigkeiten auf die äußeren Oberflächen, den Plattenträger oder andere Teile des Instruments. Wischen Sie alle Spritzer sofort weg und dekontaminieren Sie die Oberflächen im Fall von verspritzten biogefährdenden Flüssigkeiten. Lesen Sie Details in Kapitel 7.



- **VORSICHT:** Die Flüssigkeiten und Testkomponenten, die mit dem Gerät prozessiert werden, können eine Gefahr, z.B. eine potentielle Biogefährdung, darstellen. Deshalb sind die Reagenzien Einlässe und der Abfallschlauch an der Seite mit diesen kombinierten Labels gekennzeichnet.
- Falls Flüssigkeit in das Innere des Gerätes gelangt sein könnte, sofort den Netzstecker ziehen. Betreiben Sie das Instrument niemals, wenn interne Komponenten möglicherweise mit Flüssigkeiten in Kontakt gekommen sein könnten, da dies potentiell einen elektrischen Schlag oder einen Brand herbeiführen kann. Lassen Sie das Gerät durch eine autorisierte Servicestelle reinigen.
- Vor Reparatur- oder Wartungsarbeiten muss das Instrument gereinigt und dekontaminiert werden, um den Kontakt des Servicepersonals mit potentiell bio-gefährdendem Material oder anderen Gefährdungen zu verhindern.
- Alle über den Umfang dieses Handbuches hinausgehenden Wartungs- und Instandhaltungsarbeiten dürfen nur von Servicetechnikern durchgeführt werden, die von Berthold Technologies trainiert und autorisiert wurden. Vor der weiteren Verwendung muss das Instrument wieder zusammgebaut und gemäß der Anweisungen im Servicemanual geprüft werden.
- Für Wartungsarbeiten dürfen nur die von Berthold Technologies spezifizierten Teile verwendet werden.
- Schalten Sie das Instrument aus bevor Sie den Stecker abziehen.
- Bevor das Gerät für Wartungsarbeiten oder Umbauten geöffnet wird, muss immer der Stecker abgezogen werden.

2.4 Further instructions

The information in this manual complies with the actual state of knowledge at the publication date. When LB 925 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!

CAUTION



The user must assure that the whole system of LB 925, 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.

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

CAUTION



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

3. Installation

3.1 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.

1. Carefully unpack the instrument and the accessories.
2. The instrument is heavy and slightly awkward to lift. Use extreme care when unpacking and carrying the device.
3. Ensure that the shipment is complete and shows no sign of transportation damage.
4. Read the Accessories Check pasted on the cardboard box to check that all accessories are included.
5. The cardboard box and the foamed inserts should be stored for future shipment or service. See chapter 10 for details.

NOTICE



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

3.2 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.

1. Remove the transport lock screw that fixes the microplate holder on the surface of the Crocodile.
2. 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.

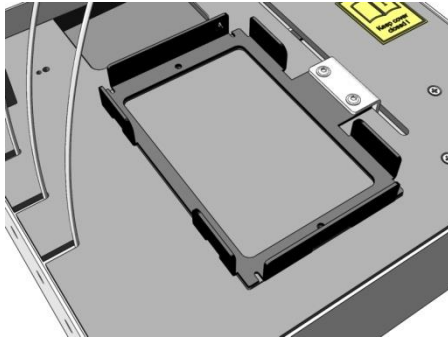


Figure 3-1: Mounting position of the transportation lock screw

3.3 Installation of the Acrylic Cover

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

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

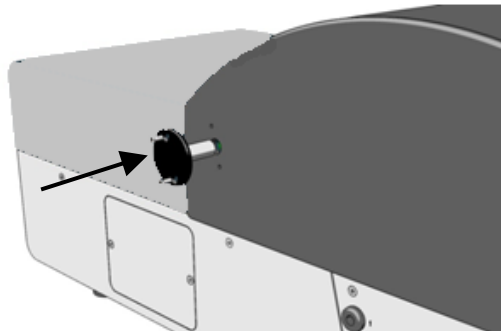


Figure 3-2:
Installation of the acrylic cover

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

3.4 Connecting Cables

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

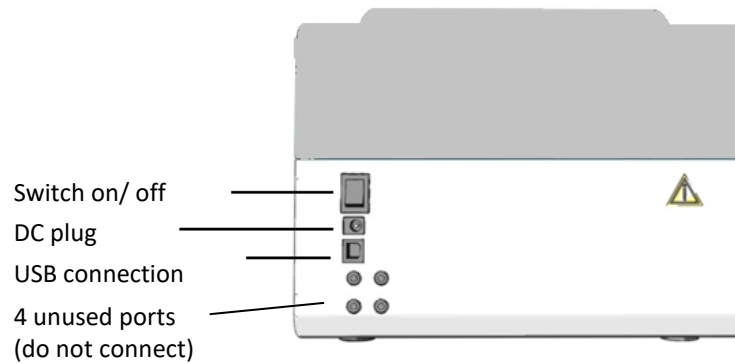


Figure 3-3:
Crocodile miniWorkstation rear view

- For connecting the Crocodile miniWorkstation to PC, use the supplied USB cable and read additionally chapter 5.1 Software Installation.

3.5 Operating conditions

NOTICE

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



The system can be operated up to 2000m above NN.

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

CAUTION



Always close the acrylic cover before start of any operation to avoid injury, e.g. of the fingers, caused by moving parts.

4. 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.

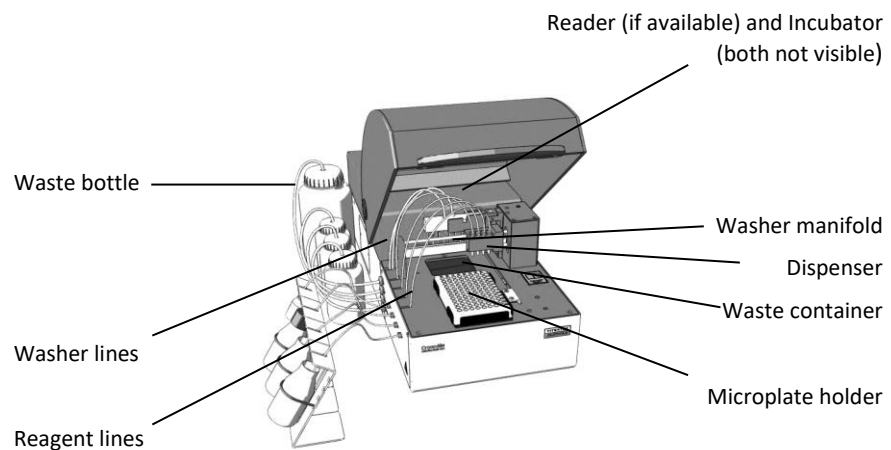


Figure 4-1:
System overview

4.1 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.

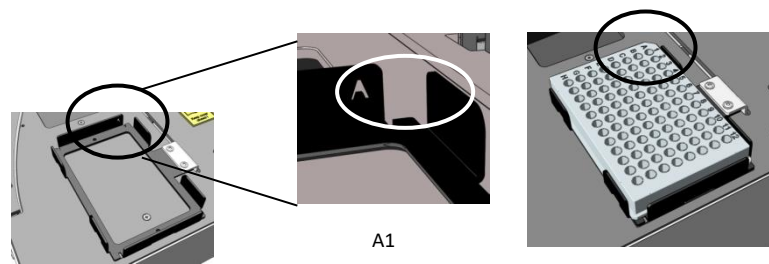


Figure 4-2:
Microplate holder

4.2 Internal Waste Container

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

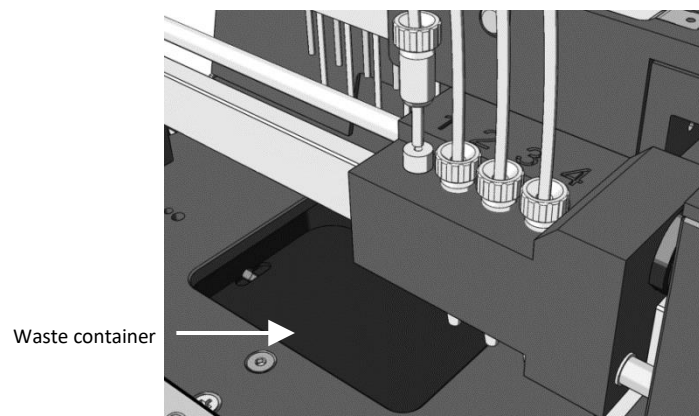


Figure 4-3:
Waste container and dispenser unit

CAUTION



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. A plastic waste bottle is part of the scope of delivery. Always connect the waste line to the external waste bottle prior to use!

4.3 Dispenser

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

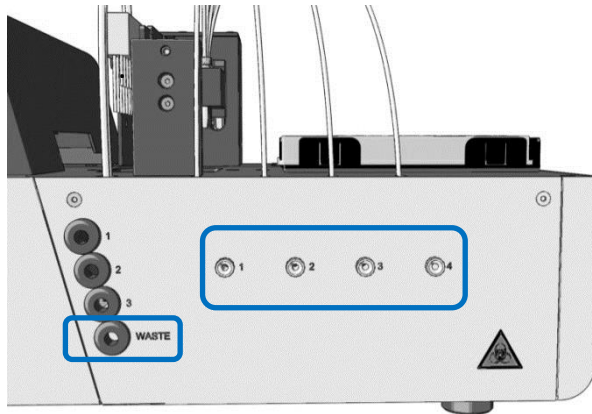


Figure 4-4:

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.

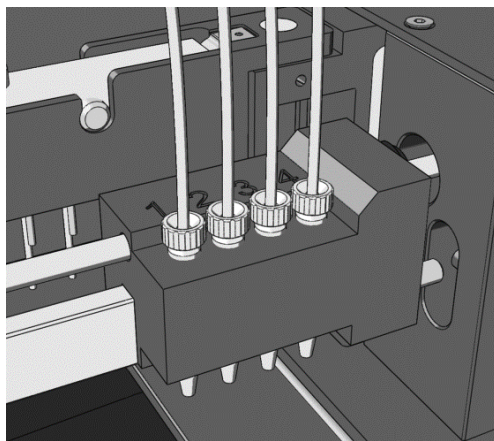


Figure 4-5:

Dispensers

The dispenser lines and tips are preinstalled and ready to use.

Four bottle holders are provided with the instrument. Fix the vials with liquids to be dispensed to the bottle holders, to prevent them from falling over when connected to the dispenser lines.

The dispensers must be cleaned and maintained occasionally to be fully functional. Check the fittings for tightness before first use and

from time to time. If a connection is leaking, it has to be replaced. See chapter 7.5 for instructions.

4.4 Shaking Function

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

4.5 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.

4.6 Washer

It is possible to connect up to three wash buffers to the inlets 1-3 at the side of the instrument. The buffer lines are preinstalled. Use the three square plastic bottles, coming with the instrument, for wash buffers.

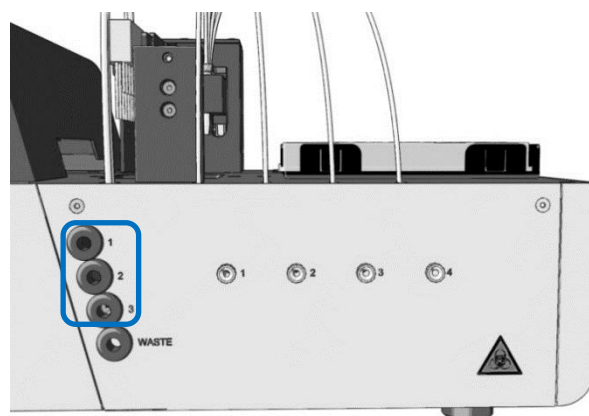


Figure 4-6:

Position of washer inlets 1-3

The washer manifold is built up of eight pairs of separate dispensing needles (short needles) and aspiration needles (long needles). The eight-way manifold can dispense in a range between 50 and 1000 µl.

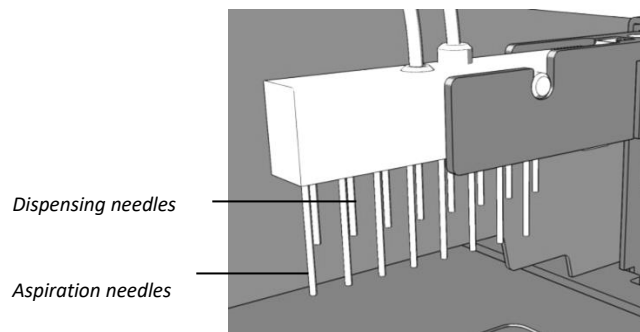


Figure 4-7:

Dispensing and aspiration needles at the washer manifold

4.7 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 eight 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.

5. 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.

5.1 Software Installation and connection

NOTICE



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

1. Connect the data carrier to your computer and double click and run the "setup_XXXXXg_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.
2. Double-click the CCS icon. The software will open and show a registration form.
3. **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:

4. **30 days trial period:** 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.
5. Enter the password within 30 days to enable unlimited use.
6. **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.
7. 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.
8. **Registration procedure:** Owner will receive the registration password from BERTHOLD TECHNOLOGIES.
9. 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.

1. Install the software before connecting the USB dongle to the computer. The installation will copy the necessary USB drivers required during USB device detection.
2. 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.

5.2 Commissioning and installation check

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:

1. Disable the Power Save Mode of your PC before using Crocodile Control Software!
2. Connect the instrument to a PC via USB cable.
3. Connect the instrument to the mains using the provided cables and switch on. Do not use any other than the provided cables.
4. 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.
5. To check the installation, open **[Select Assay]** in the Main window and start Assay1<read only>. If necessary, see chapter 5.5 for details.
6. Assay1<**read only**> will start running all hardware components to ensure operation.

5.3 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

5.4 Setup an Assay

- [Assay Setup]** The 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.

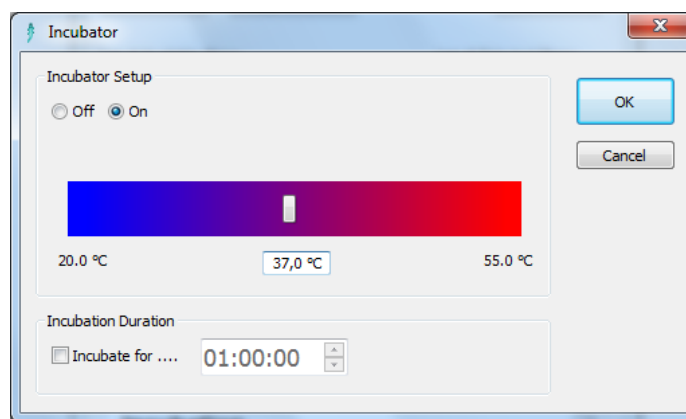


Configure the Assay:

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

4. **Configure the Assay Steps:** Every step in the **[List of Selected Steps]** must be configured using **<Edit Name>** and **<Edit step>**.
5. 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, see chapter 5.4.1 - 5.4.6.
6. When a step in the **[List of Selected Steps]** is highlighted, its parameters are shown in the sub window **[Step Parameter]**.
7. Confirm all entries with **<OK>** to save the assay.

5.4.1 Edit an incubation step



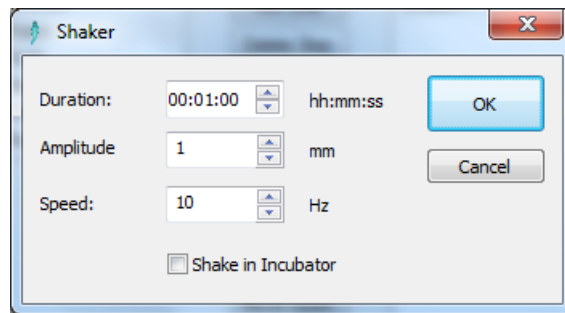
1. Switch on the incubator.
2. Set the temperature using the bar or edit the **[temperature dialog box]**.
3. For a defined **[Incubation Duration]** tick the check box **[Incubate for...]** and set the time **[hh:mm:ss]**.
4. Confirm your settings with **<OK>**.

NOTICE



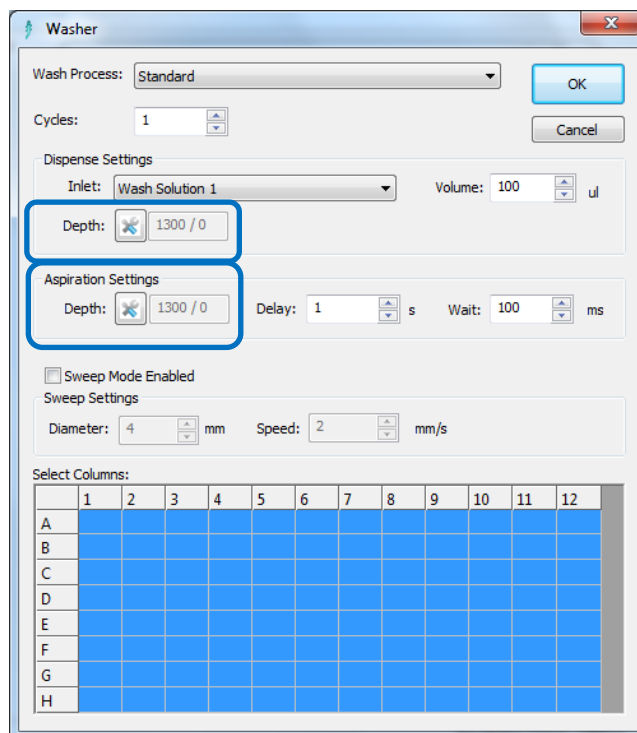
If your assay contains an incubation step, add an additional incubator step at the end of the assay, which switches off the incubator!

5.4.2 Edit a shaking step



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

5.4.3 Edit a washing step



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.

1. 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, three 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

2. Select an **[Inlet]** and optimize **[Dispense Settings]** and **[Aspiration Settings]** according to your needs.
3. 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.

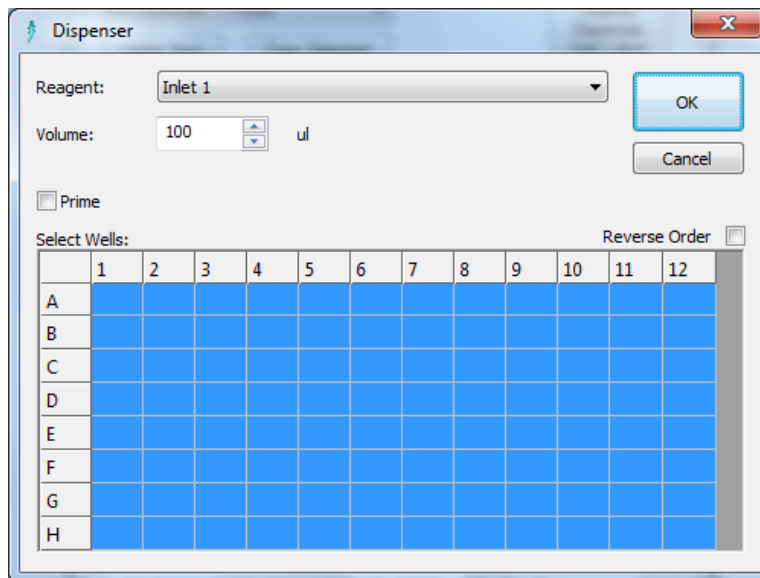
Click **<Apply>** to save your entries.

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

5.4.4 Edit a Dispense Step

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

1. Select a **[Reagent]** inlet and set the **[Volume]**
2. For priming, tick the check box **[Prime]**.



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

5.4.5 Edit Measure (5-in-one only)

Reader

Method: Reference Measurement

Measurement: Filter 1 (405 nm)

Reference: Filter 4 (620 nm)

Select Wells:

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

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

1. Choose between **[Single Wavelength]** and **[Reference Measurement]** (two measurements) in the **[Method]** drop-down list box.
2. Choose a filter from the list of available optical filters in the **[Measurement]** drop-down list box.
3. If you have selected **[Reference Measurement]**, select the optical filter for the reference measurement.
4. By default, the whole microplate is processed. If necessary, select only the columns needed.
5. Confirm your entries with **<OK>**.

5.4.6 Edit a Manual Step

Manual Step

Mode: Auto Continue

Duration: 00:01:00

Plate Position: Insert Position

Message to display:

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

1. 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.

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.

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

5.5 Run an Assay

1. Start at the Main Window and click **[Select Assay]**. A list of stored assays will be shown to select the assay to be performed.
2. The next screen will be the **Plate Identification / Meta Data** screen.

3. Enter the **[Plate ID]** and, optional, information about the assay and the reagents to be used and confirm with **<OK>**
4. Buffers and reagents defined in the **<Washer Dispenser Inlet Label>** of the Assay will occur as [Meta Data] on the left side.
5. The **[Plate Overlay]** allows selecting wells, different from the settings in the protocol. Confirm with **<OK>**.
6. **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.
7. Press the button **[Start]** to start the assay. Crocodile will perform the defined steps and show the progress on the screen.
8. After the run, the measurement data will be stored as .ewdat file and can be transferred for inspection and further calculation to the **Crocodile Result Viewer** or **MikroWin** at any time.

For the Crocodile Control 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.

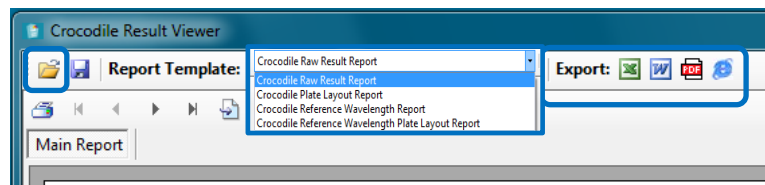
5.6 Measurement Units (5-in-one only)

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 read 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.

5.7 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.

6. Performance and Quality Control

6.1 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 see the troubleshooting list.

6.1.1 Washer

NOTICE



The washer manifold provides 2 functions, a dispenser and a suction function. Check both functions 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:

1. Prime washer inlet 1 with distilled water: 8 cycles; volume: 1000 μ l. Total priming volume for the inlet will be 64ml.
2. Program a washer dispense step that dispenses 200 μ l of distilled water to row 1-4 of a microplate, using inlet 1.
3. 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.
4. 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
5. Perform the protocol with an empty microplate. Use the manual step to inspect the fluid volumes to be equal in all wells visibly. The residual volume after aspiration depends on your individual settings and shall be approximately equal.

6.1.2 Dispenser

Check every dispenser separately. Dispense 3 rows/ dispenser as a minimum.

1. Weigh an empty 96 well microplate and note the weight.
2. 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.
3. Weigh the microplate after dispensing, then, and subtract the empty weight to get the weight of the dispensed water.
4. Divide this value by the number of dispensed wells, to get the weight per well.
5. Expected weight: 100mg +- 2mg (2%) per well

6.1.3 Shaker

Check the shaker function visually. Operate a protocol with your individual shaker settings.

6.1.4 Incubator

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

6.1.5 Reader (5-in-one only)

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

6.2 Quality control measurements

IMPORTANT

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. Obtain, treat and store samples following the instructions and recommendations of the kit insert.



Recommendation:

To ensure proper operation of the system, operate Qualification Procedures in defined time intervals and use high quality equipment. A failure in the performance of quality control checks could indicate a risk of error in test data.

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

7. Cleaning and Maintenance

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

7.1 Important information

CAUTION



- The frequency of maintenance and cleaning must match the actual frequency of usage to prevent accelerated aging and abrasion. If desired or required, perform some or all procedures more frequently than presented in the maintenance schedule (Table 7-1).
- Follow the safety instructions in chapter 2 and the instructions described below. For cleaning and decontamination, verify additionally the recommendations in the package insert of your test kit.
- 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 or hand injuries. Take special care while handling with the dispenser and washer system.
- 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 must be decontaminated. See the information on return shipment and the Confirmation on Decontamination in chapter 11.3.1 for further instructions.

DANGER



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 7-1: Maintenance schedule***7.2 Cleaning****7.2.1 Chemical resistance of materials*****IMPORTANT***

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.

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: Hydex 202 Polyurethane rigid, Stainless steel, PP, Peek, rubber-FFPM, PVDF, HNBR, Hostaform, EPDM, Neoprene, PVC
- Dispenser system: PTFE (Teflon), Kel-F, PVC, Peek, EPDM

7.2.2 Cleaning of Surfaces

- Use a damp cloth to clean the instruments surfaces. If necessary, use a mild detergent additionally.
- Clean the corners of the microplate holder using cotton swabs.

7.2.3 Cleaning the Liquid Paths

IMPORTANT



Clean the liquid paths of dispenser and washer daily after use, to avoid the growth of bacteria and algae.

IMPORTANT



Always remove reagent residues with a high volume of distilled water, e.g. up to 10-fold volume of the reagent used for cleaning.

Cleaning of dispenser and the washer–dispenser unit:

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

Before and after daily use:

- Flush all reagents out of the liquid paths with distilled water.
- Use a minimum volume of 4 ml per dispenser and 80 ml for the washer dispenser.
- Distilled water may remain inside the tubing overnight.
- If the test kit package insert contains cleaning and decontamination instructions other than those in this manual or you want to use a commercially available disinfectant, please contact the manufacturer or his local representative.

Before and after long breaks:

- Use at least the following volumes for liquids others than distilled water:
 - for every dispenser: 2ml per sequence step
 - for the washer-dispenser unit: 8-10 cycles of 1000 μ l up to 80ml in total (10ml per needle) per sequence step.

Use one of the following procedures:

- Cleaning with 0.5% bleach:
 1. Distilled water
 2. 0.5% bleach
 3. Distilled water (increased volume)
 4. Empty and dry the lines by pumping air
- Cleaning with acid/base:
 1. Distilled water
 2. 0.1 N NaOH
 3. Distilled water (increased volume)
 4. 0.1N HCl
 5. Distilled water (increased volume)
 6. Empty and dry the lines by pumping air

Never mix acid and base in the dispenser or washer unit or the waste container directly. Always rinse with water in between!

Cleaning of the washer aspiration path:

- Create a washer protocol with an [Aspirate only] function for six microplate columns as a minimum.
- In cases of distilled water after use of the listed reagents, increase the number of columns to remove reagent residues. See the description below.
- Do not forget to optimize the aspiration depth for your microplate.
- Fill the respective number of columns of a microplate with 300 μ l of the solutions listed below and perform the protocol.

Before and after daily use:

- Distilled water
- Distilled water may remain inside the tubing overnight.

Before and after long breaks: Use one of the following procedures

- Cleaning with 0.5% bleach:
 1. Distilled water
 2. 0.5% bleach
 3. Distilled water (increased number of columns)
 4. empty and dry the lines by pumping air

- Cleaning with acid/base (in case of heavy pollution):
 1. Distilled water
 2. 0.1 N NaOH
 3. Distilled water (increased number of columns)
 4. 0.1N HCl
 5. Distilled water (increased number of columns)
 6. Empty and dry the lines by pumping air

Never mix acid and base in the dispenser or washer unit or the waste container directly. Always rinse with water in between!

7.2.4 Cleaning the Washer Manifold

IMPORTANT

If the washer needles are clogged, use the provided cleaning wires to dislodge the clogging. Cleaning wires of two different sizes are provided. Use the smaller cleaning wire for the aspiration needles and the bigger one for the dispensing needles.



The washing comb must be dismantled for cleaning the needles. Dismantling of the washing comb is only recommended when the needles are clogged and not as a regularly performed maintenance step.

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

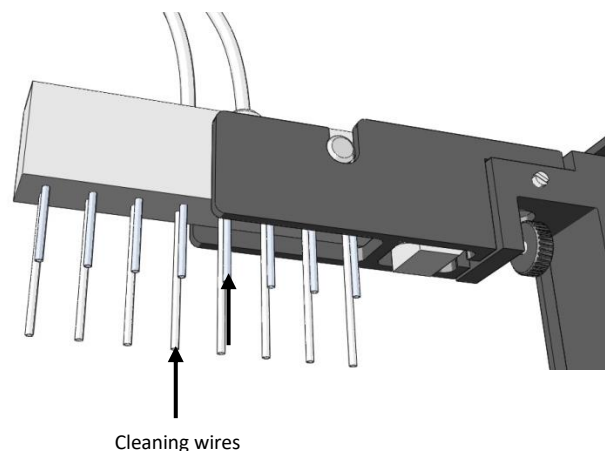


Figure 7-1:
Cleaning of the washer needles

7.2.5 Cleaning the Dispenser Tips

Use the provided bigger cleaning wire to clean clogged dispenser tips. Re-use the dispenser tips after cleaning (no disposables!).

1. If it is necessary to take out the dispenser tips for cleaning, follow the description in chapter 7.5.1 to unscrew the lines at the dispenser and press the dispenser tips out from below.

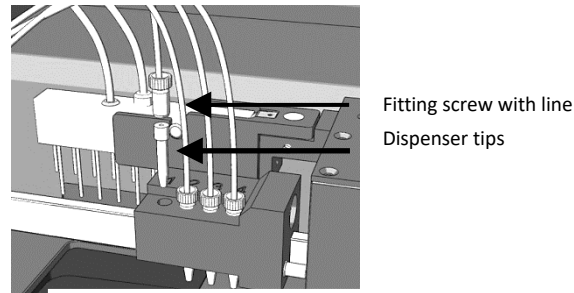


Figure 7-2:

Dismounting of dispenser lines and tips

2. Soak the dispenser tips with 0.5% bleach and distilled water. Use the cleaning wires to dislodge the clogging.
3. Reassemble the dispenser after cleaning and rinse with distilled water afterwards.

7.2.6 Cleaning the internal Waste Container

- Wipe out the internal waste container with a damp cloth and a mild detergent.
- If necessary, use 0.5% bleach and wipe with distilled water, then.
- Use cotton swabs to clean the corners and the extraction hose.

7.3 Decontamination

CAUTION



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

1. Decontaminate all outer surfaces, including the microplate holder, the washer manifold and the dispenser surfaces by wiping with 0.5% bleach and with distilled water afterwards. Dry the surfaces, then.
2. Take special care in doing the decontamination of the washer needles and the dispenser tips. Wipe the needles and tips multiple times with 0.5% bleach and with distilled water afterwards. Dry the needles and tips, then.
3. Decontaminate the liquid and aspiration paths of dispenser and washer by following the instructions for cleaning but leave

the reagents in the lines for approximately 10 minutes. Empty and dry the lines, then. Wipe the outside of all lines with 0.5% bleach multiple times and with distilled water afterwards.

4. Follow the description for cleaning the internal waste container and the extraction hose but wipe out with 0.5% bleach multiple times and with distilled water afterwards. Dry the waste container and the extraction hose by pumping air.
5. If necessary, decontaminate the reagent bottles and the waste bottle with 0.5% bleach. Use distilled water afterwards and dry them carefully.

You will find information on the Declaration on Decontamination in chapter 11.3.1.

7.5 Maintenance

7.5.1 Changing the Dispenser Lines

IMPORTANT



The user may exchange the dispenser lines if a tubing connection is faulty or if desired, using the Dispenser Tubing Set coming with the instrument. Refer to the Maintenance Schedule in chapter 7.1. Operate as follows:

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

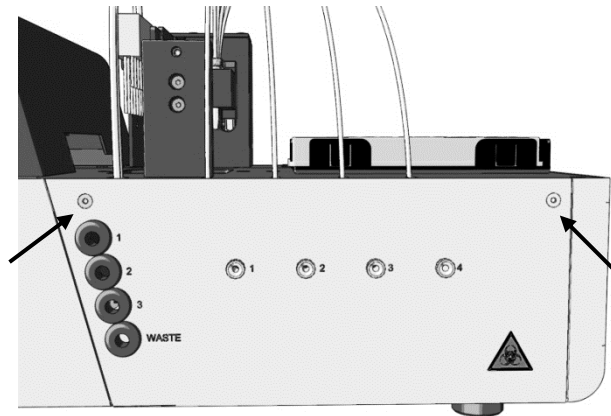


Figure 7-3:

Drawer at the side of the instrument

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

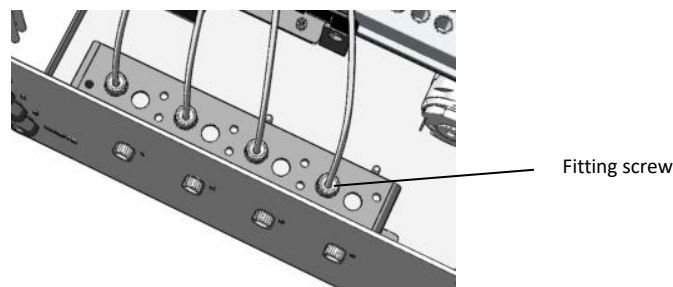


Figure 7-4:

Fitting screw at the dispenser pump

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

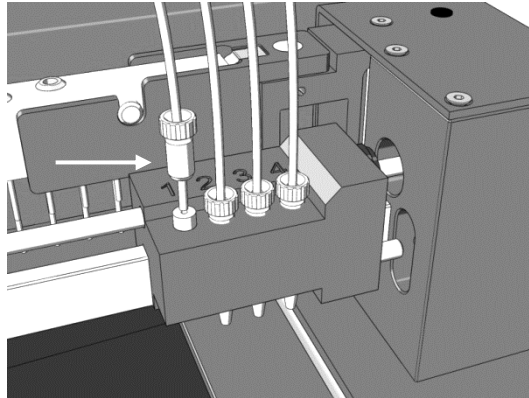


Figure 7-5:

Fitting screw at the dispenser

7. 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.
8. Connect the other end of the tubing to the corresponding pump and reassemble the drawer at the side.

8. Troubleshooting

In cases of malfunction or unexpected measurement values, see the troubleshooting list and/or contact your local distributor or Berthold Technologies.

IMPORTANT



The list 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	<ul style="list-style-type: none"> • Clean the dispenser daily according to the description in chapter Maintenance.
Inefficient washing	
→Manifold is not parallel to the microplate	<ul style="list-style-type: none"> • Check the manifold is in the right position and adjust the angle if needed.
→Dispense or Aspiration needle is blocked	<ul style="list-style-type: none"> • Use the cleaning wire to get rid of the dirt in the needles. • Rinse the washer afterwards.
→Washing seems to be not good enough	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Check that all reagents have been added in the correct order
→Incorrectly prepared, incomplete or wrong substrate	<ul style="list-style-type: none"> • 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 H₂O₂ is added if necessary.
→Washes too stringently	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Incubation times should be appropriate for the system. Typical substrate development times vary

	from 10-30 minutes.
→Substrate or conjugate is no longer active or is weak	<ul style="list-style-type: none"> • Test conjugate and substrate for activity.
→Enzyme inhibitor present	<ul style="list-style-type: none"> • Sodium azide will inhibit peroxidase reactions.
→Plate reader settings not optimal	<ul style="list-style-type: none"> • Verify the wavelength and filter settings in the plate reader.
→Incorrect assay temperature (too cold)	<ul style="list-style-type: none"> • Use recommended incubation temperature. • Bring substrates and micro titer plate to room temperature before use.
→Excessive kit stress has occurred	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Check that correct volume is dispensed • Check if the dispenser tubes are 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Omit blocking protein from coating solution.
→Dispenser lines were not cleaned before use	<ul style="list-style-type: none"> • Clean dispense path
→Microbiological contamination of the washer system	<ul style="list-style-type: none"> • Clean and decontaminate the washer system according to the description in the chapter Maintenance. If necessary change the tubing.

High background	
→Cross-Reactivity	<ul style="list-style-type: none"> Detection antibody is cross-reacting with coating antibody. Run appropriate controls.
→Poor quality water was used to wash the plates or to prepare the wash solution	<ul style="list-style-type: none"> Check the water quality. If it is questionable, try an alternative water source, such as bottled distilled water.
→Substrate solution has deteriorated	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Use appropriate blocking buffer.
→Concentration of conjugated second antibody too high	<ul style="list-style-type: none"> Perform dilutions to determine optimal working concentration.
→Incorrect assay temperature	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Clean and decontaminate the washer system according to the description in the chapter Maintenance. If necessary, change the tubing.
→Inadequate washing	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Test sample with substrate alone to check for contaminating enzyme activity.
→Reagents were intermixed, contaminated or prepared incorrectly.	<ul style="list-style-type: none"> Ensure that the correct reagents have been used, that working solutions were prepared correctly and that contamination has not occurred.
→Wash system contained an alternate wash solution	<ul style="list-style-type: none"> Be sure each unique wash solution is properly labeled. Prime the system thoroughly when switching wash solutions.

Uneven colour development	
→ Incomplete washing of wells	<ul style="list-style-type: none"> • Ensure that all wells are filled with wash buffer and are 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.
Unexpected or irregular results	
→ Wells not completely aspirated	<ul style="list-style-type: none"> • Completely aspirate wells between steps. • Check the washer aspiration functionality: • Clean aspiration needles with the cleaning wire, if needed. • Optimize the aspiration settings.
→ Pipetting error, poor dilution series	<ul style="list-style-type: none"> • Check pipetting technique and double-check calculations
→ Reagents poorly mixed/ not at room temperature before the assay starts.	<ul style="list-style-type: none"> • Be sure that reagents are thoroughly mixed and at the right temperature before the Assay starts.
→ Poor or variable adsorption of reagents to plate	<ul style="list-style-type: none"> • Check choice of coating buffer, usually PBS, pH 7.4 or carbonate-bicarbonate buffer, pH 9.6. Try extending incubating time. • Consider different plates. • Check homogeneity of samples.
→ Omission of reagents	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Check pipetting technique and double-check calculations.
→ Technique problem	<ul style="list-style-type: none"> • Proper mixing of reagents and wash steps are critical. Check respective steps. • System Errors, e.g. power failure. Check the system.

→ Inappropriate ELISA plate used	<ul style="list-style-type: none"> • Appropriate plates must be used
→ Reagents were expired or intermixed from a different lot number	<ul style="list-style-type: none"> • Verify the expiration date and the lot number of the reagents.
→ Sample evaporated	<ul style="list-style-type: none"> • 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. • Read your assay insert for recommendations.
→ Wrong temperature used during assay performance	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Repeat process. • Contact your local distributor or Berthold Technologies for help.

Table 8-1: Troubleshooting list

9. Technical Data

9.1 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
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.
Operating voltage	24 VDC \pm 5%
Max. current consumption	3.3 A
Protection class	Class III
Pollution degree	2

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)
Additional Software	MS Excel™(optional)

9.2 External Power Supply

Type	Desktop power supply
Input	100-240 VAC ± 10%, 50-60 Hz
Output	24 VDC / 3.75 A
Protection class	Class I
Energy efficiency	Level VI

9.3 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.

10. 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 7.2/7.3.
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. See chapter 3.2.
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 shipment, please refer to the information on return shipment in chapter 11.3.1.

11. Warranty and Technical Issues

11.1 Special spare parts

The following spare parts are safety parts: Use only the specified original part. For support contact Berthold Technologies or your direct agent only.

	Specification	Id No.
Power supply GST90A24-P1M	Input: 100-240VAC \pm 10%; 50 / 60 Hz; Class I Output: 24 VDC, 3.75 A	69141

11.2 Warranty statement

The instrument is sold in accordance with the general conditions of sale of Berthold Technologies GmbH & Co KG and its affiliates and representatives.

Berthold Technologies warrants this product to be free of defects in material and workmanship for a period of 12 months from the date of delivery, ex works Bad Wildbad.

Berthold Technologies or its authorized representative will repair or replace, at its option and free of charge, any product that under proper and normal use proves to be defective during the warranty period.

Berthold Technologies shall in no event be liable or responsible for any incidental or consequential damage, either direct or indirect.

The above warranty shall not apply if:

- the product has not been operated in accordance with the operating manual
- the product has not been regularly and correctly maintained
- the product has not been repaired or modified by a Berthold Technologies authorized representative or user
- parts other than original Berthold Technologies parts are used
- the product and parts thereof have been altered without written authorization from Berthold Technologies GmbH & Co KG

- the product has not been returned properly packed in the original Berthold Technologies packaging

This warranty does not apply to any third-party product involved in the application.

11.3 Customer service

Customer service will be provided in the first instance by the network of Berthold Technologies representatives. In the event of any problem experienced with your instrument, the first recourse should be your local Berthold Technologies representative. For further problems requiring hardware or software expertise, contact the Technical Support group at Berthold Technologies GmbH & Co KG. Here are the contact data:

Berthold Technologies GmbH & Co KG
Technical Support
Calmbacher Str. 22
75323 Bad Wildbad / Germany
Phone: +49 7081 177 114
Fax: +49 7081 177 301
Email: service@berthold.com

Please have the following relevant information available:

- serial numbers, part number, revision: see production label on instrument
- software and firmware versions
- monitor and log files, if available

11.3.1 Return Shipment to Berthold Technologies

In case of an instrument return shipment please refer to our website and follow the instructions:

<https://www.berthold.com/en/company/service/form-rma-return-material-authorization/>

An RMA number is required to ship an instrument for repair and identify your instrument when it arrives.

Confirmation on Decontamination

If you return an instrument to Berthold Technologies for servicing purposes which is not properly decontaminated, there will be a health risk for Berthold Technologies employees.

We therefore need your confirmation that the instrument was decontaminated and cleaned properly before shipping. Follow the instructions on cleaning, decontamination and preparations for transport and confirm the decontamination in the online-form.

12. Index

Acrylic cover	24	Preparing for transport	64
Check shipment	23	Quality control.....	21, 45
Cleaning	47	Reader	30
Cleaning of surfaces.....	48	Return shipment	66
Cleaning washer needles.....	51	RMA number	66
Confirmation on Decontamination .	67	Safety Instructions.....	12
Contact information	7	Sample Incubation.....	29
Customer service	66	Setup Site	23
Decontamination	52	Shaking	29
Decontamination of surfaces	48	Software	31
Dispenser	28	Software Installation	31
Disposal.....	22	Software registration	31
Exchange dispenser lines.....	54	Spare Parts	65
Hardware Installation	23	Storage conditions	21
Heating	29	System description	26
Intended Use	10	Technical Data	61
Maintenance.....	46	Transport conditions	21
Maintenance schedule	47	Transportation lock screw.....	23
Measurement chamber.....	30	Troubleshooting	56
Measurement Units.....	42	Typographical conventions	9
Microplate holder	26	Unpacking.....	23
Operating Conditions	25	USB port	63
Password request	32	Warranty Statement	65
Performance checks	43	Washer	29
Preface.....	7	Waste Container	27

Modifications due to technical advancement reserved.