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ZEPHYRUS® Magneto

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Warning

This equipment must be installed and used in accordance with the manufacturer's recommendations. Installation and service must be performed by personnel properly trained and authorized by ELISABETH PHARMACON.

Failure to follow these instructions may invalidate your warranty and/or impair the safe functioning of your equipment.

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Table of Contents

1 Intended Use

Magnetic separation of magnetizable particles from liquid media.

2 Functional Principle

The ZEPHYRUS® Magneto is based on manufacturer's proven technology for magnetic particle separation and represents the top quality sample preparation system.

The instrument is capable of barcode reading and automated buffer dispensing to provide comfort and to satisfy the highest quality assurance demands. Hands-on time is minimized and the processing time is as short as 40 min for up to 12 samples per batch. The magnetic separation is achieved by metal rods, magnetized by an external magnet, that are immersed into several process solutions. The magnet can be switched off to facilitate the often complicated resuspension of once separated magnetic particle pellets (e.g. in wash or elution buffers). Efficient resuspension is then accomplished by rotation of the rods guaranteeing the complete and smooth resuspension of the bead pellet. This normally difficult step becomes now quick and thorough, resulting in isolation results with both high yields and purities.

The ZEPHYRUS® Magneto consists of six main parts as shown in the following drawings (Fig. 1).

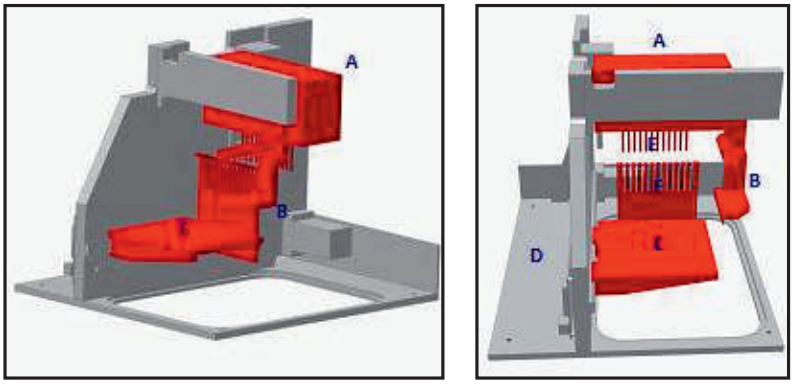

Fig. 1 Internal View

A. Magnet to magnetize and motor to rotate the separation rods

B. Buffer dispensing unit for up to 7 different buffers

C. Platform to position 96-well plates and disposable tips

D. Control unit

E. 12 magnetizable separation rods

F. Disposable tip stripper

3 Getting Started

3.1 Installation

The installation of ZEPHYRUS® Magneto has to be performed by ELISABETH PHARMACON authorized service personnel.

3.2 Requirements

ZEPHYRUS® Magneto is a small benchtop instrument which needs a clean, dry, level, and stable surface with a compatible electrical outlet. Allow at least 10 cm of space at the back of the device for sufficient ventilation and 25 cm of space on the right side for positioning ZEPHYRUS® Magneto buffer bottle tray. Protect the instrument from excessive sunlight, heat and humidity.

3.3 Starting the ZEPHYRUS® Magneto

Connect the power cord (Fig. 2C) and the barcode reader (Fig. 2A) to the appropriate sockets on the rear side of the instrument. Close the front door (see section 3.5) and press the on/off switch at the rear (Fig. 2B). After an initial self-test the instrument is ready to perform a purification protocol of your choice.

NOTE! ZEPHYRUS® Magneto WILL NOT PERFORM ANY MOVEMENTS WHEN THE DOOR IS OPEN.

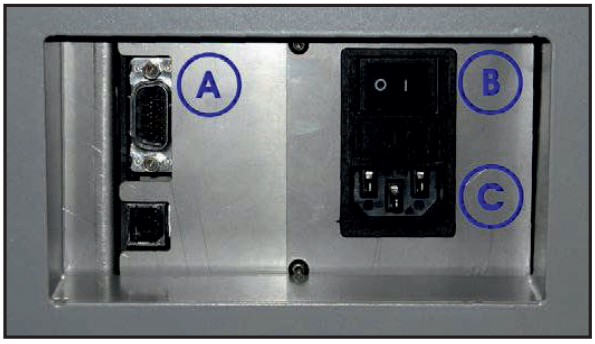

Fig. 2 Connector Terminal on the Backside of the Instrument. (A) Barcode Reader; (B) Power Switch, and the (C) Power Cord.

If applicable, remove the red Luer locks from the tube connectors on the right side of the instrument. Connect the tubes according to their numbering with the Luer connectors to their respective counterparts on the instrument. Remove the lids from the individual buffer bottles in the 8-Pack and pierce the septum with the piercing tool (spike) placed at the other end of each tube. Place the 8-Pack upside-down on the reagent holder and use the manual priming function to completely fill the dispensing system (section 5.2).

NOTE! DO NOT TRY TO OPEN THE FRONT DOOR DURING A RUN. THIS WILL DAMAGE THE INSTRUMENT.

3.4 Shutting down ZEPHYRUS® Magneto

Empty and clean the waste buffer trough and the disposable tip dish before shutting down the instrument. The emptying and cleaning of the containers has to be performed in the

"Cleaning Position" of the instrument, which can be accessed after each isolation or from the Maintenance Menu (see section 5.1 for more information). It is strongly recommended to empty and clean the containers after each separation protocol. If the instrument will not be used for a long period (> 2 weeks), it is recommended to turn over the 8 - Pack and place it beside the instrument with the septa facing up. For long term storage (> 4 weeks), transport or shipping, rinse the dispensing system with the manual priming function (see section 5.2) as described below.

Remove the spikes from the 8-Pack and place the tubes with the spikes in an appropriate vessel (e.g. a beaker glass) filled alternately with ultrapure water or 70% ethanol.

NOTE! DO NOT REMOVE THE SPIKES FROM TUBES. THEIR INTEGRATED PARTICLE FILTERS ENSURE THAT NO SOLID MATERIAL WILL CONTAMINATE THE INSTRUMENT OR BLOCK PUMPS AND NOZZLES.

Ensure that the needle area of the spike is below the surface of the liquid during the complete priming action. (To rinse the dispensing system for storage approx. 150 mL ultrapure water or 70% ethanol will be needed. Prime each channel of the instrument with 7 * 100 Units ultrapure water and afterwards with 7 * 100 Units 70% ethanol (100 Units are equivalent to about 1.5 mL). The absolute volume will depend on the dispensed liquid and the calibration of the pumps. Empty the tubes and clean the containers. Apply the original transport caps to the end of the tube to avoid any contamination of the needle part of the spike. To bring the instrument back into operation, refill the dispensing system with fresh buffer.

3.5 Opening/Closing the Front Door

In the closed state the front door of ZEPHYRUS® Magneto is held in place by a snap-on fixture.

NOTE! NEVER PUSH THE FRONT DOOR WHEN THE INSTRUMENT IS SWITCHED OFF. THIS ACTION WILL DAMAGE THE SAFETY LOCK OF THE INSTRUMENT.

In the closed state the front door of ZEPHYRUS® Magneto is held in place by a snap-on fixture. To open the front door, place your hand on the upper right edge of the front door. Carefully push the front door down. The snap-on fixture will be released with an audible click and the front door automatically slides open. To close place your hand again on the upper right edge of the front door. Carefully push the front door all the way down. The arresting of the door in the snap-on fixture is indicated by an audible click.

NOTE! DO NOT OPEN OR CLOSE THE FRONT DOOR BY ANY OTHER PROCEDURE THAN DESCRIBED ABOVE. ANY OTHER ACTION COULD DAMAGE THE FRONT DOOR MECHANISM.

4 Operation

4.1 General Remarks

For each sample material manufacturer has developed specialized protocols and kits to generate the best yield and quality of nucleic acids. Not all kits are available in all countries. Contact your local representative for those products registered in your country.

Fig. 3 Splash Screen during Startup

4.2 Startup of the Instrument

The ZEPHYRUS® Magneto is equipped with a touch screen that offers you a comfortable way to select and set-up your isolation protocols. Different dialogue windows will guide you through the entire preparation process. Detailed descriptions are given below. During the startup of the instrument a splash screen appears (Fig. 3). Once the boot process is successfully finished, the Central Program Window opens. In the upper box, the name of the last protocol used will be displayed. In addition to selecting and running protocols, the Central Program Window allows you to enter the Maintenance dialogue.

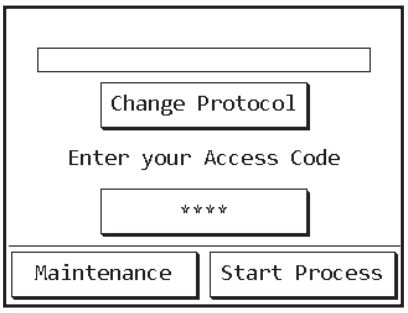

Fig. 4 The Central Program Window

4.3 Positioning of the Deep Well Plate and the Tip & Tube Rack

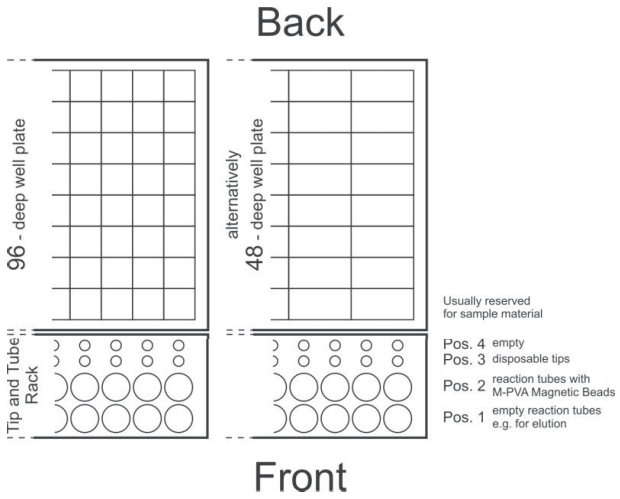

Fig. 5 Orientation of the deep well plate and Tip & Tube Rack The deep well plate type needed for the protocol is given in the corresponding kit insert.

The isolation procedure will be performed in a deep well plate (96 or 48 well). The disposable tips, the Magnetic Beads and the tubes containing the elution buffer have to be positioned in the Tip & Tube Rack. Fig. 5 illustrates the orientation of the deep well plates and the Tip & Tube Rack on the platform of ZEPHYRUS® Magneto The exact position and type of the individual components required for the isolation run is given in the corresponding kit insert that is delivered with the individual kits.

NOTE! THE REQUIRED DEEP WELL PLATE (48 WELL OR 96 WELL) AND THE EXACT POSITIONS OF THE SAMPLES, DISPOSABLES AND REAGENTS ARE DESCRIBED IN THE CORRESPONDING PROTOCOL SHEET.

4.4 Protocol Selection

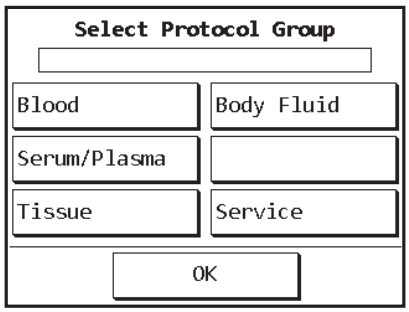

Fig. 6 Protocol Group Selection

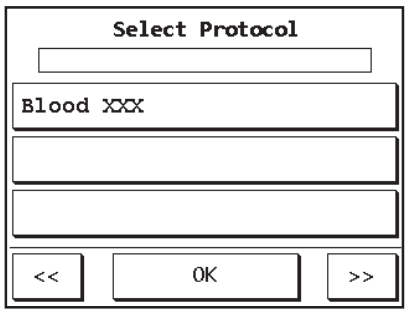

Fig. 7 Protocol Selection, the shown Blood XXX protocol serves as example.

To start or change a protocol click the **[Change Protocol]** button and a new window will open. To allow for quick and comfortable access to the protocol of your choice, different protocol groups for the possible sample materials are given (Fig. 6). Please keep in mind that for each sample material you need a dedicated kit that has been optimized for the best quality and yield of nucleic acids. The protocol group **[Service]** is reserved for special protocols that are used to set-up and maintain the ZEPHYRUS® Magneto.

Select the protocol group according to your sample material and a new window with a list of available protocols opens (Fig. 7). With the arrow buttons next to the **[OK]** button you can switch between the protocol pages. Select the protocol of your choice - the name will be prompted in the upper box. Continue with **[OK]**. You will return to the previous window (Fig. 6), another **[OK]** brings you back to the Central Program Window. If you have accidentally chosen the wrong protocol group you can always return to the previous window by clicking **[OK]** without prior selection of a protocol.

In the Central Program Window the selected protocol will be displayed in the upper box. To start an isolation run you have to enter a valid access code. This can be done with the numeric keypad (Fig. 8) that will be displayed after clicking the Access Code box **[****]**. Once you entered the Access Code, return to the Central Program Window and click **[Start Process]** to start the isolation run. A window with information about the chosen protocol opens (Fig. 9).

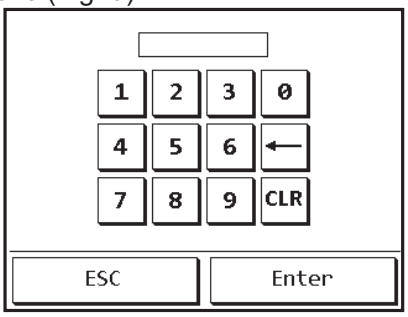

Fig. 8 Numeric Keypad for the Access Code

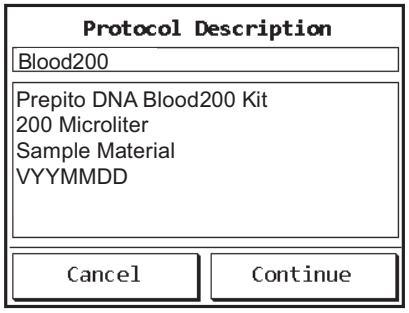

Fig. 9 Protocol Description (Example)

If everything is to your satisfaction, proceed with **[Continue]**. Depending on the selected protocol and corresponding deep well plate type, you will see one of two different windows where you have to choose the number and position of the samples you want to process (Fig. 10). Click **[Sel. All]** for a 6 or 12 sample run; the number of the displayed sample positions (6 or 12, respectively) depends on the selected protocol. Click **[OK]** to continue.

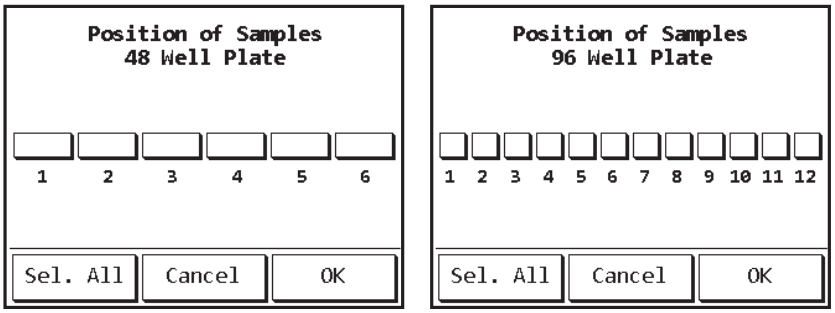

Fig. 10 Sample Number and Position

In the next dialogue window you can register the barcodes of the kit that will be used (Fig. 11) as well as the sample material and the eluates. When you click on the empty box, you can enter these barcodes with the provided barcode reader or via an alphanumeric keypad (Fig. 12) that opens when you click the barcode field. The latter option allows you to enter your own codes.

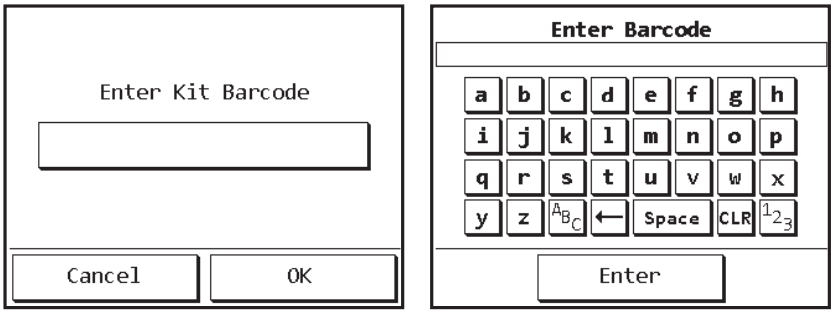

Fig. 11 Barcode Registration

Fig. 12 Alphanumeric Keypad

If the registration of the sample and eluate barcodes is necessary, confirm the “Barcode reading required?” window (Fig. 13) with **[Yes]**. You will now have the option to scan or type a barcode for each sample and eluate. To assign the same barcode to samples and eluates, click **[Copy Barcode]** to transfer the values to the respective eluate fields.

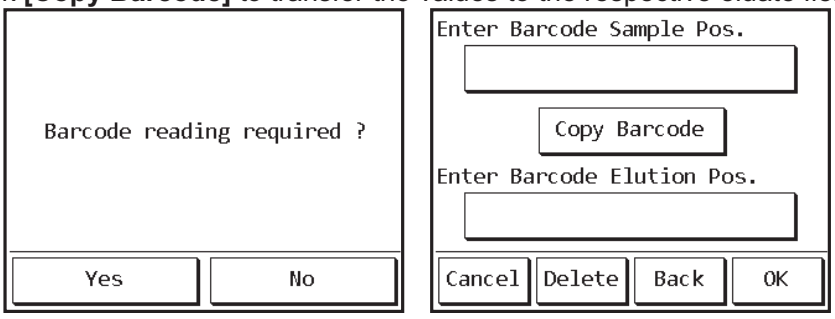

Fig. 13 Registration of the Samples

After entering the barcodes you will see one of the following two windows, depending on the protocol and its corresponding deep well plate (Fig. 14).

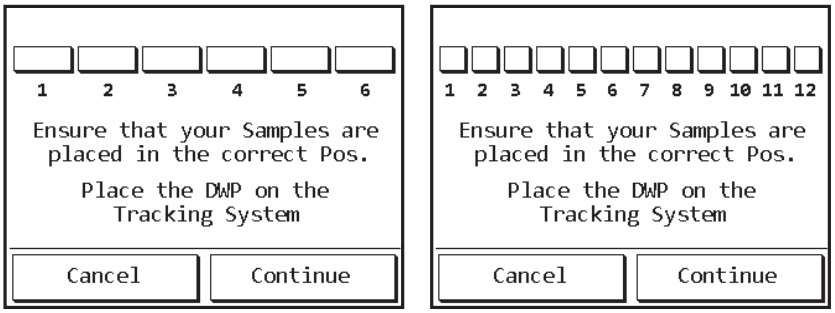

Fig. 14 Verification of the Sample Positions

The sample positions you have entered during the set-up of the run will be marked with a black box whereas the empty positions will be marked with an open box. The number of the displayed sample positions (6 or 12, respectively) depends on the selected protocol. Make sure that all samples are in the correct positions and place the deep well plate (DWP) and the Tip & Tube Rack on the platform (Tracking System). Pressing **[Continue]** leads to a final window reminding you to check all relevant parameters and to close the safety latch and the front door (Fig. 15, see section 3.5 as well). If everything is set-up properly, click **[Start]** to run the automated extraction protocol.

The front door will be locked with an audible click when the isolation procedure starts. During this process a status window will show information about the running protocol, the remaining time and the current protocol step (Fig. 16).

***NOTE!* DO NOT OPEN THE FRONT DOOR DURING A RUN; IT WILL DAMAGE THE INSTRUMENT.**

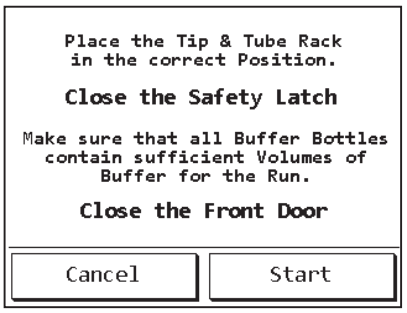

Fig. 15 Final Instructions

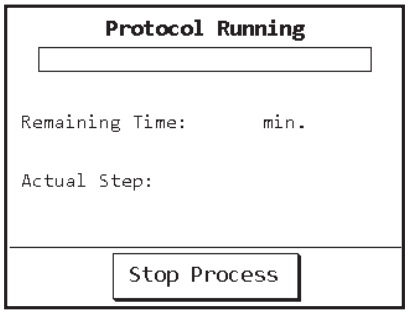

Fig. 16 Status Information

To abort a running protocol click **[Stop Process]** – a confirmation window will open (Fig. 17). Click **[Abort]** to irrevocably stop the process, **[Continue]** continues the isolation procedure.

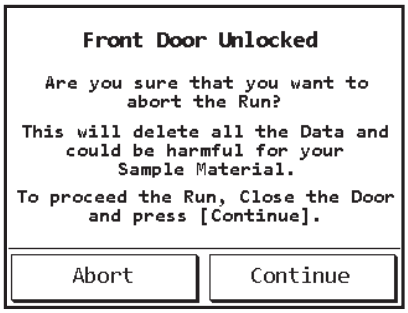

Fig. 17 Interrupted Protocol

Please keep in mind that aborting an isolation procedure can result in the complete loss of your sample material and the buffers/beads.

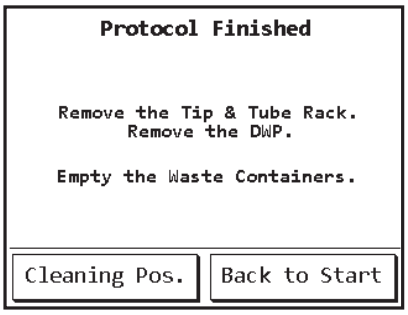

Fig. 18 Finished Run

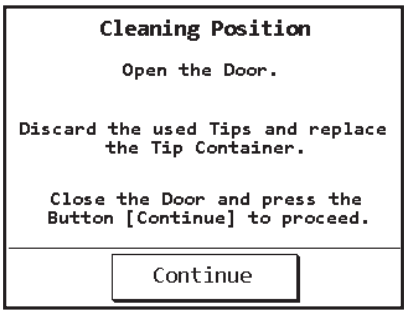

Fig. 19 Cleaning Position

Once the isolation run is finished a final window will be displayed (Fig. 18). Please check the filling status of the waste containers – if there is sufficient capacity for a new run you can click [Back to Start] which will open the Central Program Window. If not, click [Cleaning Pos.] which will move the x- and y-axis into positions that facilitate the removal of the used disposable tip and liquid waste containers (Fig. 19). Follow the instructions on the screen and press [Continue] to open the Central Program Window ZEPHYRUS® Magneto will then be ready for another isolation procedure. In case you accidentally skipped the cleaning step, you can always run this procedure from the [Maintenance] menu in the Central Program Window (see section 5.1 for further information).

4.5 Changing the Buffer System

If changing the protocol requires a buffer system different from the one currently in use, the dispensing system has to be emptied to avoid mixing of the buffers. Use the manual priming function (section 5.2) to drain the tubes before removing the tubes with the quick connector caps from the used buffer bottles. Connect the tubes with the quick connector caps to the individual buffer bottles in the new kit.

5 Service and Maintenance Section

You have three different access levels for the maintenance section of ZEPHYRUS® Magneto. Click **[Maintenance]** in the Central Program Window (Fig. 20) and a very basic maintenance menu will open (Fig. 21). The second option - for authorized personnel only - is to enter the Access Code for an advanced maintenance menu in the Central Program Window. Clicking **[Maintenance]** then opens a menu with two options (Fig. 22). Entering the administrator access code opens a window with all functions available (Fig. 23).
The maintenance procedures will be explained in the following sections.

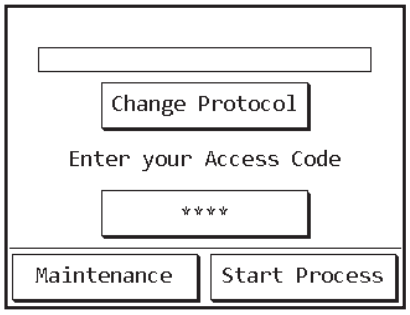

Fig. 20 The Central Program Window

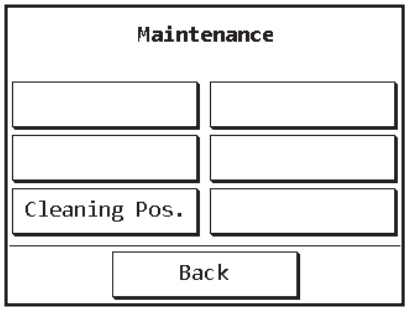

Fig. 21 Basic Maintenance Menu

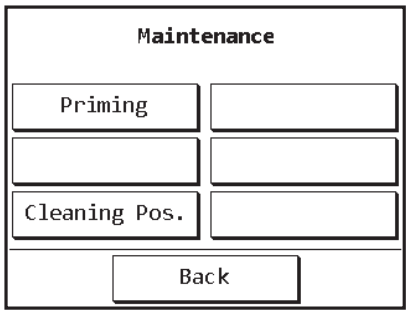

Fig. 22 Advanced Maintenance Window

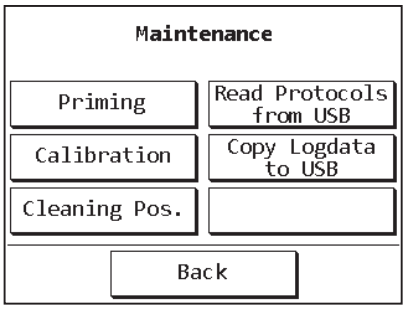

Fig. 23 Administrator panel

5.1 Cleaning Position

At the end of each isolation procedure you have the possibility to choose the **[Cleaning Pos.]** option to move the axes into positions enabling you to clean the instrument (see Fig. 18). In case you want to start a new isolation procedure and you notice that the waste buffer is too full, you can invoke the same **[Cleaning Pos.]** function from the maintenance menu. The axes will move and you can easily remove the waste buffer trough and the disposable tip container. Empty and clean both and put them back into place before starting a new run.

5.2 Priming of the Pumps

To achieve good quality results it is of special importance that the dispensing system of ZEPHYRUS® Magneto is always completely filled with buffer. Otherwise you can have deviations in the dispensed buffer volumes that could affect the isolation procedure. Especially after a change of the buffer bottles or a long period of inactivity the complete filling of the tubing of ZEPHYRUS® Magneto has to be ensured. This can be done with the **[Priming]** function (Fig. 22 and Fig. 23). Before you start the priming process, make sure that the buffer bottles are properly connected to the ZEPHYRUS® Magneto.

The priming function activates the pumps for a definable time period. Enter a value between 1 – 100 (equivalent to volumes between 0.15 – 1.5 mL) into the Priming Units field and select the pumps you want to prime. A value of 20 Priming Units is recommended to avoid wasting reagents. **[Prime Pumps]** will start the process – please repeat this procedure until all tubes are completely filled with buffer and some liquid has already dispensed from all nozzles into the waste trough.

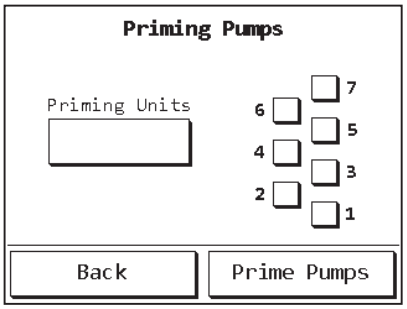

Fig. 24 Manual Priming

NOTE! AN INTEGRATED PRIMING STEP AT THE BEGINNING OF EACH EXTRACTION PROTOCOL REMOVES SMALL BUBBLES FROM THE DISPENSING SYSTEM.

5.3 Protocol Update

To update existing or to upload new protocols, please copy the provided protocol files into the root directory (not into any subfolder) of a USB stick. Enter the administrator access code into the provided field in the Central Program Window and click **[Maintenance]**. Plug the stick with the protocol files into the touch panel (Fig. 25) and click **[Read Protocols from USB]** (Fig. 23). During the transfer of the data, the message **[Reading Protocols from USB]** is shown. Please do not remove the stick while this message is shown.

Fig. 25 Touch Panel with USB Stick

5.4 Backup of the Log File

In the log file of ZEPHYRUS® Magneto, information regarding the last 100 performed runs is stored (e.g. date, protocol name, lot number of the kit). To avoid the loss of information, it is recommended to export and externally back up the log file on a regular basis. Plug a USB stick into the touch panel (Fig. 25) and click **[Copy Logdata to USB]** in the maintenance menu to export the log file.

NOTE! TO AVOID THE LOSS OF INFORMATION EXPORT AND BACK-UP THE LOG FILE EVERY 80 RUNS.

During the export process the message **[Copying Logdata USB]** is shown. Once the message disappears the USB stick can be removed from the instrument.

6 Advanced Maintenance and Repair

6.1 Safety during Maintenance and Repair

- Switch off the instrument and disconnect the power cord during the duration of your work.
- All modifications concerning safety have to be documented and communicated to all operators immediately.
- Document all modifications and instruct all operators where necessary.

6.2 End-User Actions and Controls

Item	Location	Workflow	Interval
Cleaning	Interior: waste buffer trough and used disposable tip container	Clear and clean the containers according to domestic laboratory protocols; if necessary, decontaminate the waste containers	After each run
Reagents	Periphery	Ensure correct connection and function of spikes and tubes Ensure sufficient buffer volume	Before each run
Safety device	Door locking mechanism	Check for accurate function	Weekly
Electrical connections	Instrument, accessories	Visual inspection for damage, leakage, wear and tear	Weekly
Dispensing unit	Instrument, tubing	Visual inspection for damage; leakage, wear and tear	Weekly
Cleaning	Interior	By soiling, clean and if necessary decontaminate the instrument	Monthly or when visibly soiled
Rod unit	Interior, rod unit	Visual inspection for soiling and bending	After each run

NOTE! **ALL MAINTENANCE AND REPAIR WORK MUST BE PERFORMED BY AUTHORIZED, SPECIALLY TRAINED AND QUALIFIED PERSONNEL**

6.3 Qualified Personnel Preventive Maintenance and Intervals

Item	Location	Workflow	Interval
Lubrication	Runner block, guiding rail, spindle	Clean guiding rail and spindle; lubricate guiding rail and spindle. Performed by manufacturer or authorized service organization.	Biannual; if necessary after the use of degreasing cleaning agents
Battery	Touch panel/ Controller		Annual
Servicing			Biannual

NOTE! ALL MAINTENANCE AND REPAIR WORK MUST BE PERFORMED BY AUTHORIZED, SPECIALLY TRAINED AND QUALIFIED PERSONNEL.

6.4 Cleaning and Disinfection Solutions

For the cleaning and disinfection of ZEPHYRUS® Magneto the following reagents are recommended:

- Aqueous alcohol-containing disinfectant for the interior and exterior surfaces of ZEPHYRUS® Magneto (e.g. 30 mL Ethanol and 45 mL 1-propanol per 100 mL total volume)
- Glutaraldehyde-containing disinfectant for the stainless base trough, the waste buffer trough and the disposable tip container

NOTE! DO NOT USE BLEACH TO CLEAN OR DISINFECT WASTE CONTAINERS. BLEACH IN CONTACT WITH KIT REAGENTS CAN PRODUCE TOXIC FUMES.

6.5 Cleaning Procedure

For the cleaning of ZEPHYRUS® Magneto, click the **[Cleaning Pos.]** button in the service and maintenance section of the instrument (see section 5.1). Take out the waste buffer trough, the disposable tip container and the stainless steel base trough. If necessary, discard the liquid waste and the disposable tips in accordance to the local safety regulations (see section 9.8). Moisten a soft and lint-free cloth with an alcohol-containing solution and clean the surfaces, the interior, the troughs and the disposable tip container.

NOTE! DO NOT REMOVE THE GREASE FROM THE GUIDING RAILS OF THE INSTRUMENT.

6.6 Disinfection Procedure

For the disinfection of ZEPHYRUS® Magneto, click the **[Cleaning Pos.]** button in the service and maintenance section of the instrument (see section 5.1). Take out the waste buffer trough, the disposable tip container and the stainless steel base trough. If necessary, discard the liquid waste and the disposable tips in accordance to the local safety regulations (see section 9.8). Submerge the troughs and the disposable tip container for 4 hours in a glutaraldehyde-containing disinfectant. Rinse the troughs and the container thoroughly with de-ionized water. In order to avoid residue formation on treated surfaces, wipe surfaces with a dry, soft and lint-free cloth. The surfaces should only have minimum residual moisture after the final wiping. Wipe the interior surfaces of the instrument with a glutaraldehyde-containing disinfectant. Moisten the surfaces of the

instrument and incubate for 4 hours. Moisten a soft and lint-free cloth with de-ionized water and wipe away the traces of the disinfectant from the surfaces. The surfaces should only have minimum residual moisture after the final wiping.

NOTE! DO NOT REMOVE THE GREASE FROM THE GUIDING RAILS OF THE INSTRUMENT.

7 Troubleshooting

Problem	Possible Reason	Solution
After switching on the instrument, no self-test is performed.	The power cord is connected incorrectly.	Check power cord for correct connection.
	The front door is not closed.	Close the front door.
	A fuse is damaged.	Change the fuse.
	The wall socket is damaged or without power.	Check the wall socket for correct function.
The touch paneldoesn'tfunction after the instrument is switched on.	The power cord is connected incorrectly.	Check power cord for correct connection.
	The wall socket is damaged or without power.	Check the wall socket for correct function.
	The shelf life of the battery is exceeded	Contact manufacturer or your local supplier for exchanging the battery
The instrument dispenses the buffers irregularly.	Outer tubes are incorrectly connected to the 8-Pack or the instrument.	Check the connection of outer tubes.
	The tubes are not filled with buffer after connecting the 8-Pack to the instrument.	Fill the tubes completely using the manual priming function.
The instrument does not dispense any buffer.	The buffer containers in the 8-Pack are empty.	Replace the 8-Pack. Do not use the 8-Pack for more than the indicated number of preparations.
	Buffer containers in the 8-Pack are not connected to the instrument.	Connect the buffer containers with the instrument.
	The 8-Pack is not positioned in the right manner on holder for the reagents.	Place the 8 -Pack in the correct position on the holder for the reagents.
	Tubes are not filled after connecting the 8-Pack to the machine.	Ensure that the tubes are completely filled with buffer by using the manual priming function.
The individual tubes for the eluates are not filled with buffer.	The single tubes are not in the correct position of the Tip & Tube Rack.	Place the individual tubes in the correct positions.

Problem	Possible Reason	Solution
The calibration of the dispensing system does not result in a modified volume.	Entering of the measured values was not confirmed by pressing the **[Transfer]** button.	Press the **[Transfer]** button after entering the values.
The calibration of the dispensing system does not result in a correct dispensing result.	The dispensing system was not completely filled before starting the calibration procedure.	Ensure that the dispensing system is completely filled with buffer. Ensure that no air bubbles remain in the tubes.
1.4 mL reaction tubes are not filled with buffer after the calibration procedure. The calibration plate is moistened with buffer.	The calibration plate is not positioned properly on the platform.	Place the calibration plate in the correct position on the platform.
The tube/spike is leaking at the 8-Pack.	The thread of the spike was damaged by mounting it with too much force to the Luer adapter (tube).	Exchange the spike and connect it to the tube with gentle force only
	The spike carries a production defect.	Exchange the spike and connect it to the tube with gentle force only
	The fitting between spike and tube is not correct.	Check spike and tube for correct fitting. Connect both to each other with gentle force only
	The septum was pierced repeatedly at different positions	Insert the spike in the same position as before
Tubes at the outside are soiled by buffer and/or crystals.	See topic above “The tube/spike is leaking at the 8-Pack.”	See topic above “The tube/spike is leaking at the 8-Pack.”
Several (>5) large bubbles (1-2 mm) are in a tube.	The tube/spike is leaking at the 8-Pack.	See topic “The tube/spike is leaking at the 8-Pack.”
	The instrument was not used for a long period (more than 2 weeks). The buffer has evaporated at the dispenser head and/or the instrument is located in a place with a high day/ night temperature gradient.	Fill the tubes completely using the manual priming function in order to remove the bubbles. Stop performing the priming as soon as the bubbles are eliminated since extensive priming wastes buffers.
Several small bubbles are in a tube.	The buffer is evaporated at the dispenser head and/or the instrument is located at a place with a high day/night temperature gradient.	The presence of these small bubbles is irrelevant. The majority of them will be removed by priming at the beginning of every extraction protocol.

Problem	Possible Reason	Solution
The nozzles at the dispenser head are covered by crystals.	The instrument was not used for a long period (> 2 weeks). The buffer has evaporated at the nozzles of the dispenser head. The instrument is located at a place with a high day/ night temperature gradient.	Select the “Cleaning Poston” (section 5.1); remove the lid from the liquid waster container. Rinse the nozzles with ultrapure water by the use of a wash bottle. Use the manual priming function (10 Units) for checking the complete removal of the crystals.
The number of sample positions shown on the touch screen does not correspond to the used deep well plate (48 or 96 deep well plate, resp.).	The selected protocol does not correspond to the used deep well plate. The used deep well plate does not correspond to the selected protocol.	Use the deep well plate type corresponding to the selected protocol. The correct deep well plate is given protocol sheet delivered with the individual kits.
The barcode reader doesn’t function.	The cable is connected incorrectly.	Check the cable for correct connection.
The metal rods are contaminated with sample material and/or Magnetic Beads.	No disposable tips are placed at the sample position in the Tip & Tube-Rack. Disposable tips are placed at an incorrect position in the Tip & Tube-Rack.	Clean and disinfect the metal rods. Place the disposable tips according to the sample position in the Tip & Tube-Rack.
A separation protocol is started without placing the deep well plate and/or Tip & Tube-Rack on the platform.	The instructions in the individual protocol sheet were not followed properly.	Stop the protocol immediately by pressing the [Cancel] button. Before starting an isolation run make sure that you have read and understood the protocol sheet.
The consumables for the Tip & Tube-Rack are not placed in the correct position.	The instructions in the individual protocol sheet were not followed properly.	Stop the protocol immediately by pressing the [Cancel] button. Before starting an isolation run make sure that you have read and understood the protocol sheet.
The base of the machine is moistened with buffer.	The waste buffer trough is not positioned properly.	Clean the interior of the instrument. Place the waste buffer trough in the correct position and orientation.
The waste buffer trough cannot be removed easily for cleaning.	The tracking and dispensing systems are not in the “cleaning position“.	Press the [Cleaning Pos.] button at the end of a protocol.

Problem	Possible Reason	Solution
The used tip container cannot be removed easily for cleaning.	The tracking and dispensing systems are not in the“cleaning position“.	Press the**[Cleaning Pos.]** button at the end of a protocol.
The machine does not take up the disposable tips.	1.4 mL calibration tubes were placed in the Tip & Tube instead of 0.75 mL reaction tubes.	Only use 0.75 mL reaction tubes during separation protocols.

8 Technical Data

8.1 Power requirements

Power consumption: 100 ***VA***
Mains Voltage: 110– 240 VAC, 50– 60 Hz
Fuses on inlet: T 3.15A, 250V

8.2 Overall Dimensions

Length	620 mm
Width	520 mm
Height	550 mm
Weight	45 kg (100 lbs)

8.3 Emissions

Noise Level	< 80 dB
Gas, dust, vapors	none

8.4 Operating Conditions

Installation location	indoors
Ambient temperature	15 – 35 °C
Ambient relative humidity	15– 75 % without condensation

9 Warnings and Precautions

9.1 Connections and Safety Devices

Check all cables (power cord, barcode reader and, where applicable, the USB cable) for damage before starting the instrument. Close the front door and turn on the instrument. ZEPHYRUS® Magneto performs a short self-test (section 5.2). Carefully check that the front door is locked during this process. If the front door is not locked, stop working immediately and contact the person responsible for the instrument. Only run the instrument after having:

- corrected any problems detected by the self-test
- ensured that no hazards exist for persons or mechanical parts

This safety check has to be performed at the following intervals:

- at the beginning of each shift when the instrument is operating continuously
- after each maintenance or repair
- otherwise, once a week

Only operate the instrument with an intact housing and an accurately working door locking mechanism.

NOTE! NEVER REMOVE THE HOUSING OR ANY OF THE SAFETY DEVICES. DO NOT BYPASS ANY SAFETY FEATURE AS THIS COULD POSE A SERIOUS RISK. NEVER MANIPULATE ANY SAFETY DEVICE.

Immediately report any damage, malfunction or other problem with the instrument to the responsible supervisor.

9.2 Qualification of Personnel

This manual is intended for instrument operators.

- Make sure to clearly define the different responsibilities for operation, set-up and maintenance of the instrument.
- All persons maintaining or repairing the instrument must have the appropriate qualification and are required to have read and understood the technical manual.
- Each operator is obliged to make himself familiar with all aspects of operating ZEPHYRUS® Magneto (manual) and using the **Magneto Kit** protocols (kit insert).

NOTE! OPERATION AND MAINTENANCE OF THE INSTRUMENT MAY ONLY BE PERFORMED BY AUTHORIZED PERSONNEL WITH APPROPRIATE TRAINING. THIS MANUAL IS NO SUBSTITUTE FOR QUALIFIED TRAINING GIVEN BY AN AUTHORIZED EXPERT.

9.3 Operational Safety

- Never operate the instrument under hazardous circumstances.
- Only operate the instrument according to this manual.
- Never operate this instrument under the influence of medication or alcohol.
- Apply all necessary health and safety regulations.
- Nominate a supervisor for the instrument.

- Immediately report all hazards, faults and malfunctions to the supervisor.
- Ensure that operations are coordinated by the supervisor when operating the instrument with more than one operator.

NOTE! THIS MANUAL IS NO SUBSTITUTE FOR QUALIFIED TRAINING GIVEN BY AN AUTHORIZED EXPERT. THE INSTRUMENT MUST NOT BE OPERATED WITHOUT APPROPRIATE TRAINING AND INSTRUCTION.

9.4 Non-permitted Activities

Any incorrect use of ZEPHYRUS® Magneto will void the manufacturer's warranty.

- Unauthorized changes (redesign) of the instrument.
- Unsuitable use of inappropriate devices, accessories, or peripheral apparatus unless otherwise specified.
- Operating the instrument with unsecured or unchecked safety devices.
- Operating the instrument with power supplies different from specification.
- Attaching of any kind of magnet to the housing.
- Use of the instrument for purposes other than those stated in this manual.
- Pushing the front door when the instrument is switched off. This action will damage the safety lock of the instrument.

9.5 Procedure in Case of Emergency

A case of emergency exists when a running process or instrument is out of control.

NOTE! IN CASE OF EMERGENCY, IMMEDIATELY SWITCH OFF THE MAIN POWER.

To avoid harm in case of emergency, operators should wear the following:

- safety glasses or face protection
- safety gloves
- lab coat
- in case of fire wear a respiratory mask with an appropriate filter

NOTE! MAKE SURE THAT YOU HAVE ACCESS TO THE ABOVE MENTIONED EQUIPMENT BEFORE YOU START OPERATING THE INSTRUMENT. MAKE SURE THAT ALL ITEMS ARE INTACT AND FUNCTIONAL.

9.6 Procedure and Hazards in Case of Fire

Inappropriate equipment for firefighting may cause serious injuries.
A fire may cause the following hazards:

- toxic gas and vapor
- danger of an electric shock

Make sure that the location of all firefighting equipment is known and easily accessible. Operators must be trained in the use of firefighting equipment.

9.7 Biological Safety, Chemicals and Reagents

Specimen and reagents containing material from human sources should be treated as potentially infectious. Apply safe laboratory procedures as outlined in publications such as "Biosafety in Microbiological and Biomedical Laboratories"

(http://www.cdc.gov/od/ohs/biosfty/biosfty.htm). All material that had contact with specimens should also be treated as potentially infectious. In addition, some chemicals used with this instrument may be hazardous or may become hazardous after completion of an isolation protocol.

Operating the instrument requires the following safety precautions:

- Always wear safety glasses, 2 pairs of gloves and a lab coat.
- The supervisor must take the necessary precautions to ensure that the surrounding of the workplace is safe. Additionally he has to make sure that the instrument operators are adequately trained and not exposed to hazardous levels of infectious agents as defined in the corresponding “Material Safety Data Sheets (MSDS)” or “Occupational Safety and Health Administration (OSHA)”, “American Conference of Industrial Hygienists (ACGIH)” or “Control of Substances Hazardous to Health (COSHH)” documents.
- Sufficient ventilation must be provided in accordance with all national, state and local health and safety regulations and laws.

9.8 Waste Disposal

Used disposables (deep well plates, reaction tubes), the contents of the waste buffer trough and the used tip tray may contain hazardous chemicals or infectious agents from the purification process. Such wastes must be collected and disposed of in accordance with the local safety regulations.

9.9 Moving the instrument

If the instrument must be moved, we recommend that two people lift it by supporting the instrument from the lifting areas on the bottom of the instrument indicated in the figure below. Be careful not to tilt the instrument excessively while moving it.

Fig. 26 Instrument lifting

9.10 Symbols

| Power ON

○ Power OFF

The adhesive labels used with the instrument are:

Warning! All the surfaces and components inside the instrument which are accessible when the front door is open are potentially infectious.

Warning! There are moving parts and potentially cutting edges inside the instrument.

Warning! There is a strong magnetic field inside the instrument which may damage for example wrist watches, credit cards or other magnetizable objects.

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ZEPHYRUS® Magneto

Software version 4.0