

**SLIDE STAINER
ROBOT STAINER HMS 740**

INSTRUCTION MANUAL

CERTIFICATION

MICROM International GmbH certifies that this instrument has been tested and checked carefully. Its technical data was verified before shipment to be in accordance with the published specifications.
The instrument complies with applicable international safety regulations.

WARRANTY

This MICROM product is warranted against defects in material and workmanship for a period of 1 year. Parts which prove to be defective during the warranty period will be repaired or replaced free of charge by MICROM International GmbH. No other warranty is expressed or implied. Unauthorized modification or repair by third party persons will void the warranty.
The warranty will expire in case of improper or wrong use of the instrument and in case the warning and precautionary messages are not observed. MICROM International GmbH is not liable for any occurring damage.

Errors and omissions excepted. Subject to amendment and improvement without further notice.

This instruction manual is part of the product. Further copies can be ordered at the nearest MICROM sales office by giving the serial number of the instrument, the number of the instruction manual and the date of issue.

This instruction manual is available in the following languages:

	Cat. No.
German:	387800
English:	387801
French:	387802
Spanish:	387803
Italian:	387804

Dear Customer,

Before putting the instrument into operation, please read these operating instructions carefully to familiarize yourself with its proper operation and functions. To avoid risks for the operator and technical damage to the instrument, it must only be used in accordance with its intended use (see part 1-2).

Any other use of the instrument is considered improper! All warranties and guarantees would then be null and void.

Only skilled or specially trained personnel must operate the slide stainer, i.e. staining of histological and cytological specimens. The listed and marked safety measures as well as the regulations and hygiene measures of your respective lab must strictly be observed.

MICROM Ser. No. :

Please enter the serial number, which is placed on the type plate on the rear side of the instrument. This way, questions and service can be handled faster.

Instruction Manual No. 387801

Issued on June 12, 2006

**MICROM International GmbH
Robert-Bosch-Strasse 49**

D-69190 Walldorf

**Telefon: (06227) 836-0
Telefax: (06227) 836-111**

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EC Certificate of Conformity

Name and address of the manufacturer: MICROM International GmbH
Robert-Bosch-Straße 49
D-69190 Walldorf

Product designation: Slide Stainer
Type reference: HMS 740

Notification to Competent Authorities:

This medical device has been registered with the German authority as "General Histology Instruments" under the EDMA-classification code: 23-06-01

The designated product complies with the laid down regulation:

DIRECTIVE 98/79/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 October 1998 on in vitro diagnostic medical devices

The designated product complies with the EC regulations by strictly observing the following norms:

DIN EN ISO 14971:2001-03

Medical devices - Application of risk management to medical devices (ISO 14971:2000).

DIN EN 61010-1:2002-08

Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements (IEC 61010-1:2001).

DIN EN 61010-2-101:2003-09

Safety requirements for electrical equipment for measurement, control and laboratory use - Part 2-101: Particular requirements for In-Vitro-Diagnostic-(IVD)-Medical instruments.

DIN EN 61010-2-081:2002-12

Safety requirements for electrical equipment for measurement, control and laboratory use - Part 2-081: Particular requirements for automatic and semi-automatic laboratory equipment for analysis and other purposes (IEC 61010-2-081:2001).

DIN EN 61010-2-010:1995-03

Safety requirements for electrical equipment for measurement, control and laboratory use - Part 2-010: Particular requirements for laboratory equipment for the heating of materials (IEC 61010-2-010:1992, modified); German version EN 61010-2-010:1994

DIN EN 61326:2002-03

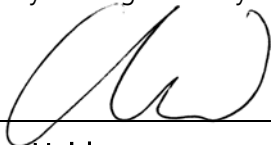
Electrical equipment for measurement, control and laboratory use - EMC requirements (IEC 61326-1:1997 + A1:1998 + A2:2000); German version EN 61326:1997 + A1:1998 + A2:2001

DIN EN 1717:2001-05

Protection against pollution of potable water installations and general requirements of devices to prevent pollution by backflow - Technical rule of the DVGW; German version EN 1717:2000

DIN EN ISO 9001:2000

Quality management systems - Requirements (ISO 9001:2000)



Hans Heid
Managing Director

Walldorf, 18 January 2005

PART 1 IMPORTANT INFORMATION

1-1 WARNING SIGNALS AND SYMBOLS

The installation and routine use of the Robot Stainer HMS 740 is easy and safe if the instructions in this manual are being observed.

**Note:**

Special instructions regarding operation of the instrument.

**Caution:**

Special precautionary measures to prevent damage to equipment. For a long lifetime of the equipment, please observe these instructions carefully.

**Danger:**

Special warning messages to prevent harm to persons and/or serious damage to equipment. For your own safety, please observe these instructions carefully.

**Biohazard:**

Warning of biological danger.

**Radioactivity:**

Warning of radioactive danger.

**Separate taking back of electrical and electronic instruments in the countries of the European Union:**

This is to be applied in the countries of the European Union and other European countries with a separate collecting system within the waste management.

This product, being an electro and/or electronic instrument, must be treated separately within the waste management process (WEEE).

SAFETY PRECAUTIONS AND IMPORTANT INFORMATION**ATTENTION!**

The operator's safety is affected, when the instrument is not operated in accordance with the instruction manual.

Please observe the following general precautions during operation of this instrument. Failure to comply with these precautions violates safety standards and the intended use of the instrument. MICROM International GmbH is not liable for misuse of the instruments and failure to comply with basic safety requirements.

INSTRUMENT GROUNDING

To avoid injury from electrical current, the instrument must be connected with the protective earth. The instrument is equipped with a three wire ground plug. The power outlet must be connected to the protective earth and must meet the International Electrotechnical Commission (IEC) regulations.

CAUTION: MAINS VOLTAGE

Never remove instrument covers during operation. Component replacements as well as adjustments must only be made by trained service personnel. Only use original spare parts for replacement work. Unplug the unit before removing or opening the covers.

DANGER IN EXPLOSIVE ENVIRONMENT

The instrument must not be operated in the presence of flammable gases. Moreover, the instrument must not be exposed to conditions whereby dangerous gas concentrations can occur.

HAZARD OF RADIOACTIVE RADIATION

When working with radioactive specimens observe all applicable radiation safety procedures. When working with radioactive contaminated material, appropriate safety and decontamination measures must be carried out. According to the rules and regulations concerning the handling of radioactive contaminated material of the respective laboratory, safety clothing (e.g. particle mask, gloves, protective shoe covers) must be worn. Radioactive contaminated waste must be disposed of according to the respective regulations.

HAZARD OF INFECTION



Specimens used during the intended operation of the instrument might potentially be infectious. For this reason, it is recommended to observe the general laboratory regulations concerning protection against danger of infection.

Information on decontamination media, their use, dilution and effective range of application can be read in the Laboratory Biosafety Manual : 1984 of the World Health Organization.

When working with infectious specimens observe all applicable safety procedures. When working with infectious material, appropriate safety and disinfection measures must be carried out. According to the rules and regulations concerning the handling of infectious material of the respective laboratory, safety clothing (e.g. particle mask, gloves, protective shoe covers) must be worn. Infectious waste must be disposed of according to the respective regulations.

CAUTION! DANGER BY MOVING PARTS

Do not manipulate at the unit when the hood is open. To avoid danger, the moving speed is reduced.

CONSERVATION

According to environmental regulations, the occurring waste water should be drained into a discharge channel with subsequent biological/chemical purification.

HAZARD OF MALFUNCTION

To avoid the hazard of malfunction of an instrument, it must only be operated in a controlled electromagnetic environment. This means that transmitters such as mobile phones must not be operated in their close vicinity.

1-2 INTENDED USE

The Robot Stainer HMS 740 is a highly efficient slide stainer. The Robot Stainer HM 420 must solely be used for staining histological, cytological and hematological stainings.

Only skilled or specially trained personnel must carry out staining of histological, cytological and hematological specimens with the Robot Stainer HMS 740.

The listed and marked safety measures as well as the regulations and hygiene measures of your respective lab must strictly be observed.



Note:

This instruction manual is part of the product.

PART 2 INTRODUCTION

2-1 DESCRIPTION SLIDE STAINER ROBOT STAINER HMS 740

The Robot Stainer HMS 740 from MICROM International GmbH sets new standards in ergonomics, operation and comfort.

Different instrument versions:

HMS 740 standard instrument with 34 reagent stations, 4 rinsing stations, 3 exit and 1 entry station

HMS 740 standard instrument with 32 reagent stations, 4 rinsing stations, 3 exit and 1 entry station and 2 DI stations

HMS 740 standard instrument with 32 reagent stations, 4 rinsing stations, 3 exit and 1 entry station and 2 heated reagent stations

HMS 740 with 4 heating stations, 30 reagent stations, 4 rinsing stations, 3 exit and 1 entry station

HMS 740 with 4 heating stations, 28 reagent stations, 4 rinsing stations, 3 exit and 1 entry station and 2 DI stations

HMS 740 with 4 heating station, 28 reagent stations, 4 rinsing stations, 3 exit and 1 entry station and 2 heated reagent stations

The self-containing metal housing and the swing-open acrylic glass cover allow an easy access to the bath containers. The bath containers can be removed individually or in groups of four and filled as needed.

The loading station and the three exit stations are user-friendly integrated into one drawer. This way, slide baskets can comfortably be inserted and removed without having to open the instrument hood.

Each bath container has an individual cover which is automatically lifted and transferred during protocol execution. Bath size for one slide basket with 30 slides, bath capacity: 480 ml.

The slide baskets are permanently agitated. The agitation speed can be selected and turned off, when needed.

The robotic arm, which is controlled in an intelligent way in three axes (x/y/z), with silent moving mechanics is only used for transferring the slide baskets and the lids. Simultaneous multiple protocol execution (multitasking) is possible.

The Robot Stainer HMS 740 is equipped with a new, almost maintenance-free drip preventer, which reduces the reagent carry-over considerably.

Easy programming of the instrument via the large touch screen.

Fast creation of bath layouts and staining protocols via logical menu-driven prompting in various languages.

Protocol execution with minimal key sequence via touch screen or touchpad keyboard with five quick start buttons.

Protocol process is shown graphically on the screen. Different protocols are shown in different colors. Additional acoustic warning signals in case of malfunctions.

Several bath layouts and up to 50 protocols with up to 100 protocol steps each can be stored.

Immersion time can individually be selected between 1 sec. up to 99 min. 59 sec. in steps of seconds.

Reagent vapors are carried off via downwards ventilation flow and are inactivated via an easily accessible active charcoal filter.

The Robot Stainer HMS 740 has an integrated uninterruptable power supply assuring that the running protocols are completed in case of an error.

TOTAL OVERVIEW ROBOT STAINER HMS 740



Fig. 1

2-2 ACCESSORIES

2-2-1 STANDARD EQUIPMENT

The slide stainer HMS 740 is supplied with the following standard equipment:

39 reagent containers (plastic)

43 covers

1 Gripping tool (for removing reagent containers in groups of four)

1 power cord 220 - 240 V/50 - 60 Hz
 100 - 120 V/50 - 60 Hz

1 feed hose, 4 m

1 drain hose, 3 m

1 charcoal filter (already installed)

1 charcoal filter (reserve)

1 Allan key, size 6

1 Allan key, size 4

1 instruction manual

When ordering the version HMS 740 with DI water, the following accessories are also included in the standard equipment:

1 feed hose for DI water



Note:

Please check all delivered parts with the delivery note and with your order. In case of a missing part, please contact your local MICROM sales office immediately!

2-2-2 ADDITIONAL ACCESSORIES (OPTIONAL)

	Cat. No.
Reagent container	556240
Charcoal filter	184000
Standard basket for CoverTech (30)	172550
Basket carrier for standard baskets	556200
Basket carrier for Sakura (tape coverslipper), (1x20)	556220
Basket carrier for Meisei/Medite (1x30)	556230
Basket carrier for Leica (1x30)	556210

2-2-3 FACTORY DEFAULT SETTINGS

Feature	Setting
Standard passwords:	
User (routine user)	admin
Supervisor	admin

**Note:**

When entering the passwords, please note the correct capital and/or small letters!

2-3

TECHNICAL DATA ROBOT STAINER HMS 740

Slide capacity: 1 x 30 slides

Bath capacity: 480 ml

Protocols: 50 protocols can be stored

Protocol steps: max. 100 steps per protocol

Immersion time: 1 sec. - 99 min. 59 sec. in steps of seconds

Transportation & storage conditions

Temperature range: -20°C up to +50°C

Water pressure: between 2,5 and 4 bar

DI water pressure: between 0,2 and 4 bar

Operating conditions: +5°C up to +35°C (at a max. rel. humidity of 60%)
 altitude up to 2000 m M.S.L.
 for indoor use only

Power requirements: 100 - 240 V 10 A +/-10% 50...60 Hz

Internal protection

Secondary circuits: 1 x 27 VDC/T8AH, 2 x 48 VDC/T8.0AH

Primary circuits: Circuit breaker T10AH

Floor loading requirements: 225 kg/m²

Pollution degree: 2

Overvoltage category: II

Acoustic pressure: 47 dBA

Dimensions: 1160 mm x 685 mm x 715 mm (w/h/d)

Weight: 160 kg

PART 3 OPERATING INSTRUCTIONS

3-1 SETTING UP THE SLIDE STAINER

Unpacking the instrument:

- Loosen and remove the tightening straps.
- Remove the wooden top of the packing.
- Remove the foam parts.
- Lift the case over the instrument. The instrument is placed on a pallet.
- Remove accessories as well as the packaging inserts.
- Install the attached carrying handles to the intended fastenings on the side.



Note:

To guarantee a safe transportation, please fasten the four handles on the instrument.

- Carry the instrument to the site of installation and place it on an even surface.
- Open the acrylic hood and remove the transportation protections of all moving axes by means of the attached tools.
- In case of an uneven table surface the instrument feet can be adjusted in a way that a horizontal alignment in X- and Y-direction is guaranteed.
- Carefully keep the shipping container and the carrying handles for possible return shipments.

Choose installation site that

- the instrument can be connected to water supply and drain.
- the distance between wall and rear panel is approx. 5 cm.
- the water drain has a constant declination, i.e. the entrance port into the drain system must be located below the outlet on the instrument.
- the mains switch for separating the instrument from the power supply is accessible any time.

**Caution:**

It is urgently required that the **water installation** be performed by a **skilled person**. MICROM International GmbH is not liable for the connections between water supply and instrument. For safety reasons, an aqua stop device, as it is used for household instruments, should be installed in addition.

Enclosed drain hose: inner Ø 19 mm,
length: 2,5 m

Install the attached hose equipment for the water feed as well as for DI water as follows:

- Connect the feed hose for the rinsing stations (fig. 3.3) and/or DI water stations (fig. 3.2) on the instrument and on the faucet.
- Connect the drain hose (fig. 3.4) on the instrument's connection piece.

**Note:**

For the version **HMS 740 with DI water**, the water pressure can be set via the pressure controller (fig. 3.1).

However, the flow rate of the water must not be so high that the specimens are removed from the slides.

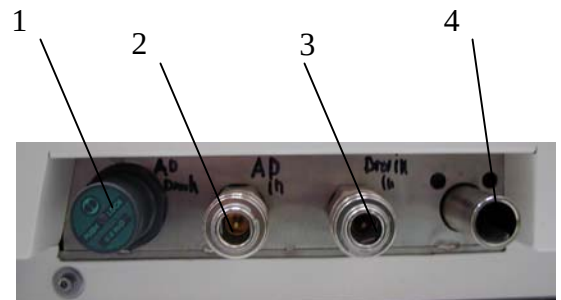


Fig. 3

Optional interfaces:

- An external keyboard can optionally be connected to the USB interface (fig. 3a.1).
- An external mouse can optionally be connected to the USB interface (fig. 3a.2).
- **Do not** connect **anything** to the sockets (fig. 3a.3).
- The button (fig. 3a.4) **must not** be used, as the instrument starts automatically when the green start button (fig. 7.1) is pressed.
- For storing and restoring data, insert a disc into the floppy drive (fig. 3a.5) (see part 3-8).

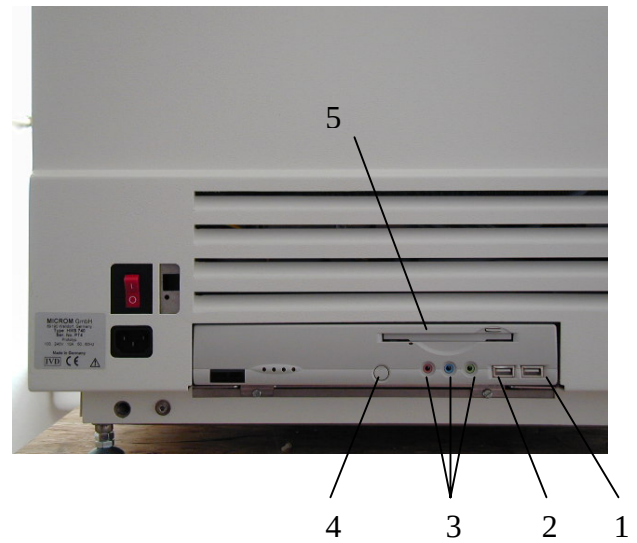


Fig. 3a

3-2 INITIAL TURN-ON


Note:

The kind of the used examination materials and all special conditions for their processing, pre-treatment and, if necessary, storage as well as instrument controls for correct and safe operation is in the responsibility of the operator. The operator is also responsible for special equipment and materials and/or reagents for the operation of the instrument.


Warning:

Before turning on the instrument for the first time, please check if the power requirements indicated on the type plate (fig. 5) correspond to the power supply voltage being used.

- Connect the power line for the instrument and insert it in a socket.

Covers:

- Place covers onto all stations.
- For the initial turn-on, a cover must be installed on the transportation arm.

Filling the reagent containers with reagents:

- Before starting the staining process, fill the containers according to the pre-defined bath plan with the corresponding reagents.
- Fill the containers to the marking. This way, optimal results are achieved during the individual staining steps.
- Moreover, when creating a bath layout, a limit how often a reagent is allowed to be used, can be stored.



Fig. 4



Fig. 5

3-2-1 TURNING ON AND/OR OFF THE INSTRUMENT

Turning on:

- First, turn on the power switch (fig. 6) on the left side of the instrument.



Note:

This power switch can be turned on, even if the instrument was shut down.

The instrument is then in the standby mode and can be started again via the green start button (fig. 7) on the front side of the instrument.

After the boot process of the computer (approx. 20 sec.) is finished, an initialization phase of the individual axes (X, Y, Z) is carried out. The instrument is now ready for operation.



Fig. 6

Turning off:



Caution:

To turn off the instrument, the software must be shut down as it must be done with each computer.

- This is done via the green button (fig. 7) or via the menu "Quit" on the touch screen.
- The software is shut down.
- The instrument turns off automatically and is now in the standby mode.



Fig. 7

3-2-2 LOG IN

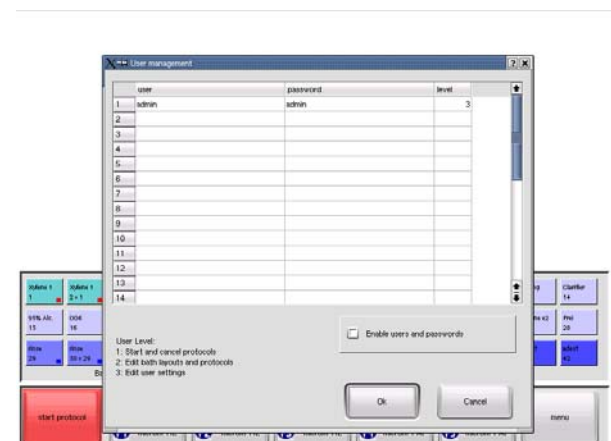
The slide stainer HMS 740 has a user-defined password inquiry with three different user levels. When turning on the instrument, a dialog field with the password inquiry becomes visible on the touch screen. The password can be entered here.



For an initial turn on, the word "admin" must be typed into the line "name". Also type "admin" into the password line.



In case the user name and the password "admin" are to be altered, please select the menu button. Then select the submenu "Settings". Then select "User Management".



For this, a table is opened. Here user names and corresponding passwords can be entered. The user name must include at least one letter or one number. A password can be entered, however, it is not compulsory.

A defined user level can be assigned to each user in the last column.

Three different user levels are available.

Level 1: User is allowed to start and interrupt protocols only.

Level 2: User is allowed to create protocols and bath layouts.

Level 3: User is allowed to carry out all settings.

Users can be deleted from a table. For this, tip the line with the concerned user on the left side of the table with your finger. Confirm the process in the appearing dialog field.

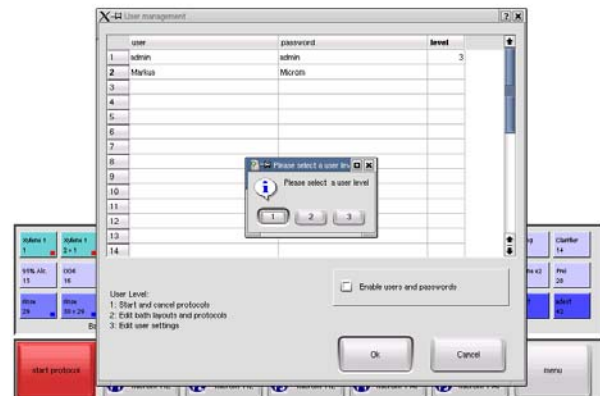


Note:

One user with user level 3 must be logged-in, at least. In case, no level has been assigned to a user, the lowest level (level 1) will be assigned automatically.

Each user can log-in and quit the instrument via his password (see dialog field below the indication of the time).

By means of our quality management system (QM), each protocol which has been started can be assigned to a user.



3-3 BASIC OPERATIONAL RULES

3-3-1 TOUCH SCREEN



Caution:

To avoid damage to the instrument, do not place objects (e.g. slide baskets) on top of the hood of the Robot Stainer.

Stainer.

- The slide stainer can completely be operated via the touch screen
- It is not necessary to install a mouse or a keyboard.

The menu structure of the Robot Stainer HMS 740 is clear and easily understandable.

The operation of the Robot Stainer HMS 740 is prompted by the menu in many cases. Requests, questions and messages are shown on the screen, which will guide the operator through the program sequences.

Main screen: The bath layout is shown as follows: Looking from the front, the first line starts in the left rear part with bath no. 1 up to 14, second line with 15 up to 28 and the third line 29 up to 42.

For **daily routine work** the buttons on the touch screen as well as the five quick-start buttons on the front panel (fig. 8) are available.

- The slides in the basket are hung up in the basket carrier into the loading drawer. The staining sequence is carried out according to a protocol, which has been entered before.
- After having finished a staining process, the basket carrier is allocated to one of the three exit stations (38 to 40). The first of the three exit stations on the left side, which is internally known as station 38, has top priority. If this station is occupied, the next one (station 39) is selected. If this one is also occupied, the slide basket is placed into station 40.



Fig. 8

- In case, all exit stations are occupied, this is indicated via an acoustic warning signal. This acoustic message can be acknowledged by activating the "O.K." button on the touch screen.
- Moreover, the error message "EXIT OCCUPIED" is shown on the screen.



Caution:

Remove one of the three basket carriers from the exit station. The specimens which have been finished, are waiting. The others are still being transported. For the "waiting" baskets, the exceeding of the flexible times is shown in red.

- Use the "Enter" button on the touch screen, to acknowledge this message.
- Then the stainer finishes the actual staining protocol and the basket carrier is moved into a vacant exit station.
- Now the basket carrier can be removed by pulling out the drawer which includes the entry and exit stations.



Note:

After having removed a processed specimen basket from the exit station, please make sure that a cover is placed onto the exit station again. This is necessary to guarantee trouble-free operations.

3-3-2 EMERGENCY SHUTDOWN

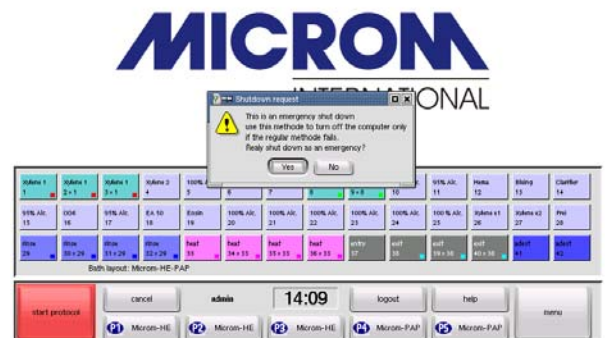
If it is not possible anymore to run down the computer in a controlled way due to a PC or software problem, the emergency shutdown can be activated. Here it is possible to run down the computer without destroying or losing necessary data.

- For this, select the menu "Shut down".
- Then select "Emergency shutdown".



Caution:

Please only use the emergency shutdown, if the instrument cannot be turned off in a controlled way!



3-4 CREATING AND DELETING A BATH LAYOUT

3-4-1 CREATING A BATH LAYOUT

Before creating a protocol, the contents of the bath containers must be defined and a bath layout must be created.

- Select the menu button.
- Select the menu point "BATHS".
- Then select "EDIT BATH LAYOUT".
- Confirm the option with Enter.

Depending on the option, a bath layout appears on the screen. Via the option "New" or "Load", it can be selected whether a new bath layout should be created or whether an existing one should be loaded for modification.

- Select the desired option.

Via the arrow buttons, entries can be made for each individual station:

- Entries that can be made for each station:
Bath no.: Is already entered and cannot be altered.
Type: The kind of station appears automatically.
Name: Enter the bath name here by selecting the line "Name". A keyboard appears on the touch screen. Via this keyboard the reagent name can be entered. For easy programming, it can be added into a reagent list and can be called up when needed. For this, enter the name in "ADD TO LIST". In case a name should be deleted, select "REMOVE FROM LIST".
Description: Here an additional bath description can be entered (e.g. date of loading, comments, protocol belongings, etc.). For this, tip onto the corresponding line and enter your data as described above.
Equivalent to: Means that equivalents (i.e. equal alternative baths) can be entered here. 0 means that there is no equivalent. Tip onto the field and enter the corresponding number via the keyboard. Equivalent baths are later marked in the bath layout with a symbol of the same color as well as a number which refers to equivalent baths.
Used: Here it is shown how often the bath has been used.



Limit: Is used for quality control of the reagents. Here it can be entered how often the bath is allowed to be used. When 90% of the limit has been reached, a yellow frame is shown around the bath on the screen. For 100% a red frame appears and for 110% this frame starts to blink. To reset this number to "0", which is shown under USED, click RESET.

Time uncritical: To guarantee an optimal and efficient working with the instrument, the first step in a staining protocol can be an uncritical one.

Reagent list: To simplify the programming of bath layouts, a list of reagents can be created. The reagent name can be entered under Name and can be stored via "Add to list". For future programming the name can easily be selected from the list. Reagent names and descriptions can also be deleted from the list. For this, please mark the names, which are to be deleted, with your finger on the touch screen and then delete them via the field "Remove from list". For this, mark the respective names on the touch screen with your finger and the tip on the field "Remove from list".

- When the entries for all stations has been completed, save the bath layout with "SAVE" or "SAVE AS".

3-4-2 DELETING A BATH LAYOUT

In case a bath layout is no longer used, it can be deleted.

- Press the button menu.
- Select the submenu "BATHS".
- Then select "DELETE BATH LAYOUT".
- Here bath layouts can be deleted.
- Confirm the option with Enter.



3-4-3 TIME UNCRITICAL BATHS

To guarantee a more efficient loading of the instrument with slides, "time uncritical baths" can be defined. A very fast loading of the baskets into the slide stainer is thus ensured.

After having started a protocol, the baskets are immediately transported into the "time uncritical baths".

Caution:



"Time uncritical baths" can only be defined for the first step of a protocol. For the other stations, flexible times must be defined as described under "Creating staining protocols".

When creating a protocol, a minimum immersion time can be defined for each time uncritical bath to use these baths as a first step in a protocol.

"Time uncritical baths" are defined when creating a bath layout. In the bath layout screen they are shown in different colors compared with the other reagent stations.



3-4-4 WASTE STATION

The HMS 740 has an automatic drip preventing system to minimize the carryover of reagents. Surplus reagent is absorbed by a drip collector and collected in an integrated container which is automatically emptied into the rinsing stations at regular intervals.

If the collected reagent should not be disposed of via the rinsing station, a bath station can be programmed as a waste station for separate disposal.

Then, the collected reagent liquid is not emptied into the rinsing station, however, it is emptied into the programmed bath container.

This bath container can be removed once a day to dispose of the contents appropriately and according to the regulations of the respective lab.



Note:

Stations 16 to 27 can be defined as waste stations.

Programming a waste station:

A waste station can be selected within the bath layout.

- For this, open the menu "Baths" under "Edit bath layout".
- Select any bath within the bath layout.
- Select "Waste" under "Bath type".
- After having confirmed it via "OK", the respective station is shown in the bath layout in brown color and with the description "Waste".



Note:

In case a waste station is to be integrated into an already existing bath layout, please note that the corresponding protocols are adjusted accordingly, if necessary.

Deleting a waste station:

A waste station can be deleted within the bath layout.

- For this, open the menu "Baths" under "Edit bath layout".
- Now select the waste station within the bath layout.
- Select "Bath" under "Bath type".
- This station can now be provided with a reagent name, as usual.
- Confirm with "OK" to use the waste station again as a reagent bath.
- If a new waste station is not programmed, the collected reagent will then be disposed of via the rinsing stations.

3-5 CREATING, EDITING AND DELETING STAINING PROTOCOLS

3-5-1 CREATING STAINING PROTOCOLS

Staining protocols are entered via the keyboard on the touch screen. Two staining programs are already installed on your Robot Stainer HMS 740. Each created protocol is provided with a file name.

Creating a new protocol:

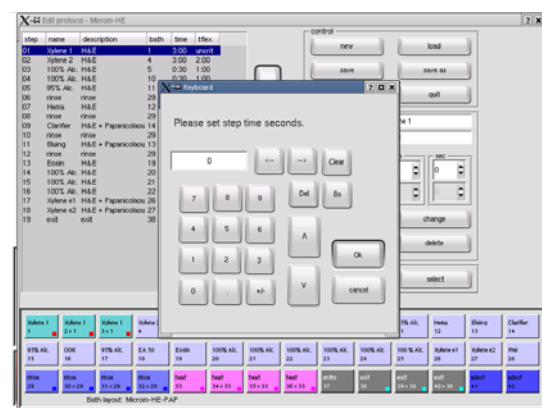
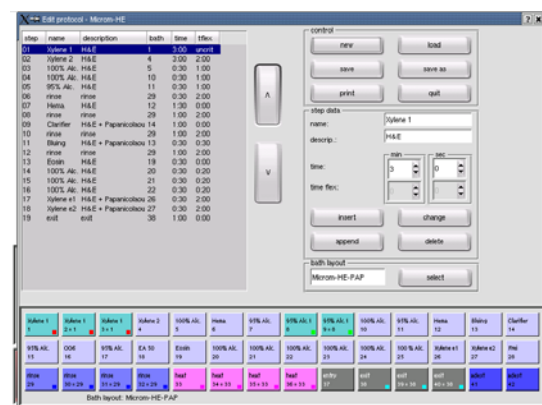
- Turn on the instrument.
- Select the menu point "PROTOCOLS" and confirm with Enter.
- Then select "EDIT PROTOCOL".
- The protocol screen is shown now.
- Then select "NEW". Here a selected protocol can be loaded and altered via "LOAD". With "NEW" a completely new protocol can be processed.
- The following entries must be made for a new protocol in the field "Stepdata":
 - Step:** The corresponding step is selected by choosing the respective bath in the bath layout.
 - Name:** The name of the selected bath for this step is automatically shown here.
 - Description:** A protocol description is entered here.
 - Time:** Time in minutes and seconds can be entered here.
 - Time flex:** The time a slide basket can remain in a station in addition to the above-mentioned time can be entered here ensuring a flexible operating process. These times should be chosen as long as possible.



Note:

To load the baskets rapidly into the instrument, the first step can be entered as **time uncritical** in the bath

- When entering a time-uncritical bath, a minimum time can be entered. However, the flexible time cannot be altered anymore.



- If a time uncritical bath is entered as another step into the protocol, an error message is shown.
- After having created a protocol, select "SAVE AS".
- Enter a protocol name and confirm with Enter.

**Note:**

A certain bath layout can be assigned to a protocol.

- Select "SELECT" in the field "BATH LAYOUT".
- Select a bath layout and confirm with Enter.



Assigning a bath layout to the quick-start buttons:

- Select the menu button.
- Then select "Protocols".
- Select "Quick Start".
- Tip onto a program button (P1 to P5)
- Via "Select" a protocol can be assigned to a respective button.
- Confirm with "OK".

3-5-2 EDITING STAINING PROTOCOLS

Editing an existing protocol:

- Select the menu button.
- Then select the submenu "PROTOCOLS".
- Now select "EDIT PROTOCOLS".
- The protocol screen is shown.
- Select "LOAD".

A list of already existing protocols is shown on the screen:

- Via the arrow button select the desired protocol and confirm with "OK".
- Via the field "Stepdata", alterations can be made.
- For this, select the step which is to be altered via the arrow buttons and enter the alteration.

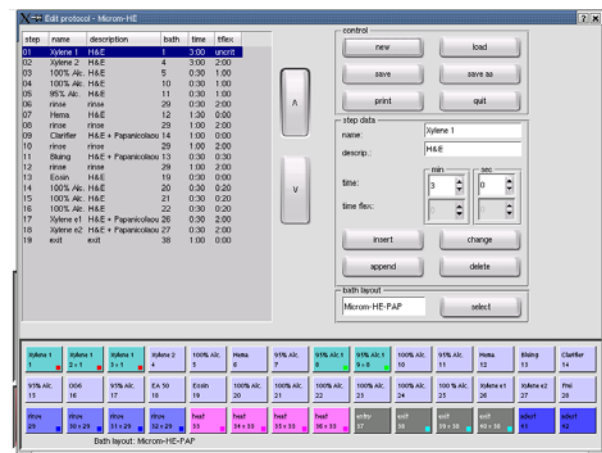
In case a step is to be added, this step is placed before the selected one. After having entered it, acknowledge with "INSERT".

In case an already existing parameter is to be altered in a step, it must be acknowledged with "CHANGE".

In case a step is to be deleted, it must be marked via the arrow buttons and acknowledged with "DELETE".

In case a step is attached to a protocol, it must be acknowledged with "APPEND".

- When all changes are entered, click to "SAVE AS" and enter a new protocol name.
- Confirm with "OK".



3-5-3 DELETING STAINING PROTOCOLS

To delete staining protocols which are no longer used, please proceed as follows:

- Select the menu button.
- Then select "PROTOCOLS".
- Select "DELETE PROTOCOL".
- Select the protocols which should be deleted and confirm with "OK".



3-6 STARTING PROTOCOLS

It is possible to start a staining protocol in three different ways:

1. Via the touch screen in the lower left corner using the button "START PROTOCOL". Select a protocol, then start.
2. Via the quick-start buttons P1 to P5 on the touch screen.
3. Via the quick-start buttons P1 to P5 on the touchpad panel at the front of the instrument.

Caution:

Before starting a protocol, please always close the hood!



- Then open the entry station and remove the cover from the station. Insert a basket carrier with a basket. Close the drawer.
- In case a protocol is started via a quick-start button, the protocol is shown on the screen. Select "OK".
- The selected protocol is now processed.
- A protocol can also be started by pressing the requested quick-start buttons for two times.

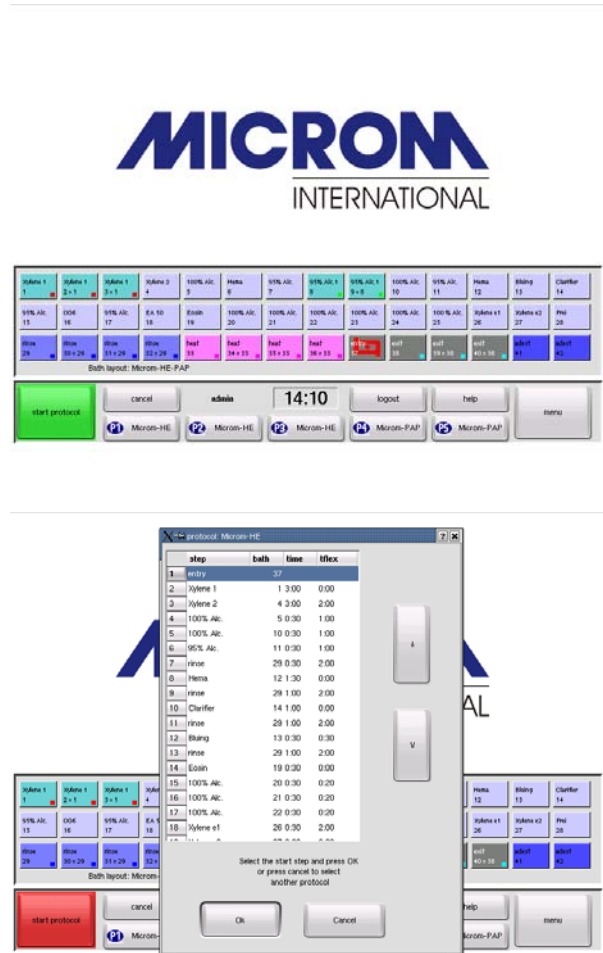
Note:

If the drying stations are used within the first 5 min., a time delay must be taken into consideration.



It is not absolutely necessary to start a protocol in the first step. It can also be started in another one.

- Tip onto the button "Start Protocol".
- Protocol appears.
- Select the desired start step via the arrow buttons.
- The select "OK".
- The protocol starts.



3-7 CANCELLATION OF PROTOCOLS

Protocols can be cancelled at any time.

- Select the button "Cancel" on the touch screen.
- Instead the "Cancel" button, the button "Select" appears for approx. 5 sec.
- Within this time, a protocol which is to be cancelled can be selected.
- For this, directly tip onto the protocol on the touch screen.
- A cancellation window opens up on the screen (gray background).
- The basket which is to be taken off, can be transported either to the entry or exit station (If the start position is not occupied).
- The respective baskets are transported to the exit and/or entry stations for removal and the protocols are cancelled.



Note:

A cancellation can only be performed when all moving axes have come to a standstill.



3-8 DATA SECURITY

3-8-1 STORING AND RESTORING OF PROTOCOLS

Storing protocols to disc:

- Select the menu "PROTOCOLS".
- Then select the sub-menu "STORE PROTOCOLS TO DISC".
- Insert a disc into the floppy drive, which is placed on the side of the instrument, according to the following message "PUT A FLOPPY DISC TO THE FLOPPY DRIVE".



Caution:

Before protocols are stored to a disc, the following warning message is shown: "PROTOCOLS WITH EQUAL NAMES WILL BE OVERWRITTEN ON FLOPPY DISC".

- The message can be confirmed with "OK" or cancelled via "CANCEL".
- When all dates are stored to the disc, the following message appears on the screen: "BACKUP TO FLOPPY DISC COMPLETED".

Restoring protocols from disc:

- Select the menu "PROTOCOLS".
- Then select the sub-menu "RESTORE PROTOCOLS FROM DISC".
- Insert a disc into the floppy drive according to the following message: "PUT A FLOPPY DISC TO THE FLOPPY DRIVE".



Caution:

Before protocols are restored from disc, the following warning message appears on the screen: "PROTOCOLS WITH EQUAL NAMES WILL BE OVERWRITTEN".

- This message can be confirmed with "OK" or canceled with "CANCEL".
- When all dates are restored from the disc, the following message appears on the screen: "RESTORE FROM FLOPPY DISC COMPLETED".

3-8-2 STORING AND RESTORING OF BATH LAYOUTS

Storing bath layouts to disc:

- Select the menu "BAD LAYOUTS" .
- Then select the sub-menu "STORE BATH LAYOUTS TO DISC".
- Insert a disc into the floppy drive according to the message: "PUT A FLOPPY DISC TO THE FLOPPY DRIVE".



Caution:

Before bath layouts are stored to a disc, a warning message is shown on the screen: "BATH LAYOUTS WITH EQUAL NAMES WILL BE OVERWRITTEN ON FLOPPY DISC".

- This message can be confirmed with "OK" or cancelled with "CANCEL".
- When all dates are stored on the disc, the following message appears on the screen: "BACKUP TO FLOPPY DISC COMPLETED".

Restoring bath layouts from the disc:

- Select the menu "BATH LAYOUTS" .
- The select the sub-menu "RESTORE BATH LAYOUTS FROM DISC".
- Insert a disc into the floppy drive according to the following message: "PUT A FLOPPY DISC TO THE FLOPPY DRIVE".



Caution:

Before the bath layouts are stored from the disc, the following warning message is shown on the screen: "BATH LAYOUTS WITH EQUAL NAMES WILL BE OVERWRITTEN".

- This message can be confirmed with "OK" or cancelled with "CANCEL".
- When all dates are restored from the disc, the following message is shown on the screen: "RESTORE FROM FLOPPY DISC COMPLETED".

3-9 QUALITY MANAGEMENT AND DOCUMENTATION

Each created and processed protocol is stored in a quality management report (QM report) after having removed the basket from the exit station.

The following parameters are shown in a list:

- name of the protocol
- name of the person, who was currently logged in when the protocol was started
- date
- start time
- exact transportation times
- exact immersion times in the baths
- bath status (how often was a bath used)
- error messages



Note:

A QM report is deleted after 30 days without further queries in advance.

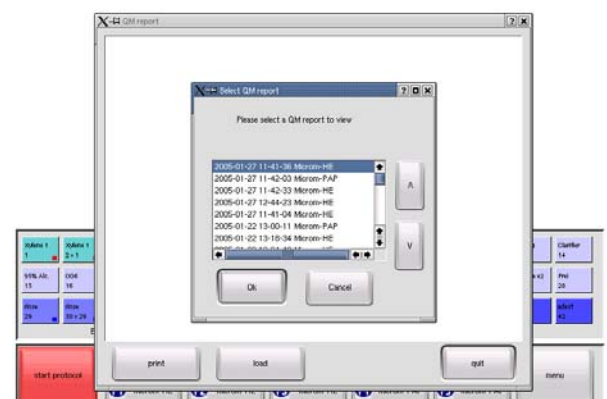
QM reports can be displayed, deleted or printed.

Display QM reports:

- Select the menu button.
- Then select the button "QM".
- Select "VIEW QM REPORTS" and select the corresponding QM report and confirm with "Enter".
- The selected QM report is shown on the screen.
- Error messages are shown in red.
- Information notes are shown in yellow.

Delete QM reports:

- Select the menu button.
- Then select the button "QM".
- Select "DELETE QM REPORTS".
- Select the QM reports which are to be deleted and confirm with Enter.
- These QM reports will now be deleted from the fixed disk.



Print QM reports:

- Put a disk into the disk drive.
- Select the menu button.
- Then select the button "QM".
- Select "PRINT QM REPORTS" and select the reports which are to be printed.
- Now click on the button "PRINT".
- The selected reports are then stored onto the disk as pdf-files.
- The pdf-files from the disk can be transferred onto a PC and can be printed or filed.
- System supposition: The Adobe Acrobat Reader must be installed.

3-10 SETTINGS

3-10-1 USER SETTINGS



Note:

User settings can only be carried out when no protocol is running.

Different specific settings can be carried out in the USER SETTINGS:

- Language selection
- Operation mode
- Sound on/off
- Shake function
- Temperature setting of drying station
- Real time
- Change pad

- For this, select the menu button on the touch screen.
- Then select "SETTINGS".
- Via the arrow buttons select "USER SETTINGS".
- Confirm via the Enter button.
- The window with the user settings opens.

Language selection:

The desired language can be selected here. Four different languages are available: Deutsch, English, Français, Español and Italiano.

- Select the desired language.

Operation mode:

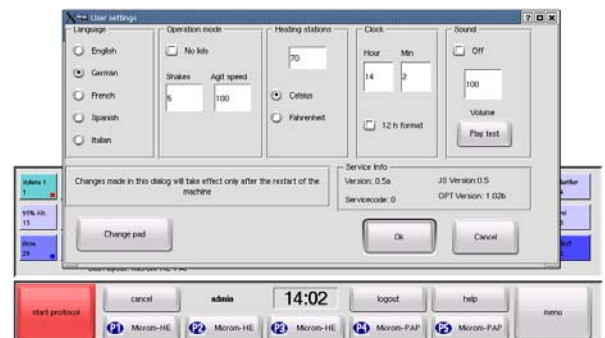
You can select here whether the instrument is to be operated with or without covers.

- Select the desired operation mode.



Caution:

If the operation mode "without cover" is chosen, please note that all covers are removed from the instrument!!



Sound on/off:

Here, any acoustic messages can be turned on or off.

- Select the desired setting.

Setting of the shake function:

To minimize the reagent carryover, shake processes from 0 – 5 can be select. After lifting a basket carrier out of the reagent bath, superfluous reagent can be shaken off.

- Enter the desired setting.
- 0 = no shake function, 5 = 5 shake movements.

Temperature setting of the drying station:

The temperature of the drying station can be pre-selected from ambient temperature to max. +70°C.

- Enter the desired setting.
- You can choose between Celsius and Fahrenheit.

Real time (clock):

Your real time can be set here.

- Enter the desired setting.
- A 12-h format can be selected here.
- After having carried out all desired settings, confirm them with OK.
- The following message will appear: "CHANGES MADE IN THIS DIALOG WILL TAKE EFFECT ONLY AFTER THE RESTART OF THE MACHINE."
- To activate the settings, the instrument must be shut off and started again.

Change pad:

- Select "CHANGE PAD", if the pad is to be replaced.
- The robotic head moves into the front left corner. For easy access, the pad is swiveled downwards.
- After having replaced the pad, you can continue with your normal routine operations.
- The pad cannot be replaced during staining processes.

3-10-2 INSTALL UPDATE



Note:

Please observe the installation instructions on the supplied update CD-Rom.

- For this, select the menu button.
- Then select "SETTINGS".
- Select "INSTALL UPDATE".

3-10-3 SERVICE SETTINGS



Note:

Service settings must only be carried out by trained service personnel and are protected with a password.

PART 4 THEORY OF OPERATION OF THE ROBOT STAINER HMS 740

4-1 STRUCTURAL DESIGN

The MICROM Robot Stainer HMS 740 has a robotic arm which is moved via an electro motor. Protocol-controlled, it can move to each single station.

The processing stations are arranged in three lines with 14 bath stations each. In the front line, there are no common baths, however, there are stations with additional functions. These are amongst others, one entry and three exit stations, which are integrated in a drawer.

The instruments are equipped with four rinsing stations. These rinsing stations are filled with fresh water via electro valves, pressure hose and a downstream pressure controller. The water is drained into a water basin, which has the size of approx. the entire base of the instrument for safety reasons.

The waste water as well as the reagents that have been spilled when filling/inserting the reagent baths are scoured and drained via a drain hose that must be connected to a suitable drain system. The transport logic operated with the operating system Linux.

4-2 OPERATING FEATURES

To choose the basic functions of the instrument such as selecting a protocol, starting a protocol or canceling one or several protocols as well as for further functions, such as editing, creating or deleting of a protocol as well as the definition of the 34 reagent stations, please use the touch screen.

On the monitor of the touch screen, the currently running protocols are shown.

When a staining protocol is selected via the touch screen, the software allows the protocol start in any protocol step, which can also be selected via the touch screen.

4-3 FUNCTION

When starting a protocol, a sensor checks whether there is a specimen basket in the entry station.

Then the robotic arm moves to the entry station and lifts the specimen basket by means of a lifting mechanism on the Z-axis out of the station and drops the specimen basket off via rhythmic up and downward movements to minimize reagent carryover.

Now the cover, which has been swiveled to the side, is swiveled back downwards and placed onto the empty station. Simultaneously, a drip collector (mentioned below as CP) is swiveled under the specimen basket, to avoid dripping during the basket transportation. Now the specimen basket is placed onto the drip collector and remaining drops are absorbed by the drip collector.

The liquid which is absorbed by the drip collector then flows into a reservoir. This reservoir is emptied via a drain faucet into a rinsing station at regular intervals. This avoids the spilling of liquids. The emptied liquids are then washed out of the respective rinsing station. This drain is always carried out after a protocol has been finished.

The transportation arm moves in X- and Y-direction to the destination station and inserts the specimen basket into this station. Before, however, the CP is swiveled away to the side via the Z-drive. All transportation movements are repeated in the same way. After having inserted the specimen basket into a station, the robotic arm can carry out further transportations for staining protocols which are running at the same time. The specimen agitation is independent from the transportation arm and can be turned on and off continuously for each station individually.

The software allows to interlace several different staining protocols. However, there must be no collision (= simultaneous need from several protocols for one specific reagent station) during the process. Before another protocol can start, the software checks whether there might be a collision.

Further protocols are interlaced within their flexible times with already running protocols.

At the end of the protocol, the specimen basket is placed into one of the three vacant exit stations.

PART 5 WORKING WITH THE ROBOT STAINER HMS 740

5-1 PREPARATIONS

Before turning on the instrument, please note the following:

- Check that all stations, including exit stations are covered with a cover.
- Check if the liquid level in each station is correct.
- Turn on the water flow.
- Close the hood.

5-2 STAINING OF SPECIMENS

- Closed the hood of the instrument.
- Turn on the power switch of the instrument.



Note:

Now the initialization phase is carried out. The transportation arm moves into its end position to a stop. After this phase, the main screen is shown on the screen.

- Open the drawer.
- Remove the cover from the entry station.
- Insert the basket carrier into the entry station.
- Close the drawer.
- Select a protocol either via "Start Protocol" on the touch screen or via a quick-start button.



Note:

If the protocol is to be started in the first step, press the quick-start button twice.

- To avoid position conflicts, equivalents can be defined.
- To better interlace protocols flexible times can be entered. Select them as long as possible.



Note:

The flexible time of a station depends on the maximum duration time of the specimen in a reagent and may vary.



Warning:

After the daily routine work has been completed, the water flow to the instrument must be turned off.

- After routine work, turn off the instrument in a controlled way.

5-3 HOW TO AVOID MALFUNCTIONS

- Before turning on the instrument, check that all stations are covered in a correct way. Please note that the covers are not shifted.
- Check for correct liquid level.
- Insert the basket carrier.
- Insert the basket with specimens into the basket carrier in a correct way.
- To avoid glass damage, insert the slides into the intended guidances of the basket.
- The drawer for the entry and exit stations must be closed. By no means, open it while the basket carrier is just inserted or removed from a station.
- Check, if the charcoal filter has been inserted.



Danger:

The instrument must not be operated without charcoal filter, as the resulting vapors are then released unfiltered into

the ambient air.

- Moreover, sufficient space (approx. 15 cm) for ventilation must be guaranteed on either side of the instrument.
- Correct water connection must be guaranteed.
- Water flow must be free from impurity (e.g. rust precipitation). If necessary, add a filter.
- The water drain must have a constant declination.
- Do not mark the covers of the stations, as they are replaced during a protocol run.
- Do not place heavy objects onto the hood.
- Before turning off the instrument, please note that all protocols have been processed.



Warning:

Turn off the water flow after having finished the daily routine.

- After the daily routine, shut down the instrument in a controlled way.

5-3-1 POSSIBLE SOURCES OF ERRORS - CAUSE AND REMEDY

Problem	Cause	Remedy
There is no heating after a five-minute warming-up of the drying station	– Integrated overheating protective switch was activated due to an error	– Contact MICROM headquarters
No water flow	– No water connection	– Check water connection – Check pressure controller – Contact MICROM headquarters
Different staining results	– Incorrect water pressure	– Check water pressure, 2,5 bar min.
Excessive carryover	– Reagent container too full. Basket carrier carries over reagents.	– Do not exceed marking line for filling amount

**Note:**

In case of malfunctions and/or service work, please turn off the instrument and contact your local dealer.

PART 6 MAINTENANCE AND CARE

6-1 CLEANING AND CARE

Cleaning, care and decontamination of the slide stainer depends on how frequently the instrument is used. However, it is recommended to shut the instrument off every 6 - 8 weeks.

Please proceed as follows:

- Make sure that all protocols have been finished.
- Remove the baskets with slides.
- Shut down the instrument in a controlled way.
- Turn off the mains switch of the instrument and unplug the unit.
- Open the hood.



Danger:

Open the hood completely so that it reaches its stable end position. To avoid damage to the instrument or injuries of persons, keep and close the hood on its handle.

- Remove the bath covers and clean them with appropriate agents outside the instrument.
- Remove the bath containers and dispose of the contents according to the rules and regulations of the respective lab.
- Reagent containers, stainless steel surfaces, entry and exit stations can be cleaned with all disinfectants for surface treatments on the basis of alcohol, which are listed in the regulations of the respective country.



Note:

For stainless steel surfaces use commercially available household cleaners for stainless steel with a humid cloth or a sponge. Do not use cleaning sponges made of steel wool and products containing vinegar, citric acid or hydrochloride acid.

- Then unhinge the entry and exit stations, remove them and clean them with appropriate agents.
- Clean the hood with a glass detergent.



Note:

When cleaning the instrument, please note that only slightly humid tissues are used.

6-2 MAINTENANCE

Annual routine maintenance:

To secure staining quality and functioning of the instrument, it is recommended that a routine maintenance be performed by a trained service technician once a year.

Service contract:

MICROM offers a service contract which guarantees that your instrument is always in perfect condition. For more information, please contact the nearest MICROM sales office.

**Note:**

We strongly recommend to not carry out repair by yourself. All warranties and guarantees would then be null and void! Repair work must only be carried out by an authorized service technician.

Check by the operator:

Check the liquid hoses for tightness and fissures. This check is also carried out during the annual routine maintenance.

**Note:**

To guarantee operational security of the instrument, only use the hoses attached by MICROM!

6-3 REPLACEMENT WORK

6-3-1 REPLACING THE CHARCOAL FILTER

The charcoal filter should be replaced every 6 - 9 months.

- Loosen the screws of the cover on the right side of the bath stations.
- Remove the cover.
- Remove the charcoal filter and insert a new one.
- Close the cover again and tighten the screws.



Note:

To guarantee operational security of the instrument, only use the charcoal filter, inserted from the factory (cat. no. 184320).

PART 7 CONDITIONS FOR THE TRANSPORTATION OF THE INSTRUMENT

7-1 RETURNING THE INSTRUMENT FOR REPAIR OR ROUTINE MAINTENANCE

Repair or maintenance work are normally carried out at the site of installation. If this is not possible for some specific reasons, the instrument can be returned to MICROM. The contact address can be found at the beginning of this instruction manual.

- To guarantee a trouble-free function of the instrument after transportation, please note the below-mentioned measures for transportation preparations.
- In addition, the conditions for storage and transportation as mentioned in part 2-3 must be observed during the entire transportation.



Biohazard:

Please also note the precautionary measures described in our safety precautions concerning biological hazards!

Measures for taking out of operation:

- Shut down the instrument in a controlled way.
- Turn off the instrument.
- Unplug the unit.
- Remove covers and other accessories from the instrument.
- Loosen the water connections.
- Insert the transportation safety device for the individual movement axes.
- Install the carrying handles.

In case the instrument or parts of the instruments are sent to MICROM or to one of its representatives in such a condition that there might be a potential danger of infection, the instrument and/or the part(s) will be returned to the customer in a non-repaired status. Costs for this are to be borne by the customers.

For transportation outside closed buildings, please observe the following additional measures:

- Place the instrument onto the wooden pallet.
- Arrange the removed accessories into the intended transportation packing.
- Slightly tilt the slide stainer by the handles and place the foam parts underneath the instrument.
- Place the wooden packing over the instrument.
- Put the wooden cover onto the packing.
- Attach the tightening strips around the packing.

7-2 DISPOSAL OF THE INSTRUMENT AFTER THE FINAL SHUT-DOWN

After the final shut-down of the instrument, we recommend to contact a local recycling company for the disposal according to the national applicable regulations.



To be applied in the countries of the European Union and other European countries with a separate collecting system within the waste management.

The marking of the product and/or the respective literature indicates that, after its final shutdown, it must not be disposed of together with ordinary domestic waste.

- Please dispose of your instrument separately from other waste to not harm our environment and/or human health by uncontrolled waste disposal.
- Recycle your instrument to support the sustainable recycling of material resources.
- **Industrial users** should contact their suppliers and observe the conditions of the contract. This product must not be disposed of together with other commercial waste.
- **Please contact your supplier!!**