

# Leica Autostainer XL (ST5010)

## Automated slide stainer

Instructions for Use  
English

**Order No.: 14 0456 80101 - Revision J**

Always keep this Instructions for Use with the instrument.  
Read carefully before working near the instrument.





The information, numerical data, notes and value judgments contained in this Instructions for Use represent the current state of scientific knowledge and state-of-the-art technology as we understand it following thorough investigation in this field.

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For the instrument serial number and year of manufacture, please refer to the nameplate on the back of the instrument.



Leica Biosystems Nussloch GmbH  
Heidelberger Str. 17 - 19  
D-69226 Nussloch  
Germany

Tel.: +49 - (0) 6224 - 143 0

Fax: +49 - (0) 6224 - 143 268

Web: [www.LeicaBiosystems.com](http://www.LeicaBiosystems.com)

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# 1 Important Information

## 1. Important Information

### General information

These Instructions for Use include important instructions and information related to the operating safety and maintenance of the instrument.

The Instructions for Use are an important part of the product. They must be read carefully prior to startup and use, and must always be kept near the instrument.

If additional requirements for accident prevention and environmental protection apply in the country of operation, these Instructions for Use must be supplemented by appropriate instructions to ensure compliance with such requirements.

Make sure to read all of these Instructions for Use before you work on or operate the instrument.



### Warning

Be sure to comply with the safety instructions and warnings in (→ p. 11 – 2. Safety). Be sure to read these notes even if you are already familiar with the operation and use of other Leica products.

### 1.1 Symbols in the text and their meaning

Symbol:



Title of the symbol:

Warning

Description:

Warnings appear in a white box and are marked by a warning triangle.

Symbol:



Title of the symbol:

Note

Description:

Useful tips, i.e. important information for the user, appear in white boxes and are marked by an information symbol.

Symbol:

→ "Fig. 7 - 1"

Title of the symbol:

Item number

Description:

Numbers in parentheses refer to item numbers in illustrations or to the illustrations themselves.

### Instrument type

All information in these Instructions for Use applies only to the Leica Autostainer XL (ST5010) described here.

A nameplate indicating the instrument serial number is attached to the rear of the instrument.



### Note

(→ Fig. 1) is provided as an example only and shows a valid nameplate for this instrument with the necessary information about instrument type and power requirement. The precise data for the various versions is specified in (→ p. 18 – 3.3 Specifications).

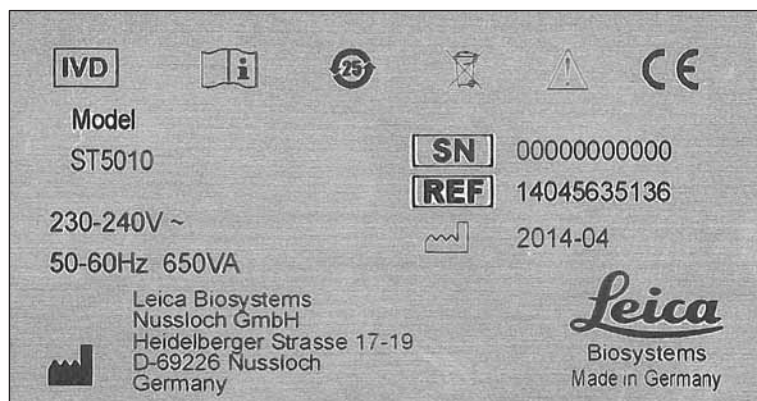









Fig. 1

|   |                             |   |
|---|-----------------------------|---|
| <b>Symbol:</b>  | <b>Title of the symbol:</b> | In vitro diagnostic medical device  |
|    | <b>Description:</b>         | Indicates a medical device that is intended to be used as an in vitro diagnostic medical device.  |
| <b>Symbol:</b>  | <b>Title of the symbol:</b> | Consult Instructions for Use  |
|    | <b>Description:</b>         | Indicates the need for the user to consult the Instructions for Use.  |
| <b>Symbol:</b>  | <b>Title of the symbol:</b> | China ROHS  |
|  | <b>Description:</b>         | Environmental protection symbol of the China RoHS directive. The number in the symbol indicates the "Environment-friendly Use Period" of the product in years.  |
| <b>Symbol:</b>  | <b>Title of the symbol:</b> | WEEE Symbol   |
|  | <b>Description:</b>         | The WEEE ( <b>W</b> aste <b>E</b> lectrical and <b>E</b> lectronic Equipment) symbol, indicating separate collection of electrical and electronic equipment, consists of a crossed-out wheeled bin (§ 7 ElektroG).          |
| <b>Symbol:</b>  | <b>Title of the symbol:</b> | CE Compliance   |
|  | <b>Description:</b>         | The CE marking is the manufacturer's declaration that the medical product meets the requirements of the applicable EC directives.   |
| <b>Symbol:</b>  | <b>Title of the symbol:</b> | Caution   |
|  | <b>Description:</b>         | Indicates the need for the user to consult the Instructions for Use for important cautionary information such as warnings and precautions that cannot, for a variety of reasons, be presented on the medical device itself. |
| <b>Symbol:</b>  | <b>Title of the symbol:</b> | Caution – Moving parts  |
|  | <b>Description:</b>         | Label is attached on the transport arm. It indicates a risk of collision between the transport arm and any operator working within the instrument while the transport arm is moving.  |

**Symbols:****Title of the symbol:****Description:**

Caution – Toxic chemicals / Flamable substances

Labels are attached inside the instrument below the fixation of the hood (in the middle).

The first label indicates that toxic chemicals are inside the instrument. Do not handle solution containers unless properly protected.

The second label indicates that there is a risk of fire because of flammable substances inside the instrument. Thus, avoid any source of ignition close to the instrument.

**Symbol:****Title of the symbol:****Description:**

Caution – Hot surface

Two labels are attached close to the oven. They indicate a risk of burns because of hot surfaces. Do not touch these parts.

**Symbol:****Title of the symbol:****Description:**

Caution – Risk of fire

Label is attached at the rear of the instrument close to the fuse. It indicates a risk of fire in case that no or inappropriate fuses are used. For continued protection against the risk of fire replace only with appropriate fuses as indicated on the instrument.

**Symbol:****Title of the symbol:****Description:**

Caution – Input voltage

Label is attached at the rear of the instrument above the switched mains power inlet. It indicates that the unit is wired either for 100-120 VAC or 230-240 VAC (depending on your order). Do not change wiring or voltage selection on your own but contact qualified Leica service personnel in this case.

**Symbol:****Title of the symbol:****Description:**

Caution – Water supply and interfaces

Labels are attached at the rear of the instrument close to the serial port and the water supply connections. They indicate that both Instructions for Use and – if applicable – any inscription on the instrument must be observed.

**Symbol:****Title of the symbol:****Description:**

CSA Statement (Canada/USA)

The CSA test mark means that a product has been tested and fulfills the applicable safety standards.

**Symbol:****Title of the symbol:****Description:**

Serial number

Indicates the manufacturer's serial number so that a specific medical device can be identified.

**Symbol:****Title of the symbol:****Description:**

Article number

Indicates the manufacturer's catalog number so that the medical device can be identified.



**Symbol:**



**Title of the symbol:**

Manufacturing date

**Description:**

Indicates the date when the medical device was manufactured.

**Symbol:**



**Title of the symbol:**

Manufacturer

**Description:**

Indicates the manufacturer of the medical product.

**Symbol:**



**Title of the symbol:**

This way up

**Description:**

Indicates correct upright position of the transport package.

**Symbol:**



**Title of the symbol:**

Store dry

**Description:**

Indicates a medical device that needs to be protected from moisture.

**Symbol:**



**Title of the symbol:**

Fragile, handle with care

**Description:**

Indicates a medical device that can be broken or damaged if not handled carefully.

**Symbol:**



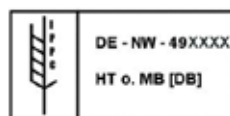
**Title of the symbol:**

Tilt indicator

**Description:**

Indicator to monitor whether the shipment has been transported and stored in upright position according to your requirements. With a pitch of 60° or more, the blue quartz sand flows into the arrow-shaped indicator window and sticks there permanently. Improper handling of the shipment is immediately detectable and can be proven definitively.

**Symbol:**



**Title of the symbol:**

IPPC symbol

**Description:**

The IPPC symbol includes IPPC symbol

- Country code to ISO 3166, e.g. DE for Germany
- Regional identifier, e.g. NW for North Rhine-Westphalia
- Registration number, unique number beginning with 49.
- Treatment method, e.g. HT (heat treatment)

**Symbol:****Title of the symbol:**

ON / STOP (Power)

**Description:**

**ON:** The electronic power supply is connected upon pushing the power switch.

**STOP:** The electronic power supply is disconnected upon pushing the power switch.

Label is attached close to the electronic power supply switch.

## 1.2 Intended use

The Leica Autostainer XL (ST5010) is an IVD (in-vitro diagnostics) instrument. The Leica Autostainer XL (ST5010) is a stainer for laboratory applications and intended for the preparation of histological and cytological tissue samples.

**Danger**

**Any use of the instrument that deviates from the designated use is considered improper. Failure to adhere to these instructions may result in an accident, personal injury, damage to the instrument or accessory equipment. Proper and intended use includes compliance with all inspection and maintenance instructions, along with the observance of all instructions in the Instructions for Use as well as the constant inspection of the reagents for storage life and quality. The Leica Autostainer XL (ST5010) carries out the specified staining steps automatically. The manufacturer assumes no liability for the staining results in the case that the staining steps and programs are entered incorrectly. Thus, the end user is independently responsible for self-created reagents or program entries.**

## 1.3 User group

- The Leica Autostainer XL (ST5010) should be operated by trained laboratory personnel only.
- All laboratory personnel designated to operate the Leica Autostainer XL (ST5010) must read these Instructions for Use carefully and must be familiar with all technical features of the instrument before attempting to operate the Leica Autostainer XL (ST5010).

**Note**

To prevent damage to the instrument and specimens, only those accessories and spare parts that have been authorized by Leica may be installed or used with the instrument.

## 2. Safety

### 2.1 General safety notes

This instrument has been built and tested in accordance with the safety requirements for electrical equipment for measurement, control and laboratory use.

To maintain this condition and ensure safe operation, the user must observe all notes and warnings contained in these Instructions for Use.

For current information about applicable standards, please refer to the CE Declaration of Conformity on our Internet site:

[www.LeicaBiosystems.com](http://www.LeicaBiosystems.com)

### 2.2 Specific safety notes



#### Warning

Operating the instrument without adequate clothing

##### Personal injury

- Always wear protective clothing suitable for laboratory use, as well as rubber gloves and safety goggles when handling the chemicals used in this instrument.
- Always follow your laboratory safety regulations.



#### Warning

Breathing in vapors dangerous to health

##### Personal injury

- Connect the instrument to a laboratory air exhaust system using the dedicated hose (lengths of 2 m and 4 m available). Alternatively the instrument can be operated below a fume cupboard. This should be run in addition to the active carbon filter.



#### Warning

Contamination after accidental handling of reagents

##### Insufficient staining quality or complete loss of tissue

- If you have accidentally contaminated reagents, e.g., because a reagent has dripped into another vessel always follow your local regulations. Focus on saving the tissue first. Dispose any contaminated reagents and clean the affected vessels thoroughly.



#### Caution

Vessels not cleaned or cleaned insufficiently before refilling with another reagent

##### Insufficient staining quality, tissue damage or loss of tissue

- Always clean the vessels thoroughly and regularly before refilling them (→ p. 38 – 6.2 Reagent containers).

**Caution**

Inadequate manual loading of specimen slide holders into vessels

**Loss of tissue and / or property damage because of crash due to automatized loading of another specimen slide holder into the same vessel**

- Do not manually load specimen slide holders and start any movement of the transport arm

**Caution**

Lids not removed from vessel

**Loss of tissue and / or property damage because of crash due to automatized loading of a specimen slide holder**

- Always make sure that any lids are removed before initiating any transport to the affected vessel.

**Caution**

Specimen slide holders are loaded unintentionally into exit drawer instead of the load drawer.

**Delay of processing time / Damage or loss of tissue**

- Always pay attention to load specimen slide holders into the load drawer ([→ p. 34 – 5.9.4 Loading specimen slide holders](#)).

**Caution**

Reagent filling level within vessels is insufficient

**Loss of tissue and / or property damage because of crash due to automatized loading of a specimen slide holder**

- Check the filling level of the vessels regularly and clean and / or refill if required.
- Cover unused vessels to minimize evaporation.

**Caution**

Water drainage not cleaned or cleaned insufficiently

**Insufficient staining quality, loss of tissue or property damage**

- Check and clean the draining system regularly for correct flow.

**Caution**

Specimen slide holders not unloaded in a timely manner from exit drawer

**Delay of processing time / Damage or loss of tissue**

- Unload the exit drawer in time, close the exit drawer and press **EXIT** ([→ p. 35 – 5.9.5 Unloading specimen slide holders from the exit drawer](#)).

**Caution**

Specimen slide holder processed with wrong program parameters

**Damage or loss of tissue**

- Always double-check program parameters of user-specific programs before you start processing.

**Warning**

In accordance with national rules and regulations, the operator may be obligated to provide long-term protection of the public water supply from contamination due to backflowing water from the building installation. In Europe, the protection device of the potable water installation to be connected is selected in accordance with the specifications of DIN EN 1717:2011-08 (information status August 2013).

### **3. Instrument Features**

#### **General description**

The Leica Autostainer XL (ST5010) was developed with the goal of satisfying the quality requirements of modern laboratories:

- high specimen throughput,
- flexibility,
- safety.

The Leica Autostainer XL (ST5010) achieves its high throughput by means of a specimen slide transport system, which allows for simultaneous processing of up to 11 specimen slide holders, each with 30 slides.

The flexibility of Leica Autostainer XL (ST5010) permits simultaneous processing of specimen slide holders according to various staining protocols.

An oven is integrated into the instrument which accelerates drying of specimen slides. Optimized wash stations provide for rapid removal of reagent residue. The design of the specimen slide holders ensures minimal reagent displacement and prevents the reagents from being contaminated by liquid dripping into them and needing to be replaced prematurely.

The Leica Autostainer XL (ST5010) is safe to use and has an integrated system for extracting reagent vapors. The specimen slide holders are loaded and unloaded using two drawers.

### 3.1 General description

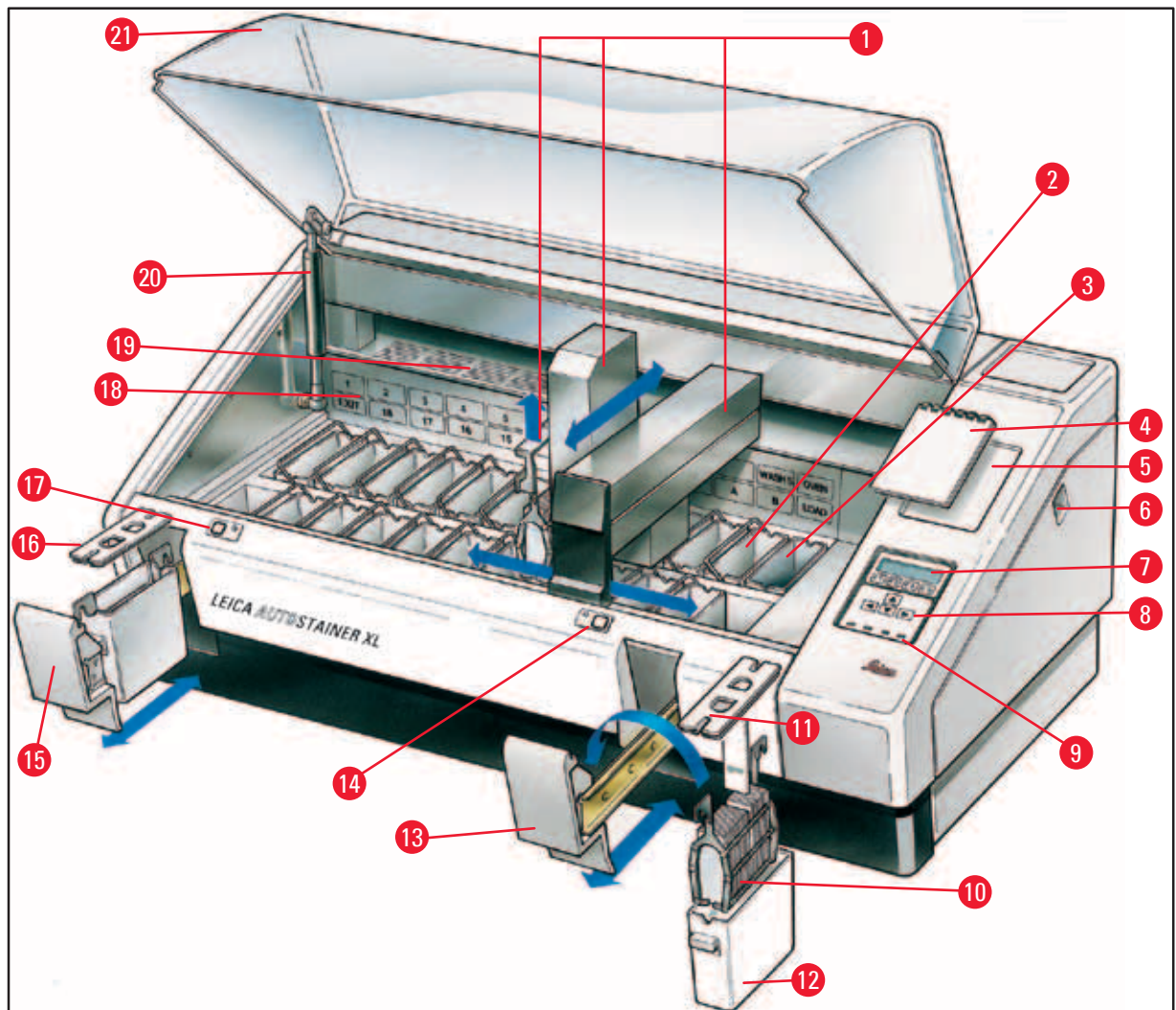


Fig. 2

#### Front side of instrument

|    |                                |    |  |
|----|--------------------------------|----|--|
| 1  | Transport arm                  | 12 | Reagent container                                  |
| 2  | Wash stations                  | 13 | Load drawer  |
| 3  | Oven                           | 14 | LED indicator and key for load drawer              |
| 4  | Notepad for staining protocols | 15 | Exit drawer  |
| 5  | Recess for notepad             | 16 | Cover with cut-outs (for container transportation) |
| 6  | ON/STOP switch                 | 17 | LED indicator and key for exit drawer              |
| 7  | Display screen                 | 18 | Schematic diagram of the stations                  |
| 8  | Keypad                         | 19 | Cover plate  |
| 9  | LED indicators                 | 20 | Lock for hood <sup>1)</sup>                        |
| 10 | Specimen slide holder          | 21 | Hood   |
| 11 | Container cover                |    |  |

<sup>1)</sup> The lock for the hood contains a gas pressure spring. This part can wear out. In case of weakening holding force, please contact our after-sales service and ask for replacement.

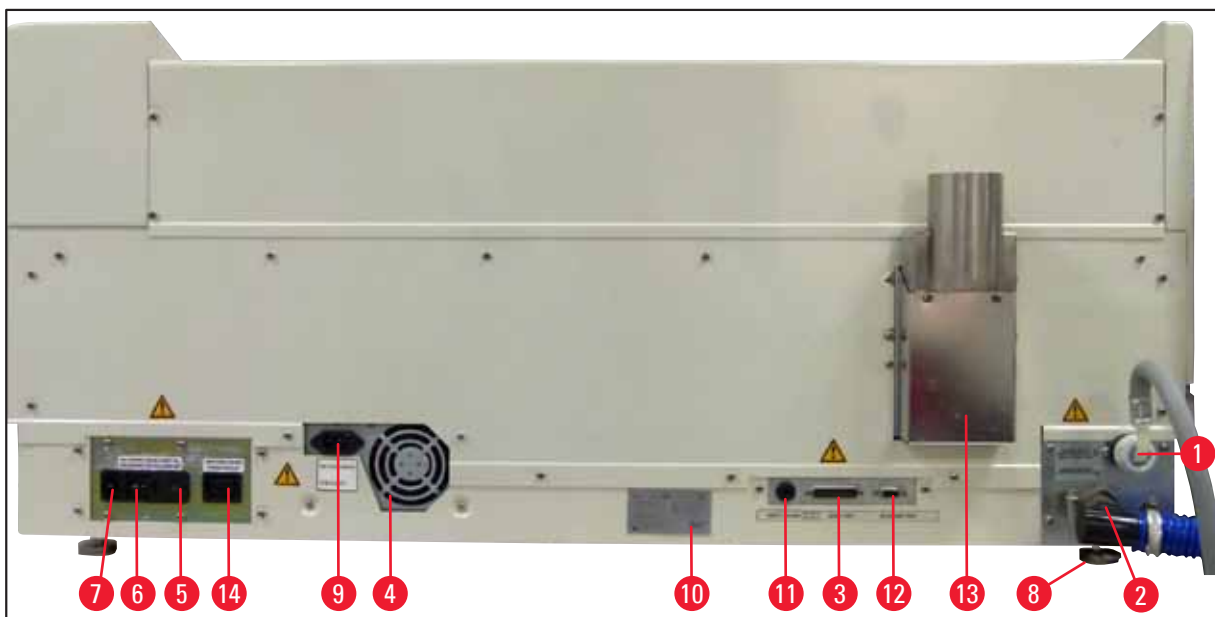


Fig. 3

### Rear side of instrument

|   |                                       |    |                                     |
|---|---------------------------------------|----|-------------------------------------|
| 1 | Water inlet                           | 8  | Feet, adjustable                    |
| 2 | Drain outlet                          | 9  | Power supply input                  |
| 3 | Serial port (service computer)        | 10 | Nameplate                           |
| 4 | Power supply (electronics)            | 11 | Remote alarm socket, max. 50 V, 1 A |
| 5 | Voltage selector and fuses for heater | 12 | Accessory port                      |
| 6 | Power switch (ON/OFF)                 | 13 | Exhaust air duct                    |
| 7 | Power input                           | 14 | Power output                        |

### 3.2 Standard delivery – packing list



#### Note

To prevent damage to the instrument and specimens, only those accessories and spare parts that have been authorized by Leica may be installed or used with the instrument.

Standard delivery:

| Qty. | Designation   | Order No.     |
|------|---|---------------|
| 1    | Leica Autostainer XL (ST5010) basic unit (230-240 V / 50-60 Hz) | 14 0456 35136 |
|      | - or -  |               |
| 1    | Leica Autostainer XL (ST5010) basic unit (100-120 V / 50-60 Hz) | 14 0456 35340 |
| 1    | accessories kit (0456 35660) consisting of:                     |               |
| 22   | reagent vessels with lids                                       | 14 0475 33659 |



| Qty. | Designation  | Order No.     |
|------|--|---------------|
| 5    | wash vessels   | 14 0456 35268 |
| 5    | specimen slide holders, metal  | 14 0456 33919 |
| 2    | covers with slots for reagent vessels                                    | 14 0475 34486 |
| 1    | jumper cable, power supply   | 14 0411 34604 |
| 1    | remote alarm connector   | 14 6844 01005 |
| 1    | tubing band clamp  | 14 0422 31972 |
| 1    | angular connecting nozzle for hose                                       | 14 0475 33669 |
| 1    | V filter 3/4.  | 14 0456 36101 |
| 1    | active carbon filter   | 14 0474 32273 |
| 1    | filter cover   | 14 0456 35240 |
| 1    | collecting tray for paraffin (heater) (inside the instrument)            | 14 0456 35216 |
| 1    | staining protocol notepad (attached to instrument)                       | 14 0456 35459 |
| 1    | water supply hose with seal  | 14 0474 32325 |
| 1    | drain hose   | 14 0475 35748 |
| 1    | Instructions for Use Leica Autostainer XL (ST5010) English (+ CD)        | 14 0456 80001 |
| 1    | reference manual as appendix, only in English (staining protocols, etc.) |               |

The country specific power cord needs to be ordered separately. Please find a list of all power cords available for your device on our website [www.LeicaBiosystems.com](http://www.LeicaBiosystems.com) within the product section.

### 3.3 Specifications

|   |  |
|---|--|
| Dimensions (width x depth x height):            | 109 cm x 67 cm x 51 cm   |
| Weight:   | 65 kg  |
| Nominal supply voltages:                        | 100-120V AC $\pm$ 10 % or 230-240V AC $\pm$ 10 %   |
| Nominal frequency:                              | 50-60 Hz   |
| Power draw:                                     | 650 VA   |
| Fuses:  | 5 x 20 mm, VDE / UL listed<br>100-120 V: quick acting fuse F 6.30 A L250 VAC<br>230-240 V: quick acting fuse F 3.15 A L250 VAC |
| IEC 1010 classification:                        | Protection class 1   |
| Overvoltage category:                           | II   |
| Pollution degree:                               | 2  |
| International protection class:                 | IP20   |
| A-weighted noise level:                         | $\leq$ 70 dB (A)   |
| <b>Performance parameters</b>                   |  |
| Slide throughput                                | depending on selected protocol:<br>max. 600 slides /h<br>min. 200 slides /h  |
| Loading capacity:                               | max. 11 specimen slide holders   |
| Capacity of one specimen slide holder:          | 30 slides  |
| Overall number of stations:                     | 26   |
| Reagent stations:                               | min. 18  |
| Volume of reagent vessels:                      | 450 ml   |
| Overall number of water stations:               | max. 5 (DI water optional)   |
| Number of oven chambers:                        | 1  |
| Temperature of oven chamber:                    | Ambient temperature or +30 to +65 °C   |
| Incubation time setting:                        | 0 s to 99 min 59 s   |
| Overall number of loading / unloading stations: | 1 / 1  |
| Capacity of nonvolatile storage:                | 15 programs with up to 25 steps  |
| Integration:                                    | Connection with CV5030 (coverslipper, optional)  |
| <b>Fresh water connection</b>                   |  |
| Hose material:                                  | PVC  |
| Hose length:                                    | 2.5 m  |
| Connecting piece:                               | G3/8   |
| Inner diameter:                                 | 10 mm  |
| Outer diameter:                                 | 16 mm  |
| Internal pressure:                              | Min. 1 bar / max. 6 bar  |
| Required flow rate:                             | Min. 12 l / min  |

**Waste water connection**

|                 |         |
|-----------------|---------|
| Hose material:  | PVC     |
| Hose length:    | 4 m     |
| Inner diameter: | 32 mm   |
| Outer diameter: | 36.8 mm |

**Exhaust air**

|                      |  |
|----------------------|--|
| Hose material:       | PVC  |
| Hose length:         | 2 m or 4 m   |
| Inner diameter:      | 50 mm  |
| Outer diameter:      | 60 mm  |
| Exhaust performance: | 22.4 m <sup>3</sup> /h   |
| Exhaust extraction:  | Active carbon filter and exhaust hose for connecting with an external exhaust system |

**Ambient conditions**

|                              |                              |
|------------------------------|------------------------------|
| Operating temperature:       | 15 to 35 °C                  |
| Operating relative humidity: | 20 % to 80 %, non-condensing |
| Operating elevation:         | Max. 2000 m above sea level  |
| Storage temperature:         | +5 to +50 °C                 |
| Storage relative humidity:   | 10 % to 85%, non-condensing  |
| Transport temperature:       | -29 °C to +50 °C             |
| Transport relative humidity: | 10 % to 85%, non-condensing  |

## 4. Installing the Instrument

This chapter provides instructions on how to install the Leica Autostainer XL (ST5010). It also includes a diagram and detailed description of the instrument's components. The procedure for replacing the active carbon filter for protection against reagent vapors is outlined as well.

### 4.1 Installation site requirements

- Required hard surface: 1.09 x 0.67 m<sup>2</sup>
- The laboratory bench must be of sufficient bearing capacity relating to the instrument and must have a rigid surface.
- The device is intended for indoor use only
- The next power socket must not be further away than the length of the power cord (2.5 m)). Use of an extension cord is not allowed.
- The instrument needs to be connected to a grounded power supply socket.
- Use only the provided power cord intended for the local power supply
- The instrument must not be installed below any air conditioning system
- Any shaking, direct sunlight and significant current fluctuations need to be avoided
- Proper function is ensured only if a minimum distance of 10 cm is respected towards all walls and any other fixtures
- The instrument needs to be installed in a way that allows easy access to the power switch and the power plug at the rear side.
- Operation is not allowed in any areas exposed to explosion hazards
- The installation site needs to be protected against electrostatic discharges
- The installation site needs to be well ventilated because chemicals used within the instrument are highly flammable and unhealthy
- Connect the instrument to a laboratory air exhaust system using the dedicated hose (lengths of 2 m and 4 m available). Alternatively the instrument can be operated below a fume cupboard. This should be run in addition to the active carbon filter.
- Please consider that the active carbon filter supports only filtration of hazardous vapors (Xylene)
- The situation at the installation site may vary significantly and depends on existing ventilation, emissions of other installed devices, the use of solvents, the volume of the room, etc.
- It is the responsibility of the laboratory owner / laboratory operator to not exceed the legal maximum permissible values and to take all measures at the working places regarding the solvent vapors. This includes also corresponding documentation.
- The operator of the instrument needs to make sure that sufficient ventilation is ensured and the active carbon filter is replaced within the required interval.
- The voltage selector and other internal components are preset by the manufacturer to meet the power requirements of the respective country of destination.



#### Warning

The user must not alter the voltage selector setting.

- The Leica Autostainer XL (ST5010) must be connected to a laboratory water tap with a pressure reducer.

## 4.2 Setting up the instrument



### Warning

Inadequate lifting and transportation of the instrument

#### Injury of persons and/or property damage

- Do not try to lift the instrument with less than 4 persons.
- Grab the instrument under the frame at all corners and lift it evenly.

1. Grip the instrument with at least 4 persons at all corners and evenly lift the instrument.
2. Place the instrument onto the bench (→ p. 20 – 4.1 Installation site requirements).
3. Pull off plastic cover.
4. Check whether all accessories have been delivered as per your order.

## 4.3 Connections on the instrument

### 4.3.1 Power supply

- Connect the power cable to the power input (→ Fig. 3-7).
- Connect the power supply jumper cable to the power supply output (→ Fig. 3-14) and power supply input (→ Fig. 3-9).

How to switch on:

1. Plug the power plug into the power socket.
2. Set the **ON/STOP** switch on the right side of the instrument to **STOP**.
3. Set the **ON/OFF** switch on the rear side of the instrument to **ON**.
4. Set the **ON/STOP** switch on the side to **ON**.

✓ The instrument will emit 3 short beeps and the **Main Menu** will be displayed.

When the instrument is not in use, set the **ON/STOP** switch on the side to **STOP**.

The ON/OFF switch on the rear side of the instrument should be left **ON**.



### Warning

The instrument must never be operated without the power supply jumper cable.  
The instrument must be connected to a grounded power socket.

### 4.3.2 Water supply

Connect the water hose to the water connection on the rear side of the instrument. Attach the other end of the hose to the cold-water tap. The hose has a 3/4" connector. Then slowly turn the tap on all the way.



### Note

The water filter must be in place when the water hose is connected, otherwise water can leak out.

## 4 Installing the Instrument

Connect the drain hose to the discharge nozzle on the rear side of the instrument.

### 4.4 Battery backup – UPS (optional)

An interruption of the staining process can be avoided in the event of a temporary power failure by connecting an uninterruptible power supply (UPS).

A compact UPS can be connected easily as shown in (→ Fig. 4) via the power supply jumper cable.

The UPS should be designed for an output of 200 VA for a duration of 5 minutes. However, the UPS will not maintain operation of the oven.

The UPS must be designed for power supply voltage at the installation location. Your distributor will gladly recommend a UPS that is suitable for you.

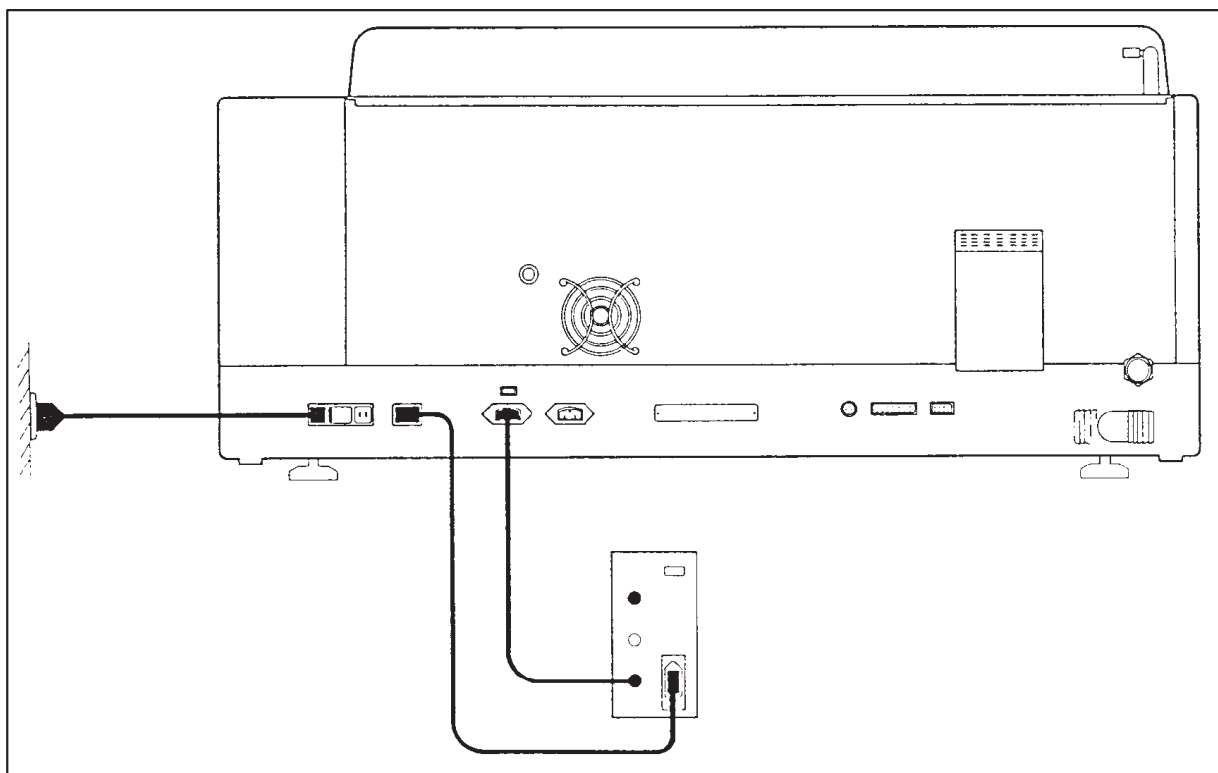


Fig. 4

### 4.5 Remote alarm (optional)

The optional remote alarm is an interlock relay that is voltage-isolated from the rest of the instrument. When there is an alarm condition (a major operational malfunction or a power failure during a staining run with a UPS connected), the alarm circuit closes and the alarm sounds.



#### Note

If you need a remote alarm that sounds even if there is a power failure, you have to use a battery-operated remote alarm.

Ensure that the instrument is still turned ON and press any key to turn off sound of the alarm. If the power failed during a staining run, you may first need to turn the ON/STOP switch on the side to STOP and then back to ON.

The remote alarm will only operate during a power failure if a UPS is connected. For details on how to connect a remote alarm, contact your distributor.

The remote alarm must be designed for less than 1 A and a maximum of 50 V.

Connect the remote alarm to the connection socket on the rear side of the instrument using a phono jack (6.25 mm).

#### **4.6 Vacuum extraction system for reagent vapors**

Fumes are extracted through the active carbon filter, which must be changed every three months (with average usage).

To change the filter, remove the cover plate over the filter (→ Fig. 2-19). Use the straps provided to remove the filter. Put in a new filter and reattach the cover.

#### **4.7 Oven**

Put the wax tray on the oven floor.

## 5. Operating the Instrument

### Introduction

This chapter describes how to operate Leica Autostainer XL (ST5010). It includes information on how to use the function keys and displays in the control panel. It also describes how to create and edit programs as well as how to stain specimen slides.

Leica Autostainer XL (ST5010) offers many features not found in other stainers. In particular, the specimen slide holders are loaded and unloaded not by opening the cover, but by means of drawers. Once the instrument is able to accept a new specimen slide holder, the LED by the load drawer lights up. After a specimen slide holder has been loaded, the LOAD key must be pressed for the instrument to begin the staining run. Similarly, if the staining run for a specimen slide holder has finished, the LED by the exit drawer lights up. After the specimen slide holder has been removed, the EXIT key must be pressed so that the instrument knows this has been done. Programs can be ended at any station. However, if the exit drawer is not the program's last step, then the LCD will display which station to unload the holder from. In this case, the instrument's cover will have to be opened to remove the holder.

The Leica Autostainer XL (ST5010) can accept a new specimen slide holder as soon as the LOAD LED on the load drawer lights up. This makes it possible to process up to 11 specimen slide holders simultaneously.

Each specimen slide holder can be processed according to any of the 15 programs, provided that the corresponding reagents are available and the program chosen is compatible (no conflicting sequence) with the programs already being used.

### Operation

The Leica Autostainer XL (ST5010) is operated using the control panel, the LOAD and UNLOAD keys and corresponding LEDs, and audible signals.

#### 5.1 The control panel

The control panel consists of an LCD, the keypad and four LEDs.

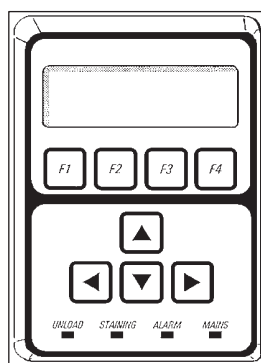


Fig. 5



### The display

The display has a backlit LCD with four lines. The fourth line is usually reserved for commands associated with the function keys **[F1]** to **[F4]**. A flashing cursor appears under the settings that the user can change.

### The keypad

The membrane keypad incorporates 4 function keys and 4 arrow keys. The function keys perform the actions that appear immediately above them in the fourth line of the display. The arrow keys move the cursor in the direction indicated. They are also used to select digits and other settings.



#### Note

Contact with solvents, use of sharp instruments or excessive force may damage the membrane keypad.

### The LED indicators

The four LEDs are located below the arrow keys and have the following functions: The UNLOAD LED (yellow flashing) indicates that a specimen slide holder has been fully processed and is ready to be removed from a station (except the exit drawer). The staining LED (yellow) is lit when staining is in progress. The alarm LED (red) indicates that a malfunction has occurred. The power LED (green) signals that the power supply voltage is available (ON/OFF switch and ON/STOP switch are both switched ON).

### LOAD and EXIT keys and indicators

The LOAD and EXIT keys and associated LED indicators are located adjacent to the load and exit drawers. For more information, see ([→ p. 34 – 5.9.4 Loading specimen slide holders](#)) and ([→ p. 36 – 5.9.7 Interrupting staining](#)).

### Audible signals

There are four different audible signals:

- |                      |  |
|----------------------|--|
| • Short single beep: | Sounds when a key is pressed.                                |
| • Short double beep: | Wrong key pressed or error message received.                 |
| • Long double beep:  | Operator action required to remove a fully processed holder. |
| • Continuous tone:   | Indicates a malfunction.                                     |

## 5.2 Main menu

When the ON/STOP switch has been turned ON, the Main Menu appears and the instrument beeps 3 times.

|                |       |       |    |
|----------------|-------|-------|----|
| Autostainer XL | V2.00 |       |    |
| Main Menu      |       |       |    |
| Stain          | Edit  | SetUp | PC |

|                |                        |                      |    |
|----------------|------------------------|----------------------|----|
| Autostainer XL | V2.00                  |                      |    |
| Hauptmenü      |                        |                      |    |
| Färben         | Programme<br>erstellen | Geräte-<br>parameter | PC |

The instrument has the following operating modes:

- Stain: To stain the specimen slides.
- Edit: To create, view or change programs.
- SetUp: To set or change parameters such as oven temperature and how many times the specimen slide holder moves up and down (dips) in a reagent station.
- PC: For service use only.

## 5.3 Menu overview

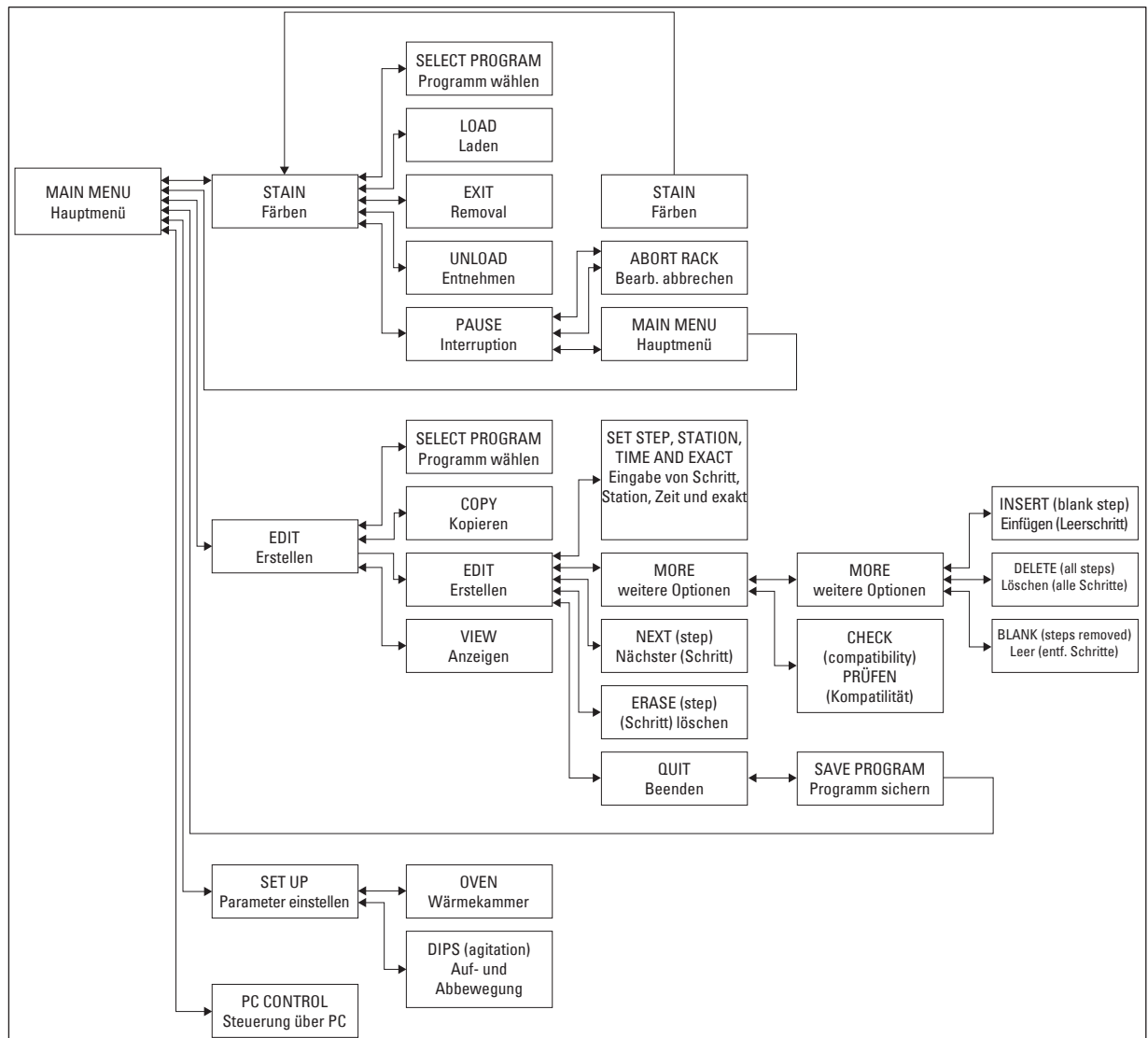


Fig. 6

## 5.4 Editing programs

The Leica Autostainer XL (ST5010) can store up to 15 programs, numbered consecutively from 1 to 15. Programming is easy. The user is guided through a menu and enters all information via the keypad.



### Caution

Specimen slide holder processed with wrong program parameters

#### Damage or loss of tissue

- Always double-check program parameters of user-specific programs before you start processing.

A program consists of 25 steps, some of which may be blank. A step consists of the following information:

- The step number
- The station
- The incubation time (immersion time)
- Whether or not the specified incubation time must be adhered to exactly.

The step number defines the order in which the stations are used. The incubation time is the time the specimen slide holder is fully immersed in a station.

Times may overlap when multiple specimen slide holders are being processed simultaneously, therefore the steps requiring precise adherence to the specified dwell time are designated as **exact** in the program. Therefore incubation times at these steps have priority and are adhered to with an accuracy of  $\pm 1$  second. Specimen slide holders that are in a step that was designated **not exact** are processed further as soon as the transport arm is available for that.



### Warning

Programs assigned to specimen slide holders currently being processed cannot be altered, neither can steps be copied into them.

The menu overview ([→ p. 27 – 5.3 Menu overview](#)) provides an overview of the programming structure.

#### 5.4.1 Entering program steps

1. Press **[F2]** Edit in the Main Menu.
2. Select the desired program using the **↑** and **↓** keys.
3. Press **[F2]** Edit.

✓ The first step of the program is displayed under the following headings:

- step: the step number,
  - stn: the station number or name,
  - time: the incubation time in minutes and seconds,
  - exact: whether or not the incubation time is critical.
4. Move the cursor under the step number and use the **↑** and **↓** keys to call up steps 1 to 25 of the program. Alternatively, press **[F2]** Next to move to the next step.
  5. To enter the appropriate information, use the **←** and **→** keys to position the cursor beneath the appropriate heading. Scroll through the existing information or alter the digits using the **↑** and **↓** keys.  
Enter the program details and, after each item of a step is completed, use the **←** and **→** keys to move to the next heading.



### Warning

An incubation time of 00:00 means that this step will be omitted.

6. Repeat items 4 and 5 until the program is complete.

**Warning**

If the specimen slide holder needs to end up in the exit drawer, enter this as the last step.

7. Save the program (→ p. 30 – 5.4.5 Saving a program).

### 5.4.2 Deleting program steps

Information contained in a step may be deleted, leaving a blank step.

1. Select the program (see items 1 to 3 (→ p. 28 – 5.4.1 Entering program steps)).
2. Select the step to be deleted (see item 4, (→ p. 28 – 5.4.1 Entering program steps)).
3. Press **[F3]** Erase.  
Then the step is left blank.  
You may enter new details for the step, if desired.
4. Save the program (→ p. 30 – 5.4.5 Saving a program).

### 5.4.3 Inserting a blank step into a program

This function is used to insert an additional step into an existing program.

1. Call up the program (see items 1 and 2 (→ p. 28 – 5.4.1 Entering program steps)).
2. Press **[F2]** Edit.
3. Select the step number where the new (blank) step is to be inserted.
4. Press **[F1]** More.
5. Press **[F1]** More.
6. Press **[F1]** Insert.
7. If you wish to proceed, press **[F1]** Yes.  
A blank step is inserted now at the step selected under item 3.

**Note**

The steps following the blank step will be renumbered. Step 25 is lost when a blank step is inserted.

8. Continue editing the program.
9. Save the program (→ p. 30 – 5.4.5 Saving a program).

### 5.4.4 Removing blank steps from a program

This function is used to remove blank steps left by deleting one or more program steps.

- ① Steps will then be renumbered in the same sequence as in the original program.
1. Select the program (see items 1 and 2 (→ p. 28 – 5.4.1 Entering program steps)).
  2. Press **[F2]** Edit.
  3. Press **[F1]** More.
  4. Press **[F1]** More.

5. Press **[F3]** Blank.
6. Press **[F1]** Yes to continue. The blank steps are removed and the subsequent steps are renumbered.
7. Save the program (→ p. 30 – 5.4.5 Saving a program).

#### 5.4.5 Saving a program

When the program is complete, save it as follows:

1. From the **Edit Program** screen, press **[F4]** Quit. You now have the options of saving the edited program **[F1]**, leaving the program as it was before the changes were made **[F2]**, or continuing to edit the program **[F4]**.
2. Press **[F1]** to save the program, or
3. Press **[F2]** to leave the program unchanged, or
4. Press **[F4]** to continue editing the program.

#### 5.4.6 Deleting a program

This function is used to delete all steps in a program.

1. Select the program (see items 1 and 2 (→ p. 28 – 5.4.1 Entering program steps)).
2. Press **[F2]** Edit.
3. Press **[F1]** More.
4. Press **[F1]** More.
5. Press **[F2]** Delete.
6. Press **[F1]** Yes to continue.
7. To save the program (which now contains no steps), see above.

#### 5.4.7 Copying a program

This function is used to copy a program into another program number.

1. Select a corresponding program (see items 1 and 2 (→ p. 28 – 5.4.1 Entering program steps)).
2. Press **[F1]** Copy.



#### Note

If an empty program has been selected, a corresponding message appears in the display.

3. Using the **↑** and **↓** keys, select the program number into which the program is to be copied.
4. Press **[F1]** Copy.



#### Note

If the selected program number is not blank, a corresponding message appears in the display.  
If the selected program number is assigned to a specimen slide holder currently being processed, copying is not allowed and a corresponding message appears in the display.

A confirmatory message will be momentarily displayed if the copy is successful.

5. If you wish to copy the program into another program number, repeat items 3 and 4.
6. Press **[F4]** Cancel to exit this routine

#### 5.4.8 Viewing a program

To view a program:

1. Select the program (see items 1 and 2 (→ p. 28 – 5.4.1 Entering program steps)).
2. Press **[F3]** View.  
Up to four steps can be viewed simultaneously. Use the **↑** and **↓** keys to view other steps.
3. Press **[F4]** to return to the previous screen.

#### 5.4.9 Checking the compatibility of programs

This function is used to check whether two programs can be run simultaneously. Programs cannot be run in parallel if they would need to control two identical stations defined as "exact" simultaneously, or if they contain two identical stations in reverse order, as in the following example:

| Program 1 | Program 2 |
|-----------|-----------|
| Station 1 | Station 1 |
| Station 2 | Station 3 |
| Station 3 | Station 2 |

However, the instrument carries out this calculation automatically.

1. Select the program (see items 1 and 2 (→ p. 28 – 5.4.1 Entering program steps)).
2. Press **[F2]** Edit.
3. Press **[F1]** More.
4. Press **[F2]** Check.
5. Using the **↑** and **↓** keys, select the program number to be checked for compatibility.
6. Press **[F2]** Check.  
A message appears in the display to inform you of whether or not the programs are compatible.
7. If the programs are not compatible, an explanation will be given. Press **[F4]** to continue.
8. Repeat items 5 and 6 to check the compatibility with other programs.
9. Press **[F4]** to return to the program selected under item 1.



#### Note

In many cases, incompatibility of staining protocols can be traced to assignment of the wash stations. Therefore, these stations can be selected by the user.

(→ p. 47 – 11.3 Compatible staining programs) gives some examples of staining protocols that are compatible with each other.

## 5.5 User-adjustable parameters

The Leica Autostainer XL (ST5010) has multiple parameters that pertain to operation of the instrument regardless of the selected program. These parameters can be set by the user (refer also to ([→ p. 45 – 11.1 Adjustable parameters](#))):

- Oven temperature.
- Number of up/down movements (dips) of a specimen slide holder within a station.
- Time for one complete movement up and down (dip).
- Time for the process to remove a specimen slide holder from a station.
- Time for the process to insert a specimen slide holder into a station.

## 5.6 Oven

The oven temperature can be set between 35 and 65°C, or the oven can stay turned OFF.





### Note

The oven operates during the entire staining process with the respectively specified temperature setting, even if it is not used.

To set, view or change this setting:

1. Press **[F3]** SetUp in the **Main Menu**.  
The current setting appears in the first line of the display.

To alter this setting:

2. Press **[F1]** Oven.
3. Press **[F1]** to turn the oven ON, or press **[F2]** to turn the oven OFF, or use the  and  keys to alter the programmed oven temperature.
4. Press **[F4]** to return to the **SetUp** screen.

The new oven setting will now be displayed.

5. Press **[F4]** to return to the **Main Menu**.

## 5.7 Up/down movement (dips)

The number of times the specimen slide holder moves up and down (dips) after being inserted into a station can be set to OFF, in the range 1 - 20 or continuous.



### Note

If continuous movement was selected, then only one specimen slide holder from the instrument can be processed at a time.



To view or change this setting:

1. Press **[F3]** SetUp in the **Main Menu**.  
Then the current setting appears in the second line of the display.  
To alter this setting:
2. Press **[F2]** Dips.
3. Press **[F1]** to turn the dips ON, or  
Press **[F2]** to turn the dips OFF, or  
Use the **↑** and **↓** keys to alter the number of dips.
4. Press **[F4]** to return to the **SetUp** screen.  
The new setting for the number of dips is displayed.
5. Press **[F4]** to return to the **Main Menu**.



#### Note

The time for one complete movement up and down (dip) is set in the menu (Setup/Move).

Use the selected time as a guide when setting the number of dips.

If the incubation time for a selected number is too short, only the number of dips that fit into the specified incubation time will be done.

## 5.8 Number of up/down movement (dips)

You can set the number and duration of dips of the specimen slide holder to suit the duration and special requirements of the staining run (→ p. 45 – 11.1 Adjustable parameters).

To view or change this setting:

1. Press **[F3]** SetUp in the **Main Menu**.
2. Press **[F3]** Move.  
The current setting appears as the number of seconds for each individual movement operation, that is, the total duration for dips and the duration for unloading and loading each holder.
3. To change the values, press **[F1]** Dip, **[F2]** Up or **[F3]** Down to position the cursor under the appropriate value.
4. Use the **↑** and **↓** keys to alter the setting.
5. Repeat steps 3 and 4 as required.
6. Press **[F4]** to return to the **SetUp** screen.
7. Press **[F4]** to return to the **Main Menu**.

## 5.9 Staining

This chapter discusses how to stain specimen slides.

The Leica Autostainer XL (ST5010) can accept a new specimen slide holder as soon as the load drawer is empty. Then the specimen slides are stained according to the program selected for the respective holder. Different programs may be used simultaneously, provided they are compatible. The method for checking compatibility is described on (→ p. 31 – 5.4.9 Checking the compatibility of programs).

### 5.9.1 Reagent containers

Reagent containers can be individually removed for filling. Each container holds 450 ml. The filling level mark is on the inside. After being filled, they are put in the instrument at the position designated in the corresponding programs.

To make the containers easier to identify, a label can be inscribed or attached on the side directly above where the handle is connected.

A schematic drawing of the individual stations is inside the instrument on the back panel (→ Fig. 2-18). Make sure that the containers are inserted correctly and that all handles are folded to the correct side so that they do not obstruct transport of the specimen slide holders. Lids are provided to reduce evaporation of solvent while the reagent containers are not in use. The containers of the load and exit drawers can also be filled with a reagent, if desired. However, the instrument will not monitor the incubation times in these two stations.

### 5.9.2 Wash system

The wash system consists of five flow-through wash stations, each capable of holding one specimen slide holder. Water is supplied through the opening in the container floor and drains through the cut-out at the upper left edge.



#### Note

The floor of the station has a locating pin, which means the station can be used only in one direction. Be careful when removing or inserting wash containers, because using excessive force may damage the seals. Wet the O-ring before inserting the wash station.

To use the wash station, slowly open the water tap in the lab all the way. The flow control valve in the Leica Autostainer XL (ST5010) limits the flow rate in the wash stations to an optimum value of 8 liters/minute.



#### Note

If the flow rate drops below this value for any reason, the wash period specified in the program may have to be extended.

### 5.9.3 Water-saving function

The Leica Autostainer XL (ST5010) has a water-saving function that stops the flow of water when none of the wash stations is in use and the reagent residue has been flushed out of them.

### 5.9.4 Loading specimen slide holders

Specimen slide holders are inserted into the instrument only via the load drawer, which is on the front right side of the instrument. Reach several fingers into the recess on the underside of the drawer, release the lever by gently pushing it up and pull the drawer out as far as it will go.

To load a specimen slide holder:

1. Press **[F1] Stain** in the **Main Menu**.  
The instrument will take a few seconds to initialize.

**Note**

If a holder is already loaded, then the Abort menu will be displayed. Press **[F1] Stain** to continue.

2. Select the required program number using the **↑** and **↓** keys.  
Check to see whether the load drawer is actually empty (the **[LOAD]** LED will be lit). Open the drawer and insert the specimen slide holder, ensuring that it is positioned correctly. Close the drawer.
3. Press the **[LOAD]** key.  
If the program is compatible with the programs already in use, then the **[LOAD]** LED will turn off and the specimen slide holder will be processed using the selected program, otherwise a message will appear in the display and the holder will not be processed.
4. To load additional specimen slide holders, repeat items 2 and 3.

**Note**

If the instrument is in the midst of processing a specimen slide holder, there may be a delay before processing of additional holders begins.

### 5.9.5 Unloading specimen slide holders from the exit drawer

**Caution**

Specimen slide holders not unloaded in a timely manner from exit drawer

**Delay of processing time and damage of tissue**

- Unload the exit drawer in time, close the exit drawer and press **EXIT**.

When a specimen slide holder is in the exit station, the **[EXIT]** LED will be on and the beeper will sound every 30 seconds.

To unload from the exit drawer:

1. Open the exit drawer carefully and remove the holder. Alternatively, you can remove the entire reagent container including the holder and replace it with another.
2. Close the drawer and press the **[EXIT]** key. Then the LED will go out.

**Note**

If the **[EXIT]** key is not pressed, the instrument will be unable to finish processing other holders that require this station.

### 5.9.6 Unloading specimen slide holders from other stations

If the final step in a program is not the exit drawer, the **[UNLOAD]** LED on the control panel will flash when processing of the holder is complete.

To unload:



#### Note

For unloading, below steps must be carried out as quickly as possible. In the case of delays, the staining quality of other samples within the device may be negatively impacted.

1. Press **[F1]** Unload.  
A confirmatory message will appear in the display while the transport arm completes its current operation. Then the station number of the fully processed specimen slide holder will be displayed.
2. Select the station number of the holder to be removed using the **[↑]** and **[↓]** keys (if more than one holder is completed), or
3. Press **[F4]** Cancel if you do not wish to unload the holder. Then the instrument will resume processing.
4. Press **[F1]** Unload.  
Open the lid and remove the specimen slide holder.
5. Press **[F1]** Done.
6. Repeat items 2 to 5 to remove other fully processed holders.

### 5.9.7 Interrupting staining

Staining can be interrupted:

- To edit a program not currently being used for staining;
- To change the general instrument parameters (**SetUp**);
- To allow access to the instrument to check/change reagents;
- To abort staining of one or more specimen slide holders.

To interrupt a staining run:

1. Press **[F4]** Pause in the **Abort** screen.



#### Note

If staining is interrupted, incubation times during the pause will not be identical to those in the selected program(s).

If no specimen slide holders are loaded, then the **Main Menu** will be displayed.

2. To cancel processing of a holder, ([→ p. 37 – 5.9.8 Aborting the processing of a specimen slide holder](#)).
3. Press **[F1]** Stain to continue staining, or

4. Press **[F4]** Main Menu to return to the **Main Menu**.

You may now edit programs not currently in use or change the general instrument parameters (**SetUp**).

To resume staining, press **[F1]** in the **Main Menu**.

### 5.9.8 Aborting the processing of a specimen slide holder

To abort the processing of a specimen slide holder:

1. Press **[F4]** Pause in the **Staining** screen.
2. Press **[F2]** Abort rack.
3. Using the **[↑]** and **[↓]** keys, select the station containing the holder for which you want to abort processing.
4. Press **[F2]** Abort.
5. Remove the holder as instructed. Press **[F1]** Done to confirm.
6. To abort the processing of other holders, repeat items 3 to 5.
7. Press **[F4]** Cancel to exit the **Abort** screen.
8. Press **[F1]** to continue staining or press **[F4]** to return to the **Main Menu**.

## 6. Care and Cleaning

Clean the interior stainless steel surfaces with a detergent and then rinse them with water. Clean the transport arm surfaces by wiping them with a damp cloth.



### Warning

The transport arm contains sensitive electronic components, therefore do not use any liquid in this area. Wipe clean only.

The drainage system may be flushed with 5 % sodium hypochlorite to inhibit bacterial growth. However, metal parts must not be in contact with this solution for prolonged periods (such as overnight). Flush well with water afterwards. Painted exterior surfaces can be cleaned with a mild detergent and then wiped with a damp cloth.



### Note

Do not use solvent on the outer surfaces, particularly the control panel and the cover!

Carefully wipe the control panel with a damp cloth.

### 6.1 Wash containers

Remove the wash containers and clean them with detergent. Reagent and rinsing water vessels can be cleaned in a dishwasher, at a maximum temperature of 65 °C, using a standard, commercially available detergent for lab dishwashers. The handles can remain attached to the various vessels during this process.

### 6.2 Reagent containers



### Caution

Reagent containers not cleaned or cleaned insufficiently

#### Damage or loss of tissue

- Clean reagent containers regularly according the instruction.

Clean with warm water and detergent.

### 6.3 Specimen slide holders

Clean with household or laboratory detergent as needed.

### 6.4 Oven

Regularly check the wax tray on the oven floor and clean it if you find excessive wax residue.

## 6.5 Water drainage



### Caution

Water drainage not cleaned or cleaned insufficiently

**Insufficient staining quality, loss of tissue or property damage**

- Check and clean the draining system regularly for correct flow.

1. To clean the water draining system, remove the rinsing water vessels and all surrounding reagent vessels.
2. The remaining reagent vessels have to be covered with lids.
3. Remove the drainage sieve and clean it if necessary.
4. Place one to two cleaning tablets with active oxygen (e.g. a denture cleanser) into the drain and dissolve in water to remove various residue (reagents, bacteria, fungi, algae).
5. Then, clean the entire curved drainage area inside the instrument with a long, flexible brush.
6. Check the flow by flushing thoroughly with water.
7. Insert the drainage sieve again, and put the vessels back in their original, defined positions.
8. Remove any lids from vessels before processing specimen slide holders into them.

## 7. Error Messages and Troubleshooting

### Introduction

The Leica Autostainer XL (ST5010) has a system that continually monitors the instrument's functions. It displays a corresponding error message if any errors occur. If a minor error occurs during staining, the instrument will first attempt to correct the problem on its own. If this is unsuccessful, then a message appears and the instrument waits for the user to rectify the problem.

Some errors trigger an audible alarm. This alarm can be turned off by pressing **[F1] Quiet**.

If there is an error message, press **[F2] Pause** to pause staining.

Error messages and their meaning are listed on the following pages.

### 7.1 Warning messages for instrument errors

|   |   |
|---|---|
| <b>Mains Power fail</b>                               | This warning indicates a power failure. It appears only if a UPS is connected.<br>For more details, ( <a href="#">→ p. 22 – 4.4 Battery backup – UPS (optional)</a> )   |
| <b>Power Supply fail</b>                              | The power supply device has failed and must be repaired.  |
| <b>Make sure that the head is free of obstruction</b> | The transport arm for transferring the specimen slide holder is locked. The most frequent causes for this are: <ol style="list-style-type: none"> <li>1. The reagent container is inserted incorrectly</li> <li>2. The handle is positioned incorrectly</li> <li>3. The cover is still on the reagent container</li> <li>4. The specimen slide holder is bent</li> </ol> The instrument immediately starts staining again after the problem is remedied |
| <b>Head stalled</b>                                   | Even after the attempt to resume staining, the head of the transport arm does not move. Eliminate all blockage and resume staining. If the problem does not go away, contact our after-sales service.   |
| <b>Fume system blocked</b>                            | The drain opening on the rear side of the instrument is blocked. Eliminate blockage.  |
| <b>Oven failure</b>                                   | The oven is not working and has to be repaired. All other stations of the instrument are still working. Only drying of the specimen slides has to be done outside of the instrument.  |
| <b>Oven overheating</b>                               | If this message appears, it is very likely that the oven is blocked. Make sure the slot in the oven floor is not blocked.   |
| <b>Remove obstruction and replace rack on hook</b>    | The specimen slide holder could have separated from the hook. Remedy the problem (e.g., the reagent container is inserted incorrectly) and put the holder back on the hook.   |



## 7.2 More information and warnings

### 7.2.1 During staining

|   |   |
|---|---|
| <b>Program (x) cannot be used for staining</b>                  | Either the program in question contains no steps, or it consists only of blank steps or steps with the time set to 0.   |
| <b>Program (x) is not compatible with programs in use</b>       | The program in question is incompatible with a program assigned to one (multiple) specimen slide holder(s), which is (are) currently being processed. Processing of the specimen slide holder(s) must be finished before the program in question can be used.<br><br>(→ p. 31 – 5.4.9 Checking the compatibility of programs) |
| <b>Ensure a rack is in the Load drawer and close the drawer</b> | The load drawer must be closed for the instrument to be able to remove a specimen slide holder from it.   |
| <b>Ensure the Exit drawer is empty and close the drawer</b>     | The exit drawer must be closed for the instrument to be able to insert a specimen slide holder for removal.   |

### 7.2.2 During editing of programs

|   |   |
|---|---|
| <b>Station (x) and Station (y) are in reverse order</b>         | This message appears when two programs are checked for compatibility. The stations in question are specified in the two programs in reverse order. Therefore the programs cannot be used in parallel. |
| <b>The steps after Exit will be ignored</b>                     | The Exit step is not the last program step. The steps specified after the Exit step are ignored.  |
| <b>Program (x) is in use for staining and cannot be altered</b> | A program that is currently being used for staining cannot be altered. Copy the program to another program number and then edit it.   |

### 7.2.3 During SetUp

|   |  |
|---|--|
| <b>SetUp lost. Default SetUp used.</b>                          | Programs and settings of the instrument parameters have been lost and must be reentered.   |
| <b>Battery backed RAM Failure! Service is required.</b>         | The internal memory has to be replaced. Contact the after-sales service responsible for you.   |
| <b>Caution: increasing dips might extend some station times</b> | Increasing the number of up/down movements (dips) while specimen slides are being processed can result in lengthening of exactly defined incubation periods. If continuous up/down movement was selected, only one specimen slide holder can be processed at a time. |

## **8. Warranty and Service**

### **Warranty**

Leica Biosystems Nussloch GmbH guarantees that the contractual product delivered has been subjected to a comprehensive quality control procedure based on the Leica in-house testing standards, and that the product is faultless and complies with all warranted technical specifications and/or agreed-upon characteristics.

The scope of the warranty is based on the contents of the contract concluded. The warranty terms of your Leica sales organization or the organization from which you have purchased the contractual product shall apply exclusively.

### **Service information**

If you are in need of technical customer support or spare parts, please contact your Leica representative or the Leica dealer where you purchased the instrument.

The following information about the instrument is required:

- Model name and serial number of the instrument.
- Location of the instrument and name of a contact person.
- Reason for the service call.
- Date of delivery.



### **Warning**

To prevent damage to the instrument and specimens, only those accessories and spare parts that have been authorized by Leica may be installed or used with the instrument.

## 9. Decommissioning and disposal



### Caution

The instrument or parts of the instrument must be disposed of according to existing applicable, local regulations. All objects contaminated with spilled reagents must be disinfected immediately with a suitable disinfectant to prevent spreading to other areas of the lab or to lab personnel.

Please refer to ([→ p. 38 – 6. Care and Cleaning](#)) and ([→ p. 43 – 9. Decommissioning and disposal](#)) for information about cleaning the Leica Autostainer XL (ST5010) stainer.

The instrument can be contaminated when using biohazardous specimens. Thorough disinfecting is required before re-commissioning or disposal (e.g. multiple cleaning steps, disinfection or sterilization). Dispose of the instrument in compliance with the applicable laboratory specifications.

Contact your Leica representative for more information.



Instrument components such as the computer, monitor, etc. that are labeled with the crossed-out dust bin are affected by the European Directive 2002/96/EC for Waste Electrical and Electronic Equipment (WEEE) of the European Parliament and the Council of January 27, 2003.

These objects must be disposed of via the collection points in accordance with the local regulations. More information on disposal of the instrument can be obtained from your local disposal company or your local Leica support staff.

### **10. Decontamination Confirmation**

Every product that is returned to Leica Biosystems or that requires on-site maintenance must be properly cleaned and decontaminated. You can find the dedicated template of the decontamination confirmation on our website [www.LeicaBiosystems.com](http://www.LeicaBiosystems.com) within the product menu. This template has to be used for gathering all required data.

When returning a product, a copy of the filled and signed confirmation has to be enclosed or passed on to the service technician. The responsibility for products that are sent back without this confirmation or with an incomplete confirmation lies with the sender. Returned goods that are considered to be a potential source of danger by the company will be sent back at the expense and risk of the sender.

## 11. Appendix

### 11.1 Adjustable parameters

| Parameter                                | Setting ex works | Variable | Range   |
|--|------------------|----------|---|
| Specimen slides per holder               | N/A              | N/A      | 0 - 30  |
| Specimen slide holders in the instrument | N/A              | YES      | 0 - 11  |
| Stations                                 |                  |          |   |
| Reagent stations                         | 18               | NO       | 0 - 18  |
| Wash stations                            | 5                |          | 0 - 5   |
| Oven                                     | 1                |          | 1   |
| Load drawer                              | 1                |          | 1   |
| Exit drawer                              | 1                |          | 0 - 1   |
| Programs                                 | 15               | NO       | 15  |
| Steps per program                        | 25               | NO       | 25<br>(Note: Some steps can be defined as blank)                              |
| Incubation time                          | N/A              | YES      | 0 sec. - 59 min. 99 sec.<br>(Note: Setting 0 seconds for a step will omit it) |
| Timing accuracy (exact)                  | N/A              | YES      | ± 1 second (exact)<br>0 - "infinity" (not exact)                              |
| Oven temperature                         | N/A              | YES      | OFF / 30 - 65 °C  |
| Up/down movements (dips)                 | N/A              | YES      | OFF / 1 - 20 / Continuous   |
| Duration of an entire dip (in seconds)   | 2                | YES      | 1 - 4   |
| Unloading time per holder (in seconds)   | 9                | YES      | 4 - 9   |
| Loading time per holder (in seconds)     | 2                | YES      | 2 - 4   |

### 11.2 Consumables and accessories



#### Note

To prevent damage to the instrument and specimens, only those accessories and spare parts that have been authorized by Leica may be installed or used with the instrument.

#### Consumables

Active carbon filter 14 0474 32273

#### Accessories

Leica TS5015 - transfer station 14 0506 38050

| <b>Accessories</b>  |               |
|---|---------------|
| Baseplate for workstation   | 14 0475 37647 |
| Specimen slide holders for special staining                               | 14 0475 34524 |
| Insert for special staining   | 14 0475 34525 |
| Holder for large individual specimen slides                               | 14 0456 27069 |
| Specimen slide holders 30, metal  | 14 0456 33919 |
| Wash station, assembly  | 14 0456 35268 |
| Holding frame for a specimen slide holder                                 | 14 0456 35434 |
| Plastic rack 30 (specimen slide holder for 30 specimen slides)            | 14 0475 33750 |
| Specimen slide holder for 30 specimen slides, Type Leica, plastic, 5 pcs. | 14 0475 33643 |
| Adapter Sakura (specimen slide holder 140474 33463)                       | 14 0475 34515 |
| Adapter Medite 20   | 14 0475 34516 |
| Adapter Medite 30   | 14 0475 34517 |
| Adapter Shandon   | 14 0475 34518 |
| Adapter Microm 30   | 14 0475 34943 |
| Reagent vessel, assembly, with lid and transport handle                   | 14 0475 33659 |
| Cover, without slots for reagent vessel                                   | 14 0475 34488 |
| Cover, with slots for reagent vessel                                      | 14 0475 34486 |
| Cover for 12 vessels, assembly  | 14 0475 33644 |
| Holding bracket (stand for one reagent vessel)                            | 14 0456 35445 |
| Dummy plugs (sealing plugs for wash vessel)                               | 14 0456 35393 |
| Supply hose for rinsing water, 2.50 m, assembly with 3/4" connection      | 14 0474 32325 |
| Outlet hose, 4 m  | 14 0475 35748 |
| Exhaust air hose, 2 m, assembly including adapter for fume hood           | 14 0475 35762 |
| Exhaust air hose, 4 m, assembly including adapter for fume hood           | 14 0475 35763 |
| Drip tray (wax collecting bowl for oven)                                  | 14 0456 35216 |
| O-ring 3 x 2 mm FKM (O-ring for hook)                                     | 14 0253 35822 |
| O-ring 7.65 x 1.78 FKM (O-ring for wash vessel)                           | 14 0253 34214 |
| V filter 3/4" 40/22 H6 (wax strainer).                                    | 14 0456 36101 |
| Staining protocol block   | 14 0456 35459 |
| Remote alarm device for exit drawer                                       | 14 0456 30906 |

**11.3 Compatible staining programs**

| Reagent        | Station        | Program 1 H&E |       |       | Program 2 Papanicolaou |      |       |
|----------------|----------------|---------------|-------|-------|------------------------|------|-------|
|                |                | Step          | Time  | Exact | Step                   | Time | Exact |
|                | Oven           | 1             | 10:00 | Y     |                        |      |       |
| Xylene         | 1              | 2             | 2:00  | N     |                        |      |       |
| Xylene         | 2              | 3             | 2:00  | N     |                        |      |       |
| 100 % alcohol  | 3              | 4             | 2:00  | N     |                        |      |       |
| 100 % alcohol  | 4              | 5             | 2:00  | N     |                        |      |       |
| 70 % alcohol   | 5              | 6             | 1:00  | N     | 1                      | 1:30 | N     |
| Wash medium    | Wash station 1 | 7             | 2:00  | N     | 2                      | 2:00 | N     |
| Hematoxylin    | 6              | 8             | 5:00  | Y     | 3                      | 3:30 | Y     |
| Wash medium    | Wash station 2 | 9             | 2:00  | N     | 4                      | 2:00 | N     |
| HCl alcohol    | 7              | 10            | 0:02  | Y     | 5                      | 0:05 | Y     |
| Wash medium    | Wash station 3 | 11            | 3:00  | N     | 6                      | 2:00 | N     |
| Scott's medium | 8              | 12            | 3:00  | Y     | 7                      | 4:00 | Y     |
| Wash medium    | Wash station 4 | 13            | 3:00  | N     | 8                      | 2:00 | N     |
| 95 % alcohol   | 9              |               |       |       | 9                      | 1:30 | N     |
| OG 6           | 10             |               |       |       | 10                     | 2:00 | Y     |
| 95 % alcohol   | 11             |               |       |       | 11                     | 1:30 | N     |
| 95 % alcohol   | 12             |               |       |       | 12                     | 1:30 | N     |
| EA 50          | 13             |               |       |       | 13                     | 2:30 | Y     |
| Eosin          | 14             | 14            | 2:00  | Y     |                        |      |       |
| 95 % alcohol   | 15             | 15            | 0:30  | Y     | 14                     | 1:30 | Y     |
| 100 % alcohol  | 16             | 16            | 2:00  | N     | 15                     | 1:30 | Y     |
| 100 % alcohol  | 17             | 17            | 2:00  | N     | 16                     | 1:30 | Y     |
| 100 % alcohol  | 18             | 18            | 2:00  | N     | 17                     | 1:30 | Y     |
| Xylene         | Exit tank      | 19            |       |       | 18                     |      |       |

**Note**

Wash stations 1 to 4 (and the stations in between) are used in the same sequence in both programs. These two programs are compatible with each other, but not with the programs on ([→ p. 48 – Compatible staining programs](#)).

**Compatible staining programs**

|                |                | Program 1 H&E |       |       | Program 5 Hx Counterstain |      |       |
|----------------|----------------|---------------|-------|-------|---------------------------|------|-------|
| Reagent        | Station        | Step          | Time  | Exact | Step                      | Time | Exact |
| Oven           |                | 1             | 10:00 | Y     |                           |      |       |
| Xylene         | 1              | 2             | 2:00  | N     |                           |      |       |
| Xylene         | 2              | 3             | 2:00  | N     |                           |      |       |
| 100 % alcohol  | 3              | 4             | 2:00  | N     |                           |      |       |
| 100 % alcohol  | 4              | 5             | 2:00  | N     |                           |      |       |
| 70 % alcohol   | 5              | 6             | 1:00  | N     |                           |      |       |
| Wash medium    | Wash station 1 | 7             | 2:00  | N     |                           |      |       |
| Hematoxylin    | 6              | 8             | 5:00  | Y     | 1                         | 5:00 | Y     |
| Wash medium    | Wash station 2 | 9             | 2:00  | N     | 2                         | 2:00 | N     |
| HCl alcohol    | 7              | 10            | 0:02  | Y     | 3                         | 0:02 | Y     |
| Wash medium    | Wash station 3 | 11            | 3:00  | N     | 4                         | 3:00 | N     |
| Scott's medium | 8              | 12            | 3:00  | Y     | 5                         | 3:00 | Y     |
| Wash medium    | Wash station 4 | 13            | 3:00  | N     | 6                         | 3:00 | N     |
| Eosin          | 14             | 14            | 2:00  | Y     |                           |      |       |
| 95 % alcohol   | 15             | 15            | 0:30  | Y     |                           |      |       |
| 100 % alcohol  | 16             | 16            | 2:00  | N     | 7                         | 2:00 | N     |
| 100 % alcohol  | 17             | 17            | 2:00  | N     | 8                         | 2:00 | N     |
| 100 % alcohol  | 18             | 18            | 2:00  | N     | 9                         | 2:00 | N     |
| Xylene         | Exit tank      | 19            |       |       | 10                        |      |       |



**11.4 Glossary**

|                          |  |
|--------------------------|--|
| <b>CURSOR</b>            | A flashing cursor appears on the LCD under the parameters that the user can change.  |
| <b>DISPLACEMENT</b>      | The amount of REAGENT transferred by the SPECIMEN SLIDE HOLDER from one STATION to another.  |
| <b>EXACT IMMERSION</b>   | The IMMERSION TIME is kept at 1 second, exactly as programmed.   |
| <b>EXIT DRAWER</b>       | Drawer into which the instrument inserts the SPECIMEN SLIDE HOLDER for subsequent removal by the user.   |
| <b>EXTRACTION</b>        | Noxious REAGENT vapors are extracted by a fan using a filter.  |
| <b>HEAD</b>              | see TRANSPORT ARM  |
| <b>HOOK ON</b>           | Process in which the TRANSPORT ARM gets hooked on the SPECIMEN SLIDE HOLDER before PICKING UP.   |
| <b>IMMERSION TIME</b>    | The time that a SPECIMEN SLIDE HOLDER stays in a reagent STATION. It counts the time from the end of the LOWERING to the beginning of the PICKUP.                            |
| <b>INCUBATION TIME</b>   | see IMMERSION TIME   |
| <b>INEXACT IMMERSION</b> | The IMMERSION TIME is reached as programmed or extended to ensure compatibility with other, exactly defined times.   |
| <b>LCD</b>               | The LCD on the control panel.  |
| <b>LEDs</b>              | Light emitting diodes on the control panel and on the LOAD DRAWERS and EXIT DRAWERS.   |
| <b>LOAD DRAWER</b>       | Drawer into which the user inserts the SPECIMEN SLIDE HOLDER and from which this is removed by the TRANSPORT ARM for STAINING.   |
| <b>LOWERING</b>          | The SPECIMEN SLIDE HOLDER is inserted into a STATION by the TRANSPORT ARM.   |
| <b>OVEN</b>              | STATION with warm air flowing through it to dry the SPECIMEN SLIDES so that the tissue sections adhere to them.  |
| <b>PC</b>                | IBM-compatible personal computer   |
| <b>PICKING UP</b>        | The SPECIMEN SLIDE HOLDER is removed from a STATION with the TRANSPORT ARM in such a way that only minimal REAGENT DISPLACEMENT takes place in the process.                  |
| <b>PROGRAM</b>           | Series of STEPS to which the SPECIMEN SLIDE HOLDER is subjected for STAINING in the instrument.  |
| <b>REAGENT</b>           | Chemicals used for STAINING.   |
| <b>REAGENT STATION</b>   | REAGENT-filled container, into which the SPECIMEN SLIDE HOLDERS are inserted.  |
| <b>SETUP</b>             | Parameter setting required for operating the instrument regardless of the program used, for example, the temperature of the OVEN and the number of UP/DOWN MOVEMENTS (DIPS). |
| <b>SOLVENT</b>           | Organic liquid, such as xylene and ethanol   |
| <b>SPECIMEN SLIDE</b>    | Specimen slides made of glass 25 x 75 x 1 mm   |

|                              |  |
|------------------------------|--|
| <b>SPECIMEN SLIDE HOLDER</b> | Frame on which the SPECIMEN SLIDES sit to make for easier handling with the instrument.  |
| <b>STAINING</b>              | The process in which the tissue sections are stained.  |
| <b>STATION</b>               | Part on the inside of the instrument, where part of the STAINING occurs.   |
| <b>STEP</b>                  | Defined by the STATION, IMMERSION TIME and time accuracy for a certain process in the STAINING process.  |
| <b>TRANSFER ARM</b>          | Device that moves in the x-, y- and z-directions for PICKING UP or LOWERING, MOVING UP/DOWN (DIPPING) and TRANSPORTING the SPECIMEN SLIDE HOLDERS from STATION to STATION. |
| <b>UNHOOK</b>                | Process in which the TRANSPORT ARM separates from the SPECIMEN SLIDE HOLDER after the LOWERING or after the IMMERSION PROCESSES.   |
| <b>UNLOADING</b>             | Removal of a SPECIMEN SLIDE HOLDER from the EXIT DRAWER or from a station in which the STAINING run is ended.  |
| <b>UP/DOWN MOVEMENT</b>      | The SPECIMEN SLIDE HOLDER is moved up and down (dipped) after being inserted into a REAGENT STATION. The number of up/down movements (dips) can be programmed.             |
| <b>UPS (battery backup)</b>  | Uninterruptible power supply that allows STAINING to continue during brief power failures.   |
| <b>WASH STATION</b>          | Container through which water flows to wash REAGENT from a SPECIMEN SLIDE HOLDER and the SPECIMEN SLIDES in it.  |



[www.LeicaBiosystems.com](http://www.LeicaBiosystems.com)



Leica Biosystems Nussloch GmbH  
Heidelberger Str. 17 - 19  
D-69226 Nussloch  
Germany

Tel.: +49 - (0) 6224 - 143 0  
Fax: +49 - (0) 6224 - 143 268  
Web: [www.LeicaBiosystems.com](http://www.LeicaBiosystems.com)