

Hematek[®] 3000 System

Instruction Manual

– Instructions for Use –

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Updating

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1.1	2013-09	Update
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1.3	2015-01	Update

Trademarks

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Disclaimer

Siemens Healthcare Diagnostics has validated the provided instructions, reagents, instrument, software and customizable features for this system to optimize product performance and meet product specifications. User defined modifications are not supported by Siemens as they may affect performance of the system and test results.



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Addendum to the instruction manual 1

1 Introduction

This chapter gives orientation tips for using this manual and information about service and warranty.

1.1 About this manual

This manual describes the use of the Hematek 3000 System in clinical laboratories.

1.2 Orientation tips

Bullets

Bullets indicate a list.

Example:

The box contains:

- Monitor
- Keyboard
- Manual

Numbers

Numbers indicate a procedure.

Example:

1. Open the box.
2. Check the content.
3. Read the manual.

The numbering is also used if the procedure includes only one step.

Arrow

An arrow indicates one or more results of an action.

Example:

1. Select **Print**. → The dialog **Print** opens.

Bold type

Bold type is used to put a special emphasis on something.

Example:

This process must **never** be canceled.

Gray note

Gray notes indicate important background information.

Example:

Note: Once the shift change has been activated, it cannot be interrupted.

1.3 Service

Siemens and its representatives are available to repair the system during customary local office hours. Should you require service at any other time, contact the Siemens service or your local Siemens representative. In the following, **Siemens service** refers to both, the Siemens service or any local representative authorized by Siemens. You will receive information about how to reach the Siemens service when the system is installed, or visit www.siemens.com/diagnostics to find contact information.

The scope of agreed service is included in your service contract.

1.4 Warranty

Siemens and its representatives guarantee that the system shows no defects during operation if installed and operated according to this manual. For more information about warranty, contact the Siemens service.

The warranty is not valid for damage that occurs as a consequence of non-observance of this manual.

Repairs and servicing must only be carried out by persons authorized by Siemens.

Only perform maintenance as described in this manual. Improper interventions on the system void the warranty and can result in service charges.

Only use the system as intended. If the system is not used as intended, Siemens disclaims all liability for damage to the system.

1.5 Ordering information

Use only original Siemens consumables, accessories and spare parts. Order these only from Siemens. For ordering information, see the Siemens product catalog or contact the Siemens service.

2 Safe handling

This chapter describes the intended use of the system and gives general safety instructions regarding the operation of the system.

2.1 Intended use

The Hematek slide stainer is a fully automated, bench-top hematology system for in vitro diagnostic use in the clinical laboratory. It automatically stains manually (or other method) prepared blood or bone marrow smears on standard glass microscope slides.

System functions

The system accepts, conveys, fixes, stains, and delivers dry blood or bone marrow smear preparations that are spread on standard thickness 25 mm x 75 mm or 1 in x 3 in glass slides. The glass slides are stained at the rate of one glass slide per minute.

Two conveyor spirals move the glass slides along the platen. Three sensing switches are triggered sequentially as the glass slides move along the platen. Each sensing switch activates its respective pump, which delivers the stain, buffer, or rinse into the capillary space between the glass slide and the platen. After the staining and rinsing processes have been completed, the glass slide is dried by a flow of air from a low velocity blower and it is then deposited in a slide drawer.

2.2 General safety information

The slide stainer has been inspected for technical safety before shipment. To maintain this status and to ensure hazard-free operation:

- Always follow the instructions in this manual.
- Only use the system as intended. If the system is not used as intended, Siemens disclaims all liability for any personal injury and property damage.
- Always follow good laboratory practice.
- Make sure the electrical and environmental conditions described in Chapter 9.3 are met.

The system must be operated as described in this manual. The quantity of freely accessible flammable liquid is limited to a maximum of 5 mL of methanol which can not cause the spread of fire.

2.2.1 Operator qualification

Risk of death and serious injury due to lack of knowledge. To avoid this hazard:

- The system must be operated only by persons whose skills, knowledge and practical experience qualify them to do so, and who have read and understood this manual.

2.2.2 Electrical safety

Risk of electric shock when contacting live parts. Even when the system is switched off, some components, for example, capacitors, can be live as they can still be electrically charged. Death or serious injury can result. To avoid this hazard:

- Connect the system only to a socket with a ground contact (earth).
- Use only correctly rated extension cables with sufficient power capacity and a protective conductor and ground contact.
- Never disconnect the ground contacts from the line.
- Never interrupt the protective conductor inside or outside the system.
- Never remove protective guards or fused components.
- Ensure that all surfaces, including the floor, are dry when using the system.
- Make sure that the power switch of the system is easily accessible.
- If the slide stainer needs to be opened before maintenance, repair or replacement work, switch off the slide stainer and disconnect it from all voltage sources as described in the relevant procedure.

Risk of short-circuit by spilled liquids that can come into contact with live parts. Damage to the system can result. To avoid this hazard:

- Never pour liquids or place containers with liquid on top of the system.
- Disconnect the main plug immediately if liquid is spilled in the system.

Risk of malfunctions in nearby electrical devices due to radio interference. The slide stainer complies with the emission and immunity requirements described in IEC 61326-2-6. The slide stainer has been designed and tested to CISPR 11 Class A. In a domestic environment, it can cause radio interference. To avoid this hazard:

- Assess the electromagnetic environment prior to operating the slide stainer.
- Use the cables supplied.

Risk of malfunctions of the slide stainer due to radio interference by other electrical devices. To avoid this hazard:

- Do not operate strong electromagnetic transmitters, for example, mobile phones, walkie-talkies, door openers, or elevators, in the vicinity of the slide stainer.

2.2.3 Mechanical safety

Risk of serious injury by moving parts. To avoid this hazard:

- Never open or remove the covers of the system during operation.
- Never bypass or remove safety devices, for example, cover switches.
- Keep clear of moving parts when the system is in operation. Long hair, necklaces, bracelets and similar objects can get caught in moving parts.

2.2.4 Operational safety

Risk of burns by combustion of flammable liquids. Death or serious injury can result. To avoid this hazard:

- Keep flammable liquids away from heat or open flame.
- Place the system in a well-ventilated area.

If a flammable liquid has been spilled, immediately take the following measures to prevent combustion:

- Eliminate all sources of ignition.
- Remove flammable liquid with a non-combustible absorbent material.
- Flush the stained area with water.
- Vent the room.

Explosion risk due to ignition caused by sparks generated by the system's switch contacts. Death or serious injury can result. To avoid this hazard:

- Never operate the system in an environment containing explosive mixtures of oxygen, hydrogen or other flammable gases.

Risk of property damage due to inaccurate handling of the system. Rough handling or dropping can disturb or damage internal components. Improper interventions on the system void the warranty and can result in service work having to be charged for. To avoid this hazard:

- Always handle the system with care.
- Switch off the system and secure it against accidental operation if there is visible damage to the system.
- Only carry out maintenance and repair work or replace parts as described in this manual.
- Only use Siemens spare parts.

2.2.5 Safe handling of glass slides and consumables

Risk of infection by potentially infectious material. Blood and bone marrow smears and parts of the system which have come into contact with this material are potentially infectious. Death or serious injury can result. To avoid this hazard:

- Wear appropriate personal protective equipment; that is, gloves, protective clothing, safety glasses and mask.
- Pay attention to the manufacturer's information regarding the gloves' compatibility with the materials and liquids used.
- Handle potentially infectious material in accordance with good laboratory practice, for example, as described in CLSI documents available at www.clsi.org.
- Avoid contact of the skin and mucosa with potentially infectious material.
- Check with local waste disposal authorities for specific requirements regarding potentially infectious material.

- Discard potentially infectious material according to laboratory standards and national and local standards and regulations.

Risk of very serious irreversible health effects by inhalation of or contact with methanol contained in the Hematek Stain Pak. Death or serious injury can result. To avoid this hazard:

- Keep the bottles in the Hematek Stain Pak closed.
- Refer to the Hematek Stain Pak labeling and to Material Safety Data Sheets for details concerning any special precautions related to the handling of Hematek Stain Paks. Material Safety Data Sheets are available from Siemens.

Risk of irritation of the skin and mucous membranes by cleaning agents. Minor or moderate injury can result. To avoid this hazard:

- Wear appropriate personal protective equipment; that is, gloves, protective clothing, safety glasses and mask.
- Pay attention to the manufacturer's information regarding the gloves' compatibility with the materials and liquids used.
- Follow all product manufacturer's warnings.

Risk of property damage and inaccurate processing of smeared glass slides due to inaccurate handling of consumables. To avoid this hazard:

- Use high quality glass slides.
- Do not use chipped or broken glass slides.
- Do not use glass slides of variable thicknesses.
- Do not use bevel-edged glass slides.
- Only use approved Siemens consumables.
- Do not use consumables after their expiry date.
- Be sure to read and observe any instructions for use that are supplied with the consumables.

Risk of pollution by improper waste disposal. Damage to the environment can result. To avoid this hazard:

- Discard glass slides, consumables, spare parts and liquid waste according to laboratory standards and national and local standards and regulations.
- Refer to the Hematek Stain Pak labeling and to Material Safety Data Sheets for details concerning any special precautions related to the disposal of Hematek Stain Paks. Material Safety Data Sheets are available from Siemens.

2.3 Safety messages

All safety messages must be observed to avoid hazardous situations which can result in death, injury or damage to the equipment.

2.3.1 Signal words in safety messages

The following explains the signal words and their meaning.




Signal word	Meaning
 DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury
 WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury
 CAUTION	Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury
NOTICE	Indicates a property damage message

Table 2-1 Signal words

2.3.2 Structure of safety messages

The following explains the structure of safety messages.

WARNING

This section states nature and source of the hazard.

This section states potential consequences of not avoiding the hazard. This section may be combined with the previous section.

- This section lists preventive actions to avoid the hazard.

2.4 Symbols on the slide stainer and consumables

This chapter describes the symbols used on the slide stainer and on the consumables used with the slide stainer.







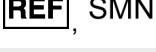












Symbol	Meaning
	Consult instructions for use
	Caution, consult accompanying documents
	In vitro diagnostic medical device
	CE mark
	Manufacturer
	Authorized representative in the European Community
	Catalog number
	Serial number
	Waste electrical and electronic equipment For more information, see Chapter 3.6.
	Power on
	Power off
	Stain is low
	Waste tank is full; Waste tank is removed
	Prime tubing
	Lock position of the pump tubing release knob
	Unlock position of the pump tubing release knob
	Stain
	Buffer
	Rinse

Table 2-2 Symbols on the slide stainer and consumables














Symbol	Meaning
	Biological hazard The labeled area can come into contact with potentially infectious material. The safety instructions regarding infectious material must be observed, see Chapter 2.2.5.
 , 	Content is toxic if swallowed, inhaled, or in contact with skin
 ,  , 	Content is flammable
	Content is harmful if swallowed, inhaled, or in contact with skin
	Batch code
	Use by
	Recycle the packaging
	Do not use if packaging has been damaged
	Temperature limitation
	This side up

Table 2-2 Symbols on the slide stainer and consumables (continued)

2.5 Statutory requirements

CE conformity

The slide stainer bears a CE mark which certifies that the slide stainer meets the essential requirements of the following European directives:

- In Vitro Diagnostic Medical Devices Directive 98/79/EC
- Directive on Waste Electrical and Electronic Equipment 2012/19/EU
- Directive on Restriction of Hazardous Substances 2011/65/EU

International standards

The slide stainer has been developed, tested, and manufactured in accordance with IEC 61010-2-101, ISO 14971, IEC 61326-2-6, and IEC 62366.

Electromagnetic compatibility (EMC), radio interference suppression and immunity to interference

The slide stainer has been tested in accordance with IEC 61326-2-6. The slide stainer corresponds to CISPR 11 Class A.

2.6 Obligations of the system owner

The system owner takes on the obligations arising from the national legislation about the operation of in vitro diagnostic medical devices.

3 Life cycle

This chapter describes the stages the system goes through, from delivery to disposal, and the requirements involved for the operator with each stage.

3.1 Delivery

3.1.1 Unpacking and checking the delivery

To unpack and check the delivery, proceed as follows:

1. Before opening, check the transport container for signs of external damage.
2. If the transport container shows any visible signs of damage, immediately file a complaint with the carrier.
3. Open the transport container.

CAUTION

The straps securing the foam packing are highly tensioned and can snap back when being cut

Minor or moderate injury can result.

- Use a suitable tool to cut the straps.
- Take special care while cutting the straps.

4. Carefully cut the straps securing the foam packing.
5. Remove all small single packages.
6. Remove the upper part of the foam packing.
7. Grasp the slide stainer from both sides under its frame where the foam packing is cut out.
8. Carefully remove the slide stainer by lifting it by its frame.
9. Remove the plastic bag from the slide stainer.
10. Retain the transport container, plastic bag, and foam packing. If the system needs to be transported, these will afford the best protection.
11. Check the content for completeness, see Chapter 3.1.2, and intact condition.
12. If anything is missing or damaged, inform the Siemens service immediately.

3.1.2 Scope of delivery

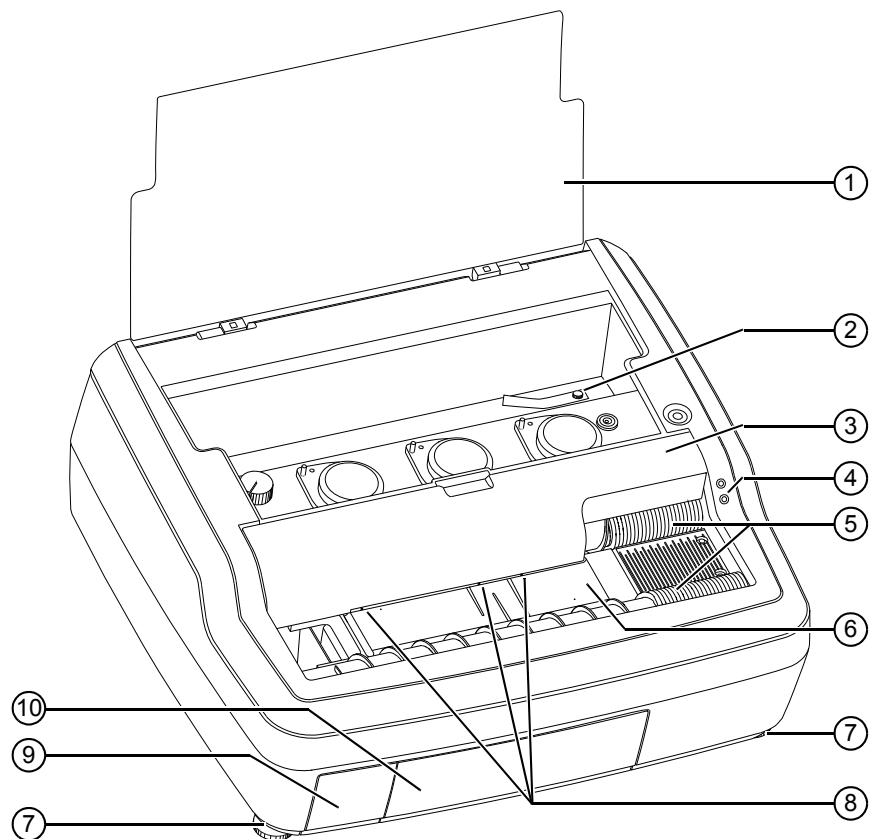
The delivery includes three separate packages with the following content:

- 1 Hematek 3000 slide stainer
- 1 Hematek Pump Tube Set
- 1 Hematek Cannula Set
- 1 Hematek 3000 System Instruction Manual (language-specific)
- 1 Power cord (country-specific)

Note: A Hematek Stain Pak is required for operation, but is not included in the delivery and must be ordered separately.

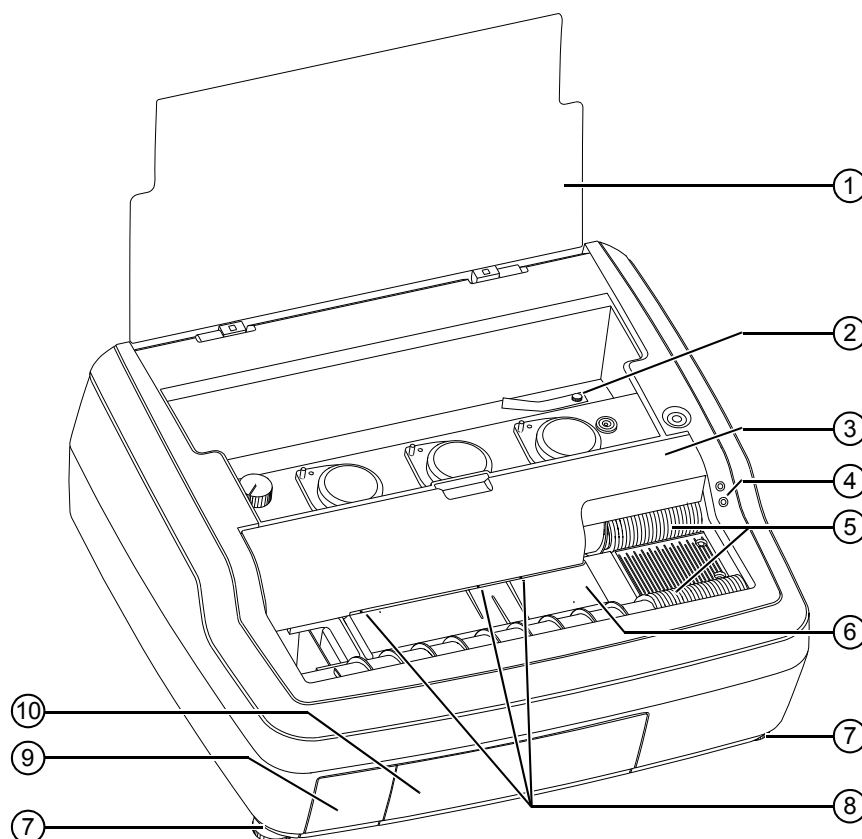
3.2 Installation

To install the system, proceed as follows:



- 1 Lid
- 2 Knurled thumb screw with cardboard strip
- 3 Middle cover
- 4 Red waste tank light
- 5 Conveyor spirals

Figure 3-1 Installing the system



- 6 Platen
- 7 Leveling feet
- 8 Sensing switch fingers
- 9 Slide drawer
- 10 Waste tank

Figure 3-1 Installing the system (continued)

1. Make sure that the electrical and environmental conditions are met, see *Electrical* on page 9-3 and *Environmental* on page 9-3.
2. Make sure that the inlet area for the blower type fan underneath the system is not blocked.
3. At the front of the system, remove the adhesive tape securing the slide drawer and waste tank.
4. At the top of the system, remove the two adhesive tapes securing the lid.
5. Open the lid.
6. In the pocket at the rear of the slide stainer, remove the knurled thumb screw together with the red cardboard strip.
7. Remove the middle cover from the system.
8. Remove the thin foam sheet from the system.

Remove transportation locks

Connect power source

9. Retain the knurled thumb screw and thin foam sheet together with the transport container. If the system needs to be transported, these will provide the best protection.

10. Set the middle cover back in place and close the lid.

11. On the rear side of the system, plug the power cord into the socket, see *Power module* on page 4-11.

12. Plug the power cord into a power outlet with a ground contact.

Level system

13. Level the system, see Chapter 8.2.

Start system

14. At the rear of the system, set the main switch to position I, see *Main switch* on page 4-11.

15. Start the system, see Chapter 5.1.

Check performance

16. Inspect the drying area for noticeable airflow, see *Platen* on page 4-8.

17. Make sure that the waste tank is properly installed, see *Waste tank* on page 4-6.

18. Make sure that the red waste tank light is off, see Figure 3-1.

19. Place five blank glass slides into the grooves of the conveyor spirals.

NOTICE

If glass slides are not placed correctly in the grooves of the conveyor spirals, this can cause them to break

Damage to the system can result.

- Glass slides must be inserted into the grooves of the conveyor spirals so they are parallel to the slide loading lines inscribed on the platen, see *Slide loading lines* on page 4-8.

20. Allow the glass slides to automatically feed onto the platen.

21. Make sure the leading edge of the glass slides comes into contact with and activates each of the three sensing switch fingers while moving along the platen. → As each sensing switch is activated, the appropriate pump activates after a specific time delay and the pump cap rotates.

Install pump tubing

22. Install the pump tubing, see Chapter 7.3.2.

Install underplaten tubing

23. Install the underplaten tubing, see Chapter 7.4.

Note: When first delivered by Siemens, the underplaten tubing is already installed.

Install Hematek Stain Pak

24. Install the Hematek Stain Pak, see Chapter 7.2.

Start system

25. Start the system, see Chapter 5.1.

26. Prime the pump tubing, see Chapter 5.2.

NOTICE

If glass slides are not placed correctly in the grooves of the conveyor spirals, this can cause them to break

Damage to the system can result.

- Glass slides must be inserted into the grooves of the conveyor spirals so they are parallel to the slide loading lines inscribed on the platen, see *Slide loading lines* on page 4-8.

27. Load some priming slides, see Chapter 5.4, step 2.

28. Check if the fluids flow evenly to the drain hole at the left-front corner of the platen during the staining process.

- If so: You can now load smeared glass slides, see Chapter 5.4.
- If not: Level the system, see Chapter 8.2.

3.3 Non-operation

To prepare the system for a longer period of non-operation, proceed as follows:

WARNING

The Hematek Stain Pak contains methanol. Risk of very serious irreversible effects through inhalation, in contact with skin, and if swallowed

Death or serious injury can result.

- Keep the containers of the Hematek Stain Pak tightly closed.
- Wear appropriate personal protective equipment; that is, gloves, protective clothing, safety glasses and mask.
- Pay attention to the manufacturer's information regarding the gloves' compatibility with the materials and liquids used.
- Avoid contact with eyes and skin.
- In case of contact with eyes or skin, immediately rinse the affected area with plenty of water for at least 15 minutes.
- In the event of an accident or if you feel unwell, seek medical advice immediately and show the label if possible.
- Refer to the Hematek Stain Pak labeling and to Material Safety Data Sheets for more information on first aid measures. Material Safety Data Sheets are available from Siemens.

WARNING

Risk of burns by combustion of flammable liquids. The Hematek Stain Pak contains methanol which is highly flammable.

Death or serious injury can result.

- Do not install and operate the system in the proximity of sources of ignition, for example, ovens, hot plates, burners, radiators, or open flames.
- Refer to the Hematek Stain Pak labeling and to Material Safety Data Sheets for details concerning any special precautions related to the handling of Hematek Stain Paks. Material Safety Data Sheets are available from Siemens.

⚠ WARNING**Infection by infectious smears on glass slides and parts of the system which have come into contact with this material**

Death or serious injury can result.

- Avoid contact with smears on glass slides and parts of the system which have come into contact with this material.
- Wear appropriate personal protective equipment; that is, gloves, protective clothing, safety glasses and mask.
- Handle smeared glass slides and parts of the system which have come into contact with this material in accordance with good laboratory practice.

NOTICE**Pollution by improper waste disposal**

Damage to the environment can result.

- Dispose of glass slides, consumables, spare parts and liquid waste according to laboratory standards and national and local standards and regulations.
- Refer to the Hematek Stain Pak labeling and to Material Safety Data Sheets for details concerning any special precautions related to the disposal of Hematek Stain Paks. Material Safety Data Sheets are available from Siemens.

Remove glass slides

1. Remove processed glass slides from the slide drawer. If glass slides are being processed, do not attempt to remove them from the platen. Allow the glass slides to complete processing by the system.

Remove pump tubing

2. Remove the pump tubing, see Chapter 7.3.1.
3. Dispose of the pump tubing and cannulas.

Remove Hematek Stain Pak

4. Lift the used Hematek Stain Pak out of the pocket at the rear of the system.
5. Dispose of the Hematek Stain Pak.

Remove underplaten tubing

6. Remove the underplaten tubing, see Chapter 7.4.1.
7. Dispose of the underplaten tubing.

Unplug system

8. At the rear of the system, set the main switch to position **O**, see *Main switch* on page 4-11.
9. At the rear of the system, unplug the power cord from the socket, see *Power module* on page 4-11.

Clean platen

10. Clean the platen, see Chapter 6.4.

Clean waste tank

11. Clean the waste tank, see Chapter 6.5.

Clean exterior surfaces

12. Clean the exterior surfaces, see Chapter 6.2.

3.4 De-installation

To de-install the system, proceed as follows:

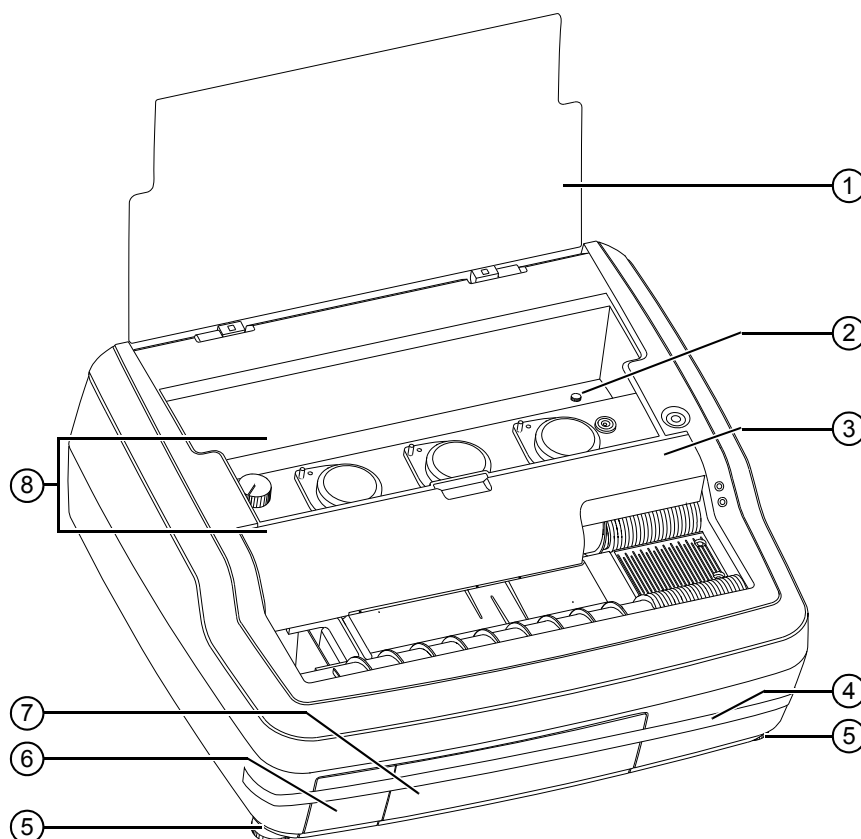
1. Prepare the system for non-operation, see Chapter 3.3.
2. If you want to store the system, make sure that the storage location meets the storage and transportation conditions, see *Environmental* on page 9-3.

3.5 Transport

To transport the system, proceed as follows:

1. Prepare the system for non-operation, see Chapter 3.3.
2. Screw the two leveling feet at the front all the way up.

Note: Always transport or ship the system in the transport container as the transport container will afford the best protection.



- 1 Lid
- 2 Knurled thumb screw
- 3 Middle cover
- 4 Adhesive tape
- 5 Leveling feet
- 6 Slide drawer
- 7 Waste tank
- 8 Pump assemblies

Figure 3-2 Preparing the system for transport

3. In the pocket at the rear of the slide stainer, screw in the knurled thumb screw retained with the transport container. If you have lost the knurled thumb screw, order from the current Siemens product catalog or contact the Siemens service
4. At the front of the system, apply adhesive tape to secure the waste tank and slide drawer as displayed in Figure 3-2.
5. Remove the middle cover from the system.
6. Place the thin foam sheet retained with the transport container over the pump assemblies.
7. Set the middle cover back in place securing the foam sheet and close the lid.

8. Apply adhesive tape securing the lid to the sides of the system.
9. Wrap the system in the plastic bag retained with the transport container.
10. Grasp the slide stainer from both sides under its frame and lift it carefully.
11. Place the slide stainer on the lower part of the foam packing in the transport container.
12. Set the upper part of the foam packing back in place.
13. Seal the transport container securely.

3.6 Disposal

In the European Union, disposal of the system is regulated by Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), and corresponding national transpositions.

Siemens is committed to taking back and recycling electrical and electronic equipment in areas where the above mentioned directive is enforced.

In areas where the above mentioned directive is not enforced, contact the Siemens service with regard to disposal of the system.

Depending on the applications, parts of the system may be contaminated with biohazardous or hazardous chemical material.

WARNING

Infection by contaminated material

Death or serious injury can result.

- Treat contaminated material according to national and local standards and regulations.
- Before transport or disposal, disinfect parts of the system that may be contaminated according to national and local standards and regulations.
- If you need assistance, contact the Siemens service.

NOTICE**Pollution by improper waste disposal**

Damage to the environment can result.

- Do not treat electrical and electronic equipment as unsorted municipal waste.
 - Check with your local waste disposal contractor for specific requirements regarding disposal.
 - Collect waste electrical and electronic equipment separately, and return them to Siemens in areas where the above mentioned directive is enforced.
-

To dispose of the system, proceed as follows:

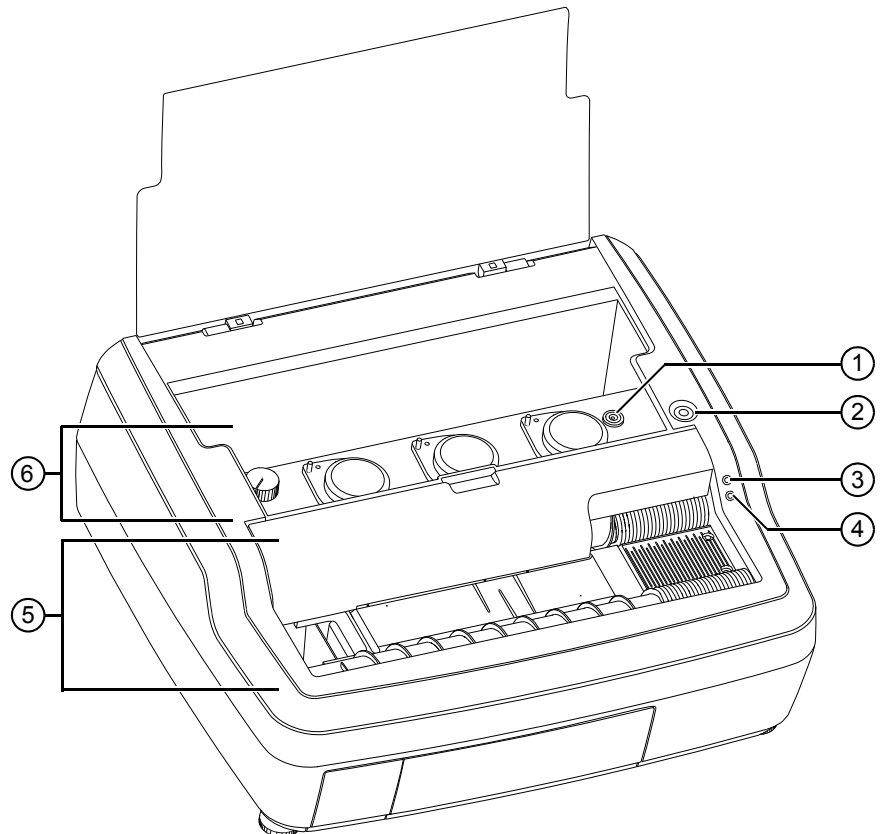
1. De-install the system, see Chapter 3.4.
2. Contact the Siemens service with regard to disposal of the system.
3. Dispose of the system according to national and local standards and regulations.

4 Description

This chapter describes the operation and the functions of the system.

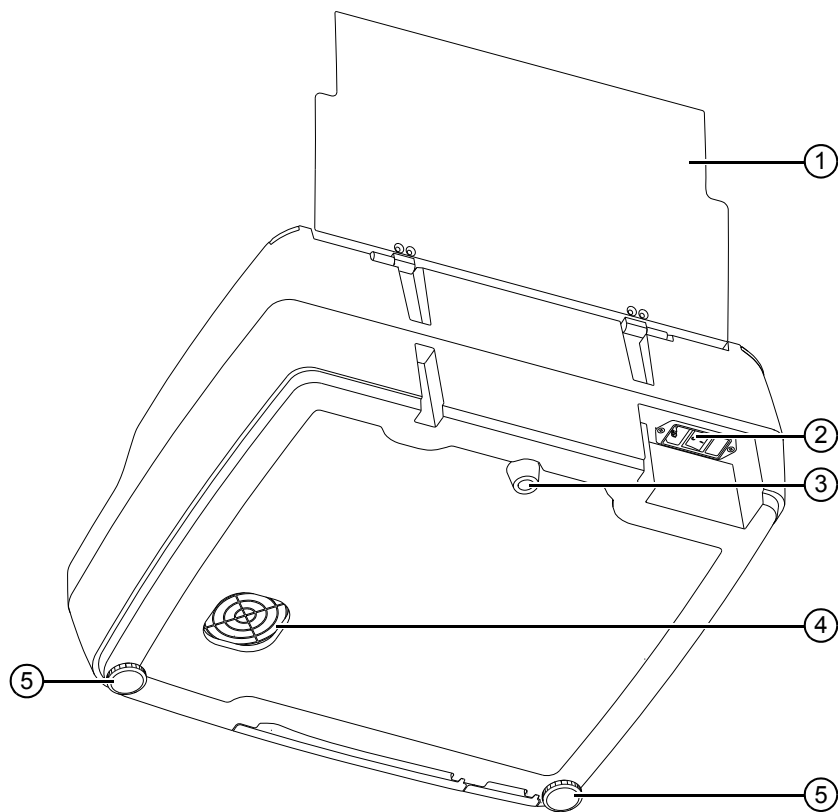
4.1 Slide stainer

The slide stainer is displayed in Figure 4-1 and Figure 4-2.



- 1 Circular bubble level
- 2 Power switch with green power light
- 3 Yellow low stain light
- 4 Red waste tank light
- 5 Slide transport components
- 6 Fluid delivery components

Figure 4-1 Front view of the slide stainer

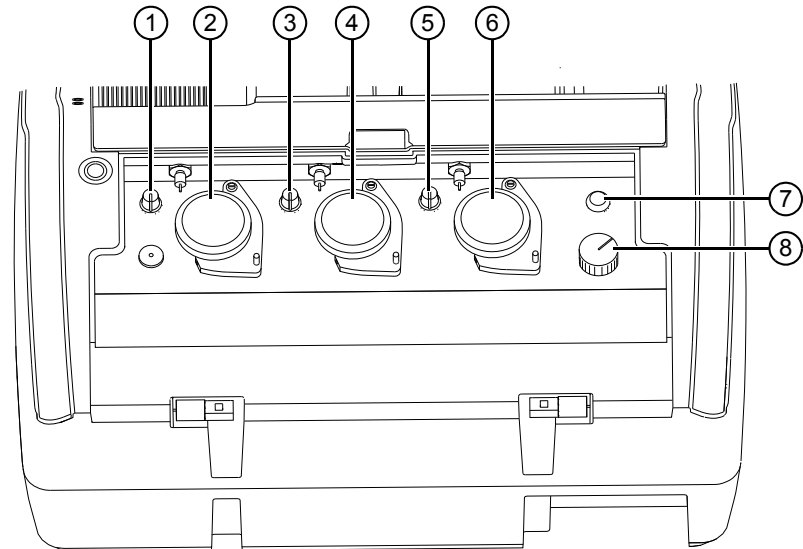


- 1 Lid
- 2 Power module
- 3 Fixed foot
- 4 Air inlet
- 5 Leveling feet

Figure 4-2 Rear view of the slide stainer

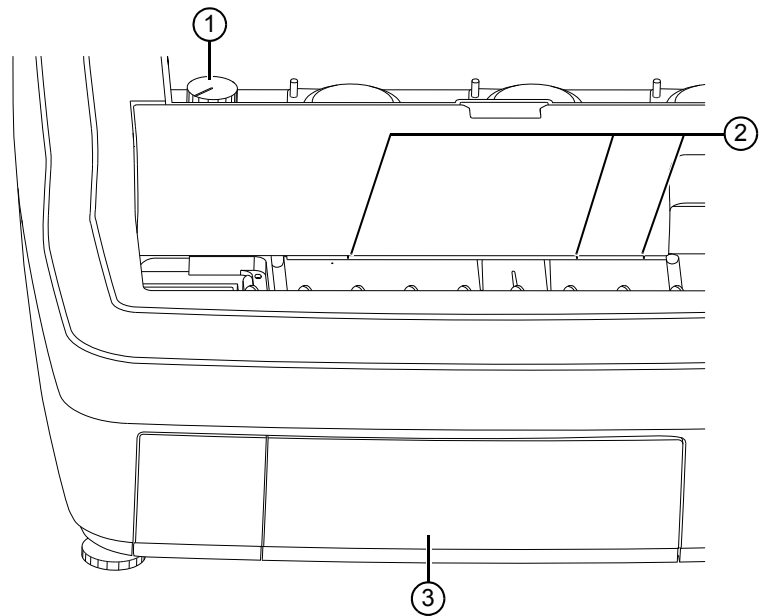
4.1.1 Fluid delivery components

The fluid delivery components are displayed in Figure 4-3 and Figure 4-4.



- 1 Stain adjustment knob
- 2 Stain pump assembly
- 3 Buffer adjustment knob
- 4 Buffer pump assembly
- 5 Rinse adjustment knob
- 6 Rinse pump assembly
- 7 Priming button
- 8 Pump tubing release knob

Figure 4-3 Fluid delivery components, rear view

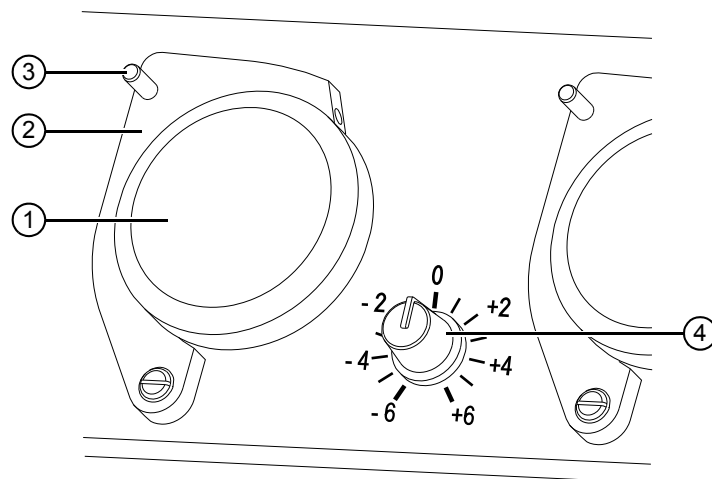


- 1 Pump tubing release knob
- 2 Sensing switch fingers
- 3 Waste tank

Figure 4-4 Fluid delivery components, front view

Pump assemblies and adjustment knobs

The slide stainer has three pump assemblies, one for each fluid. An adjustment knob that controls the rotating speed of the respective pump is located next to each pump assembly. An example pump assembly with its adjustment knob is displayed in Figure 4-5.



- 1 Pump cap
- 2 Pump arm
- 3 Pump arm handle
- 4 Adjustment knob

Figure 4-5 Pump assembly and adjustment knob, example

Each pump assembly consists of a pump motor and four rollers that are attached to the underside of a pump cap. A pump arm that presses the stain, buffer, or rinse tube against the pump is situated next to each pump assembly.

The volume of fluid delivered by each pump can be adjusted by turning the respective adjustment knob clockwise to increase the volume or counter-clockwise to decrease the volume. Each adjustment knob features a centering catch which provides a central reference point.

The stain-to-buffer ratio is adjustable to provide ratios of 1:2 to 1:3. This feature allows the user flexibility in obtaining the desired stain results. A small change in the stain-to-buffer ratio can result in either lighter or darker staining.

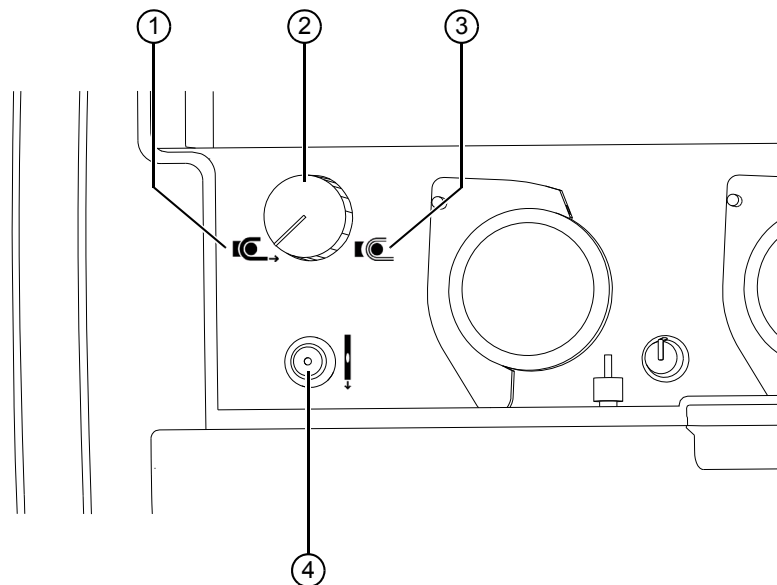
Volume increments are marked on each adjustment knob, see Table 4-1.

Adjustment knob	Value of volume increment
Stain	0.01 mL
Buffer	0.01 mL
Rinse	0.05 mL

Table 4-1 Volume increments on adjustment knobs

Priming button

The priming button is located on the left side of the system, see Figure 4-6.



- 1 Lock position of the pump tubing release knob
- 2 Pump tubing release knob
- 3 Unlock position of the pump tubing release knob
- 4 Priming button

Figure 4-6 Priming button and pump tubing release knob

When the priming button is pressed, the green light in the priming button goes on, the three pumps start rotating and fluid is delivered through the pump tubing as long as the pump tubing release knob is in the lock position, see *Pump tubing release knob* on page 4-6. When the priming button is pressed again, the green light in the priming button goes off and the three pumps stop rotating.

Priming of the pump tubing ensures that fluid is cleared of air bubbles.

Pump tubing release knob

The pump tubing release knob is located next to the priming button on the left side of the system, see Figure 4-6.

The pump tubing release knob has two positions:

- **Lock position:** The pump arms press the stain, buffer, and rinse tubes against the pumps.
- **Unlock position:** The pressure of the pump arms against the stain, buffer, and rinse tubes is released.

Sensing switch fingers

The sensing switch fingers are three finger-like devices located just above the rear edge of the platen.

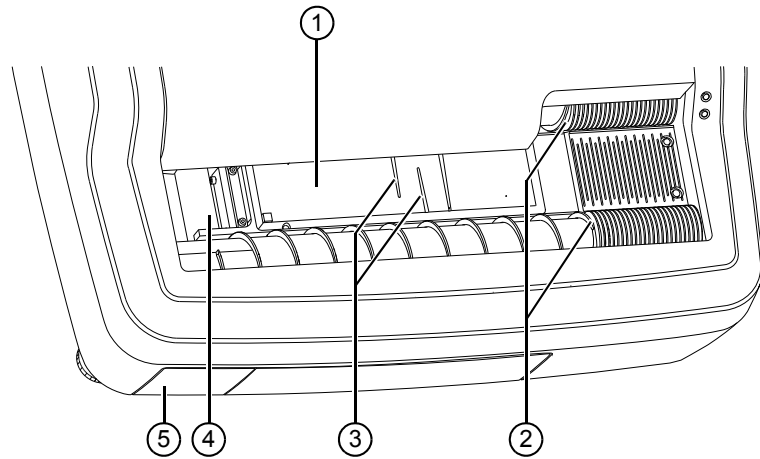
When a sensing switch finger is contacted, the respective sensing switch is activated, which signals that a glass slide is in position for the pump to run. After a specific time delay, the pump motor for the specific fluid is activated. The pumps are set so that precise volumes of stain, buffer, and rinse are delivered to their respective areas on the platen, see *Platen* on page 4-8. Each fluid is delivered through its respective cannula and tube to the platen orifice. The capillary space between the glass slide and the platen is then filled with the measured volume of fluid.

Waste tank

The waste tank is located underneath the platen and collects used and overflow fluids. The waste tank can be pulled out from the front of the slide stainer. When installed properly, the waste tank front is flush with the front plate of the slide stainer.

4.1.2 Slide transport components

The slide transport components are displayed in Figure 4-7.

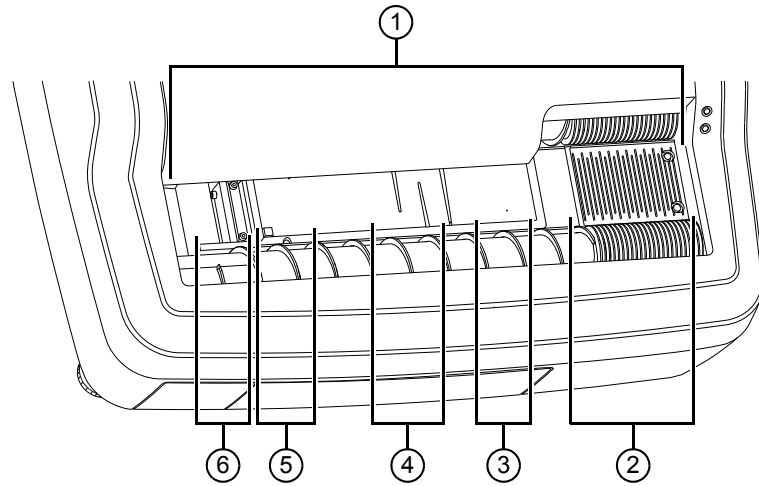


- 1 Platen
- 2 Conveyor spirals
- 3 Mixing grooves
- 4 Slide dryer
- 5 Slide drawer

Figure 4-7 Slide transport components

Platen

The platen spans the entire front of the slide stainer, between the conveyor spirals. The outside ridges of the platen are elevated guide rails, which provide support to the glass slides as they are moved along the platen. The functional areas of the platen are displayed in Figure 4-8.



- 1 Platen
- 2 Slide loading lines
- 3 Staining area
- 4 Mixing area
- 5 Rinsing area
- 6 Drying area

Figure 4-8 Functional areas of the platen

The functions of the platen are as follows:

- Maintaining the exact volumes of the required fluids within a capillary space between the platen and the glass slide.
- Providing a mixing system for the stain and buffer by way of two mixing grooves.
- Providing the necessary time interval after the rinsing for proper drying of the glass slides before they are deposited in the slide drawer.

A trough around the perimeter of the platen allows for drainage of used fluids into the waste tank below.

Slide loading lines

The slide loading lines are inscribed on the right side of the platen. They indicate the correct placing of the glass slides in the conveyor spirals.

Conveyor spirals

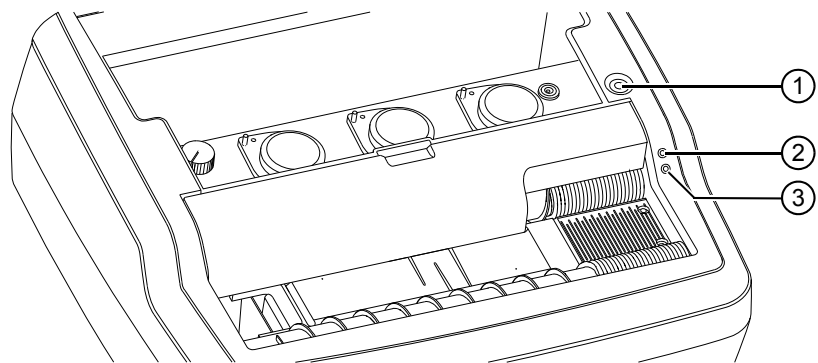
The conveyor spirals are two parallel spirals with opposing grooves. Glass slides to be stained are fitted separately into the opposing grooves, which move the glass slides across the platen.

Glass slides are moved by the conveyor spirals from right to left, first at the vertical plane, then at the horizontal plane with the blood smear facing downward toward the platen.

Mixing grooves	The two mixing grooves are located in the mixing area of the platen. As buffer is pumped onto the platen from the channel right of the mixing grooves, stain and buffer move around the mixing grooves and hence fully intermingle.
Slide dryer	The slide dryer is a blower type fan that runs continuously when the slide stainer is in operation. The airflow serves to cool the mechanical components inside the system, as well as to dry the glass slides.
Slide drawer	The slide drawer is located below the left end of the platen. It receives the glass slides as they drop from the platen after being stained, rinsed, and dried. The slide drawer holds approximately 65 glass slides and can be pulled from the front of the slide stainer. When installed properly, the slide drawer front is flush with the front plate of the slide stainer.

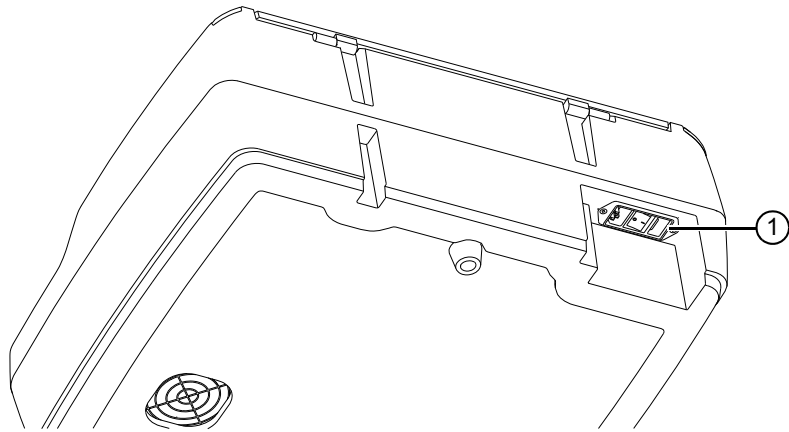
4.1.3 Electrical components

The electrical components of the slide stainer are displayed in Figure 4-9, Figure 4-10, and Figure 4-11.



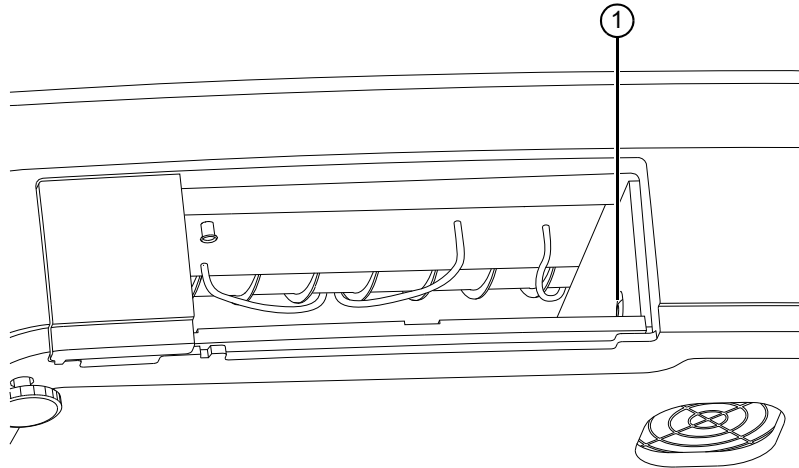
- 1 Power switch with green power light
- 2 Yellow low stain light
- 3 Red waste tank light

Figure 4-9 Electrical components of the slide stainer, front view



1 Power module

Figure 4-10 Electrical components of the slide stainer, rear view



1 Service button

Figure 4-11 Electrical components of the slide stainer, service button

Power switch with green power light

The power switch is located on top of the slide stainer, at the right side. When the main switch, see *Main switch* on page 4-11, is set to position I and the power switch is pressed, the green power light in the power switch goes on, the fan starts and the conveyor spirals slowly revolve. If the power switch is pressed again, the green power light in the power switch goes off, and the fan and the conveyor spirals stop.

Yellow low stain light

The yellow low stain light is located at the right side of the slide stainer, next to the rear conveyor spiral and above the red waste tank light. It is off under normal operating conditions.

When the Hematek Stain Pak is running low, a weight-sensing device activates the yellow low stain light. You can use the Hematek Stain Pak as long as no air bubbles appear in any of the pump tubes.

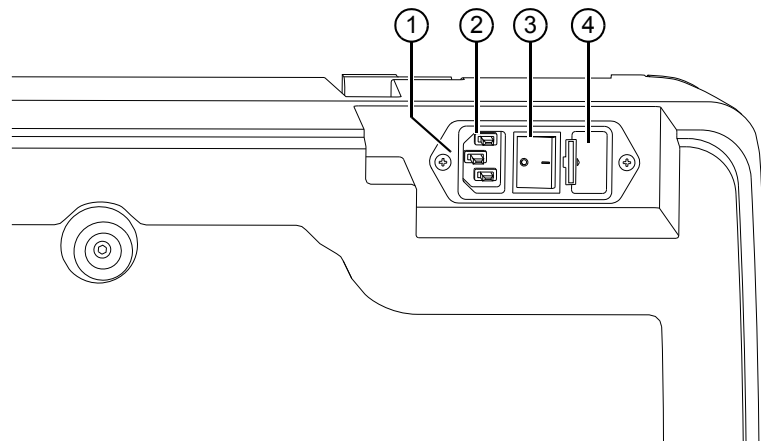
Red waste tank light

The red waste tank light is located at the right side of the slide stainer, next to the rear conveyor spiral and below the yellow low stain light. It is off under normal operating conditions.

A sensor activates the red waste tank light when the waste tank is full or removed from the slide stainer. The waste tank should be emptied and replaced.

Power module

The power module is located on the rear of the slide stainer. The power module is accessible from underneath and is displayed in Figure 4-12.



- 1 Power module
- 2 Socket
- 3 Main switch
- 4 Line fuse compartment

Figure 4-12 Power module

The power module converts the line current coming into the system to 24 V direct current, which is the voltage within the system.

Main switch

The main switch is located at the rear of the system and is accessible from underneath. The main switch has two positions:

- Position **I**: The power module is connected to power.
- Position **O**: The power module is disconnected from power.

Service button

The service button is located on the right side of the waste tank area and is accessible after the removal of the waste tank. When the waste tank is removed, a switch stops the pumps to prevent further draining of used fluids. However, pressing the service button when the waste tank is removed re-activates the pumps and allows fluid to be delivered to check the stain-to-buffer ratio.

4.1.4 Leveling components

Circular bubble level

The circular bubble level is located on top of the system, at the right side next to the stain pump assembly. The circular bubble level is a water bubble gauge with an inscribed circle that can be observed through the lid. It is used to ensure the slide stainer is in a level position.

Leveling feet

The two feet under the front corners of the system act as levelers and can be adjusted to raise or lower the slide stainer to a level position. Observe the circular bubble level to verify that the leveling feet have been properly adjusted and the system is level.

The third foot at the rear is fixed.

4.1.5 Lid

The lid covers the rear part of the slide stainer including the Hematek Stain Pak.

4.2 Consumables and spare parts

This section lists the consumables and spare parts for the slide stainer. For more details, for example, order numbers, refer to the current Siemens product catalog or contact the Siemens service.

Instructions for using the consumables are given in the respective procedures in this manual.

4.2.1 Hematek Stain Pak - Modified Wright's Stain

A Hematek Stain Pak - Modified Wright's Stain is displayed in Figure 4-13.

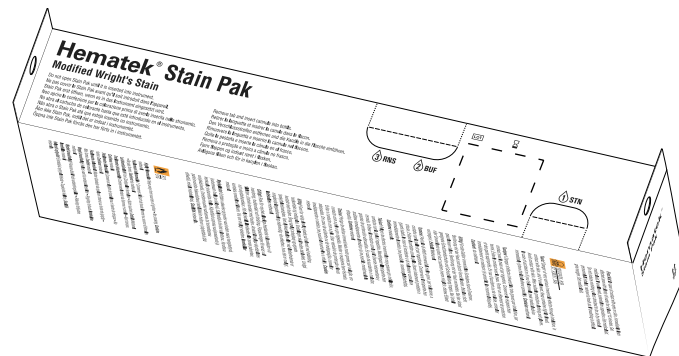


Figure 4-13 Hematek Stain Pak - Modified Wright's Stain

The Hematek Stain Pak - Modified Wright's Stain contains a polychrome methylene blue-eosin stain and specially prepared buffer and rinse. The Hematek Stain Pak is contained in a single carton that fits easily into the pocket at the rear of the slide stainer and requires no additional preparation and opening. Each Hematek Stain Pak contains sufficient fluids to stain approximately 750 to 1000 glass slides depending on the user-defined settings for rotating speed of the pumps, which will determine stain usage.

4.2.2 Hematek Stain Pak - Wright-Giemsa Stain

A Hematek Stain Pak - Wright-Giemsa Stain is displayed in Figure 4-14.

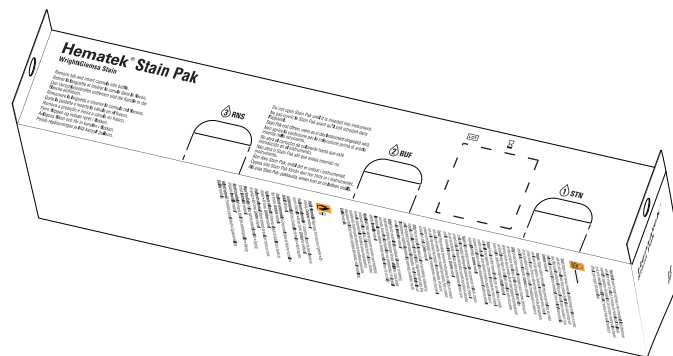


Figure 4-14 Hematek Stain Pak - Wright-Giemsa Stain

The Hematek Stain Pak - Wright-Giemsa Stain contains a modified polychrome methylene blue-eosin stain based on the original stain proposed by Romanowsky. Also supplied are buffer and rinse. The Hematek Stain Pak is contained in a single carton that fits easily into the pocket at the rear of the slide stainer and requires no additional preparation and opening. Each Hematek Stain Pak contains sufficient fluids to stain approximately 750 to 1000 glass slides depending on the user-defined settings for rotating speed of the pumps, which will determine stain usage.

4.2.3 Hematek Cannula Set

A cannula is displayed in Figure 4-15.

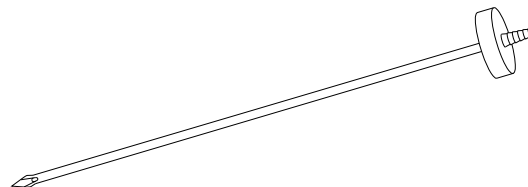


Figure 4-15 Cannula

The Hematek Cannula Set contains three cannulas. The cannulas are inserted into the Hematek Stain Pak bottles and connected to the stain, buffer, or rinse tubes.

4.2.4 Hematek Pump Tube Set

A pump tube is displayed in Figure 4-16.

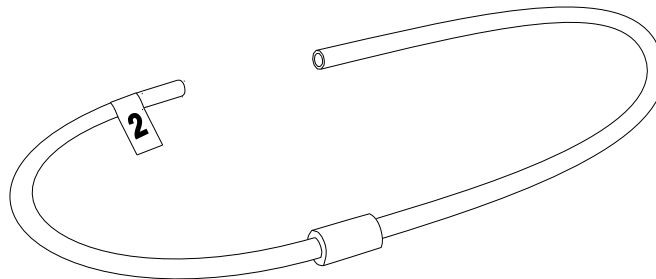


Figure 4-16 Pump tube

The Hematek Pump Tube Set consists of three tubes, each labeled with an identifying number specific to the fluid carried by the tube:

- 1 for stain
- 2 for buffer
- 3 for rinse

Each tube has a clear plastic cuff that fits snugly up to the pump arm and holds the tube in position to prevent slippage. Each tube is a specific diameter and length to ensure precise measurement of the fluids. The tubes are made of a special type of rubber that is resistant to leaching and brittleness.

4.2.5 Hematek Underplaten Tubing Set

An underplaten tube is displayed in Figure 4-17.

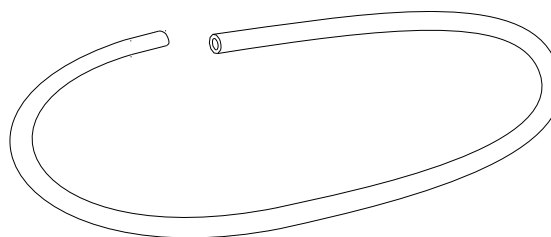


Figure 4-17 Underplaten tube

The Hematek Underplaten Tubing Set consists of three underplaten tubes of equal diameter and length.

4.2.6 Glass slides

A glass slide is displayed in Figure 4-18.

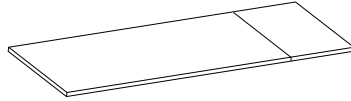


Figure 4-18 Glass slide

The dimensions of the glass slides are 75mm x 25mm x 1mm (L x W x H).

4.2.7 Line fuses

A line fuse is displayed in Figure 4-19.

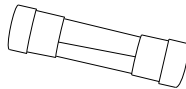


Figure 4-19 Line fuse

Two line fuses are inserted into the fuse compartment. Each line fuse is a 1 A, 5 mm x 20 mm, Type T, fuse.

4.2.8 Knurled thumb screw

A knurled thumb screw is displayed in Figure 4-20.

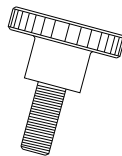


Figure 4-20 Knurled thumb screw

The knurled thumb screw secures the support plate within the pocket at the rear of the system during transport. The knurled thumb screw has an M5x12 thread.

5 Operating

This chapter describes how to operate the system, from starting the system to switching off the system.

5.1 Starting the system

To start the system, proceed as follows:

1. Inspect the waste tank and slide drawer for proper positioning below the platen. Each should be pushed completely into its respective cavity in the front of the system.
2. Check the system for correct leveling, see Chapter 8.2.
3. On top of the system, at the right side, press the power switch. → The green power light in the power switch goes on, the fan starts and the conveyor spirals slowly revolve.
4. At the right side of the system, check which of the lights is on.
 - If the yellow low stain light is on: Go to Chapter 7.2.
 - If the red waste tank light is on: Go to Chapter 6.5.
 - If the green power light in the power switch is on: Go to Chapter 5.2.

5.2 Priming the pump tubing

To prime the pump tubing, proceed as follows:

NOTICE

Air bubbles remain in the pump tubing due to insufficient or interrupted priming

Staining of the smeared glass slides can be of inadequate quality.

- Prime the pump tubing before staining smeared glass slides.
- Do not stop priming before the pump tubing is free of air bubbles.

1. Start the system, see Chapter 5.1.
2. Left of the pump assemblies, turn the pump tubing release knob to the lock position, see Chapter 4.1.1.
3. Left of the pump assemblies, press the priming button, see Chapter 4.1.1. → The green light in the priming button goes on and the pumps start rotating.
4. Wait until the stain, buffer, and rinse all flow evenly through their tubes to the platen without any air bubbles.

5. If the pump tubing does not prime easily, pinch the tubes several times with your fingers in the area between the cannula and the pump. Otherwise skip this step.
6. Press the priming button. → The green light in the priming button goes off and the pumps stop rotating.

NOTICE

Damage to or incorrect positioning of the sensing switch fingers can result from not following recommended cleaning practices

System can fail and staining of the smeared glass slides can be of inadequate quality.

- Always wipe the platen from right to left.

7. Wipe the platen with a dry, soft, disposable, lint-free, absorbent cloth or tissue from right to left.

5.3 Preparing priming slides

To prepare priming slides, proceed as follows:

1. Mark four blank glass slides as priming slides, for example, label them with the word **Prime**, using a permanent marker.
2. Process the priming slides every time before you start staining smeared glass slides.
3. After staining, wipe the stained side of the priming slides clean with a dry, soft, disposable, lint-free, absorbent cloth or tissue.
4. Store the priming slides for re-use.

5.4 Loading smeared glass slides

To load smeared glass slides, proceed as follows:

WARNING

Infection by infectious smears on glass slides

Death or serious injury can result.

- Avoid contact with smears on glass slides.
- Wear appropriate personal protective equipment; that is, gloves, protective clothing, safety glasses and mask.
- Handle smeared glass slides in accordance with good laboratory practice.

1. Prime the pump tubing, see Chapter 5.2. → The pump tubing is free of air bubbles.

NOTICE

If glass slides are not placed correctly in the grooves of the conveyor spirals, this can cause them to break

Damage to the system can result.

- Glass slides must be inserted into the grooves of the conveyor spirals so they are parallel to the slide loading lines inscribed on the platen, see *Slide loading lines* on page 4-8.

2. Load four priming slides, see Chapter 5.3, into the grooves of the conveyor spirals with the marked side facing in the opposite direction of conveyance. → The system primes the platen and performs the staining.
3. Check if the capillary gap between the priming slides and the platen is properly filled with stain, buffer, and rinse during the staining of the priming slides. Little patches in the corners could remain dry.
 - If so: Go to step 4.
 - If not: Go to Chapter 8.5.
4. Load the smeared glass slides into the grooves of the conveyor spirals with the smeared side facing in the direction of conveyance and the feathered edge of the smear toward the rear of the system. → The system performs the staining.
5. During staining, check if fluids overflow the glass slides or if fluids do not moisten the glass slides properly. Little patches in the corners could remain dry.
 - If so: Go to Chapter 8.5.2.
 - If not: Proceed as follows.

If no glass slides are to be processed for one hour or more, proceed with the following steps, otherwise go to step 9.
6. Clean the stain tube and cannula, see Chapter 6.3.
7. Left of the pump assemblies, turn the pump tubing release knob to the unlock position, see Chapter 4.1.1.

8. Before processing more glass slides, prime the pump tubing, see Chapter 5.2.

CAUTION

Injury to fingers and hands by broken glass slides

Minor or moderate injury can result.

- Wear appropriate protective equipment.
- Handle smeared glass slides in accordance with good laboratory practice.

9. Remove processed glass slides from the slide drawer. If glass slides are being processed, do not attempt to remove them from the platen. Allow the glass slides to complete processing by the system.

Note: Bone marrow smears must be stained twice when using the Hematek Stain Pak - Modified Wright's Stain. One pass through the system is generally insufficient to produce distinct nuclear intensity. A third pass generally does not increase or decrease the quality of the staining.

A single staining process is generally sufficient for most bone marrow smears when using the Hematek Stain Pak - Wright-Giemsa Stain. The smear can become over-stained on glass slides stained two or more times, with the appearance of precipitate and nuclear artifacts.

5.5 Switching off the system

To switch off the system, proceed as follows:

1. Clean the pump tubing and cannulas, see Chapter 6.3.
2. Clean the waste tank, see Chapter 6.5.
3. Clean the platen, see Chapter 6.4.
4. Left of the pump assemblies, turn the pump tubing release knob to the unlock position, see Chapter 4.1.1.
5. On top of the system, at the right side, press the power switch. → The green power light in the power switch goes off, and the fan and the conveyor spirals stop.

6 Cleaning

This chapter describes how to clean the system.

WARNING

Risk of very serious irreversible effects through inhalation of methanol, through contact with skin, and if methanol is swallowed

Death or serious injury can result.

- Wear appropriate personal protective equipment; that is, gloves, protective clothing, safety glasses and mask.
- Pay attention to the manufacturer's information regarding the gloves' compatibility with the materials and liquids used.
- Avoid contact with eyes and skin.
- In case of contact with eyes or skin, immediately rinse the affected area with plenty of water for at least 15 minutes.
- In the event of an accident or if you feel unwell, seek medical advice immediately.
- Refer to the Material Safety Data Sheet of the product containing methanol for more information on first aid measures.

WARNING

Risk of burns by combustion of flammable liquids. Methanol is highly flammable.

Death or serious injury can result.

- Do not use methanol in the proximity of sources of ignition, for example, ovens, hot plates, burners, radiators, or open flames.
- Refer to Material Safety Data Sheet of the product containing methanol for details concerning any special precautions related to the handling of methanol.

6.1 Periodic cleaning

Periodic cleaning actions are listed in Table 6-1.

Interval	Action	See
Daily, end of shift, or if necessary	Clean exterior surfaces	Chapter 6.2
Daily, end of shift	Clean stain tube and cannula	Chapter 6.3
Daily, end of shift, or if no glass slides are to be processed for one hour or more	Clean platen	Chapter 6.4
Daily, end of shift, or after installing a new Hematek Stain Pak	Clean waste tank	Chapter 6.5
Weekly	Clean drain troughs and rear guide rail	Chapter 6.6

Table 6-1 Periodic cleaning list

6.2 Cleaning the exterior surfaces

To clean the exterior surfaces of the system, proceed as follows:

CAUTION

Cleaning agents can be harmful or irritating to your skin, eyes, etc.

- Wear appropriate personal protective equipment; that is, gloves, protective clothing, safety glasses and mask.
- Pay attention to the manufacturer's information regarding the gloves' compatibility with the materials and liquids used.
- Follow all product manufacturer's warnings.

1. Wipe the exterior surfaces of the system with a damp, soft, disposable, lint-free, absorbent cloth or tissue and mild cleaning agent.
2. Use a small amount of methanol to clean stain from the exterior surfaces.

6.3 Cleaning the stain tube and cannula

To clean the stain tube and cannula, proceed as follows:

Remove cannulas

1. Remove the stain, buffer, and rinse cannulas from the Hematek Stain Pak bottles.

Note: The buffer and rinse cannulas and tubes do not require cleaning. These cannulas are removed so the buffer and rinse are not wasted while the stain tube and cannula are being cleaned.

- Rinse stain tube and cannula**
2. Place the stain cannula, with stain tube attached, into a small container with approximately 5 mL of methanol.
 3. Left of the pump assemblies, press the priming button, see Chapter 4.1.1. → The green light in the priming button goes on and the pumps start rotating.
 4. When the container of methanol is empty and the fluid that appears on the platen is clean, press the priming button. → The green light in the priming button goes off and the pumps stop rotating.

- Empty stain tube and cannula**
5. Remove the stain cannula from the container of methanol and place it on a clean cloth or tissue.
 6. Left of the pump assemblies, press the priming button, see Chapter 4.1.1. → The green light in the priming button goes on and the pumps start rotating.
 7. Wait until no more methanol appears on the platen.
 8. Press the priming button. → The green light in the priming button goes off and the pumps stop rotating.

NOTICE

Damage to or incorrect positioning of the sensing switch fingers can result from not following recommended cleaning practices

System can fail and staining of the smeared glass slides can be of inadequate quality.

- Always wipe the platen from right to left.

- Clean platen**
9. Wipe the platen with a soft, disposable, lint-free, absorbent cloth or tissue soaked with methanol from right to left.

- Switch off system**
10. Left of the pump assemblies, turn the pump tubing release knob to the unlock position, see Chapter 4.1.1.
 11. On top of the system, at the right side, press the power switch. → The green power light in the power switch goes off, and the fan and the conveyor spirals stop.

6.4 Cleaning the platen

To clean the platen, proceed as follows:

NOTICE

Breakage of glass slides due to stained front rail of the platen

If using frosted-end glass slides, the stain can spread across the frosted portion of the glass slide to the front rail. If allowed to accumulate, this can cause the glass slides to break. Damage to the system can result.

- Clean the platen after daily use.
- Clean the front guide rail, especially if using frosted-end glass slides.

After staining a large number of blood smears, precipitated stain tends to accumulate in the mixing grooves of the platen. Cleaning is especially important if bone marrow slides have been stained because the fat droplets can leave a greasy residue on the platen.

Clean the platen after daily use or if no glass slides are to be processed for one hour or more.

1. On top of the system, at the right side, press the power switch. → The green power light in the power switch goes off, and the fan and the conveyor spirals stop.

NOTICE

Damage to or incorrect positioning of the sensing switch fingers can result from not following recommended cleaning practices

System can fail and staining of the smeared glass slides can be of inadequate quality.

- Always wipe the platen from right to left.

2. Wipe the platen with a soft, disposable, lint-free, absorbent cloth or tissue soaked with methanol from right to left.
3. Thoroughly clean the mixing grooves and the front guide rail with a cotton bud.

6.5 Cleaning the waste tank

To clean the waste tank, proceed as follows:

WARNING

The content of the waste tank contains methanol. Risk of very serious irreversible effects through inhalation, in contact with skin, and if swallowed

Death or serious injury can result.

- Wear appropriate personal protective equipment; that is, gloves, protective clothing, safety glasses and mask.
- Pay attention to the manufacturer's information regarding the gloves' compatibility with the materials and liquids used.
- Avoid contact with eyes and skin.
- In case of contact with eyes or skin, immediately rinse the affected area with plenty of water for at least 15 minutes.
- In the event of an accident or if you feel unwell, seek medical advice immediately and show the label if possible.
- Refer to the Hematek Stain Pak labeling and to Material Safety Data Sheets for more information on first aid measures. Material Safety Data Sheets are available from Siemens.

WARNING

Risk of burns by combustion of flammable liquids. The content of the waste tank contains methanol which is highly flammable.

Death or serious injury can result.

- Do not dispose of waste fluid in the proximity of sources of ignition, for example, ovens, hot plates, burners, radiators, or open flames.
- Refer to the Hematek Stain Pak labeling and to Material Safety Data Sheets for details concerning any special precautions related to the handling of Hematek Stain Pak fluids. Material Safety Data Sheets are available from Siemens.

⚠ WARNING**Infection by potentially infectious fluids and parts of the system which have come into contact with this material**

Death or serious injury can result.

- Avoid contact with potentially infectious fluids and parts of the system which have come into contact with this material.
- Wear appropriate personal protective equipment; that is, gloves, protective clothing, safety glasses and mask.
- Handle potentially infectious fluids and parts of the system which have come into contact with this material in accordance with good laboratory practice.

NOTICE**Pollution by improper waste disposal**

Damage to the environment can result

- Dispose of liquid waste according to laboratory standards and national and local standards and regulations.
- Refer to the Hematek Stain Pak labeling and to Material Safety Data Sheets for details concerning any special precautions related to the disposal of Hematek Stain Pak fluids. Material Safety Data Sheets are available from Siemens.

1. Carefully pull the waste tank away from the system, supporting the bottom of the waste tank to hold it level. → The red waste tank light goes on.
2. Dispose of the fluid in the waste tank through the opening in the corner.
3. Rinse the waste tank with water.
4. Dispose of the fluid in the waste tank through the opening in the corner.
5. Reinstall the waste tank into the system. → The red waste tank light goes off.

6.6 Cleaning the drain troughs and the rear guide rail

To clean the drain troughs and the rear guide rail of the platen, proceed as follows:

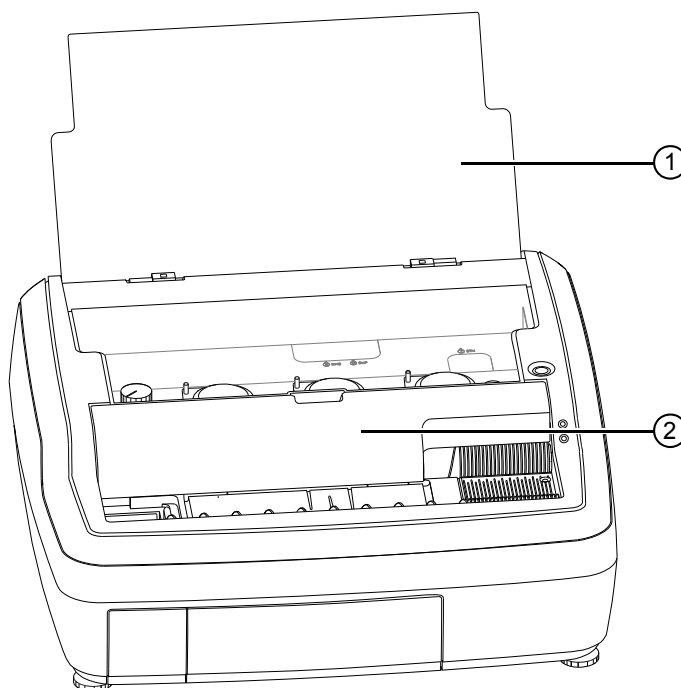
Switch off system

1. On top of the system, at the right side, press the power switch. → The green power light in the power switch goes off, and the fan and the conveyor spirals stop.

Remove middle cover

2. Raise the lid.

- Remove the middle cover from the system, see Figure 6-1. → The rear trough and guide rail are completely exposed and easily accessible.



- Lid
- Middle cover

Figure 6-1 Removing the middle cover

Clean drain troughs and rear guide rail

- Wet a cotton swab thoroughly with methanol.

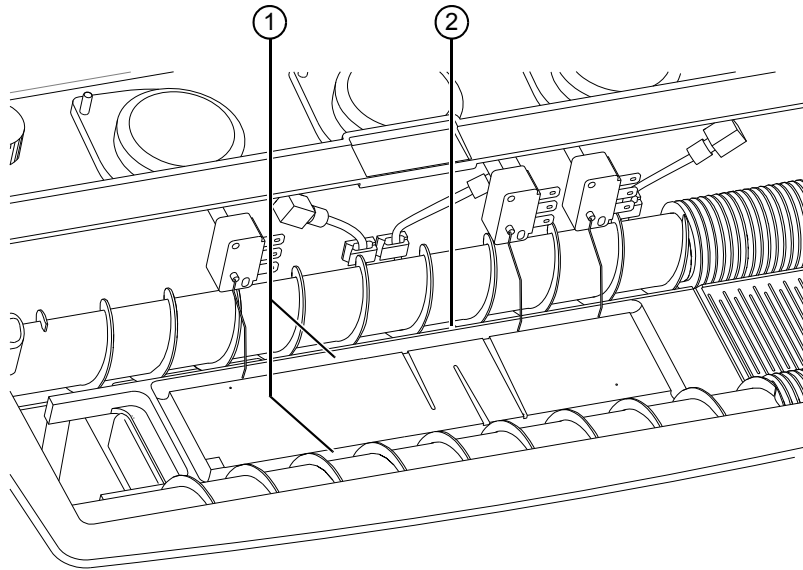
NOTICE

Damage to or incorrect positioning of the sensing switch fingers can result from not following recommended cleaning practices

System can fail and staining of the smeared glass slides can be of inadequate quality.

- Always wipe the platen from right to left.

5. Wipe from right to left along the length of the drain troughs and the rear guide rail with the cotton swab to remove the entire excess residue, see Figure 6-2.



- 1 Drain troughs
- 2 Rear guide rail

Figure 6-2 Cleaning the drain troughs and rear guide rail

Set middle cover back in place

6. Clean other exposed areas that might be accidentally stained.
7. Set the middle cover back in place.
8. Close the lid.

7 Performing maintenance

This chapter describes how to perform maintenance and replacement work.

7.1 Periodic maintenance

Periodic maintenance actions are listed in Table 7-1.

Interval	Action	See
After three Hematek Stain Paks have been used	Replace pump tubing	Chapter 7.3
After ten Hematek Stain Paks have been used	Replace underplaten tubing	Chapter 7.4

Table 7-1 Periodic maintenance list

7.2 Installing the Hematek Stain Pak

You will need:

- 1 new Hematek Stain Pak

WARNING

The Hematek Stain Pak contains methanol. Risk of very serious irreversible effects through inhalation, in contact with skin, and if swallowed

Death or serious injury can result.

- Keep the containers of the Hematek Stain Pak tightly closed.
- Wear appropriate personal protective equipment; that is, gloves, protective clothing, safety glasses and mask.
- Pay attention to the manufacturer's information regarding the gloves' compatibility with the materials and liquids used.
- Avoid contact with eyes and skin.
- In case of contact with eyes or skin, immediately rinse the affected area with plenty of water for at least 15 minutes.
- In the event of an accident or if you feel unwell, seek medical advice immediately and show the label if possible.
- Refer to the Hematek Stain Pak labeling and to Material Safety Data Sheets for more information on first aid measures. Material Safety Data Sheets are available from Siemens.


WARNING

Risk of burns by combustion of flammable liquids. The Hematek Stain Pak contains methanol which is highly flammable.

Death or serious injury can result.

- Do not install and operate the system in the proximity of sources of ignition, for example, ovens, hot plates, burners, radiators, or open flames.
- Refer to the Hematek Stain Pak labeling and to Material Safety Data Sheets for details concerning any special precautions related to the handling of Hematek Stain Paks. Material Safety Data Sheets are available from Siemens.

To install the Hematek Stain Pak, proceed as follows:

1. Raise the lid.
2. Check if another Hematek Stain Pak is already installed.
 - If so: Go to step 3.
 - If not: Go to step 5.
- Remove used Hematek Stain Pak** 3. Remove the three cannulas from the used Hematek Stain Pak.
4. Lift the used Hematek Stain Pak out of the pocket at the rear of the system.
- Insert new Hematek Stain Pak** 5. Remove the perforated tabs from the new Hematek Stain Pak carton.
6. Insert the new Hematek Stain Pak, with the stain bottle  to the right, into the pocket at the rear of the system.
7. Make sure the carton is all the way down and resting on the tray at the bottom of the pocket. The carton should be level when properly installed.
- Replace cannulas** 8. Check if the cannulas appear damaged or bent.
 - If so: Replace the cannulas, see Chapter 7.3.2, step 3 to step 4.
 - If not: Go to step 9.
- Insert cannulas** 9. Insert the appropriate cannula into its respective bottle by puncturing the center of the indentation in the visible corner of the bottle.
- Vent bottles** 10. Remove the cannula, turn it 1/4 turn, and insert it again into the same puncture. The double puncture creates a slightly larger hole for venting.
11. Decide if you want to have additional venting.
 - If so: Go to step 12.
 - If not: Go to step 13.

12. With the cannula, make a second hole in the top of the bottle, near the indentation.
13. Push the cannula down through the first puncture until the guard at the top touches the plastic container.
14. Repeat step 9 to step 13 for each bottle.
15. Prime the pump tubing, see Chapter 5.2.
16. Close the lid.
17. Clean the waste tank, see Chapter 6.5.
18. Load four priming slides, see Chapter 5.3.

You can now load smeared glass slides, see Chapter 5.4.

7.3 Replacing the pump tubing

The pump tubing is the tubing between the cannulas and the nipples on the rear of the middle panel.

7.3.1 Removing the pump tubing

You will need:

- Disposable, absorbent cloth

To remove the pump tubing, proceed as follows:

WARNING

Risk of very serious irreversible effects through inhalation of methanol, through contact with skin, and if methanol is swallowed

Death or serious injury can result.

- Wear appropriate personal protective equipment; that is, gloves, protective clothing, safety glasses and mask.
- Pay attention to the manufacturer's information regarding the gloves' compatibility with the materials and liquids used.
- Avoid contact with eyes and skin.
- In case of contact with eyes or skin, immediately rinse the affected area with plenty of water for at least 15 minutes.
- In the event of an accident or if you feel unwell, seek medical advice immediately.
- Refer to Material Safety Data Sheets of the product containing methanol for more information on first aid measures.

WARNING

Risk of burns by combustion of flammable liquids. Methanol is highly flammable.

Death or serious injury can result.

- Do not use methanol in the proximity of sources of ignition, for example, ovens, hot plates, burners, radiators, or open flames.
- Refer to Material Safety Data Sheets of the product containing methanol for details concerning any special precautions related to the handling of methanol.

NOTICE

Pollution by improper waste disposal

Damage to the environment can result

- Dispose of glass slides, consumables, spare parts and liquid waste according to laboratory standards and national and local standards and regulations.

Empty pump tubing

1. Raise the lid.
2. Remove the three cannulas from the Hematek Stain Pak.
3. Place the tips of the cannulas on a disposable, absorbent cloth to soak up fluids.
4. Left of the pump assemblies, press the priming button, see Chapter 4.1.1. → The green light in the priming button goes on and the pumps start rotating.
5. Wait until the fluids are pumped out of the stain, buffer, and rinse tubes.

NOTICE

Damage to or incorrect positioning of the sensing switch fingers can result from not following recommended cleaning practices

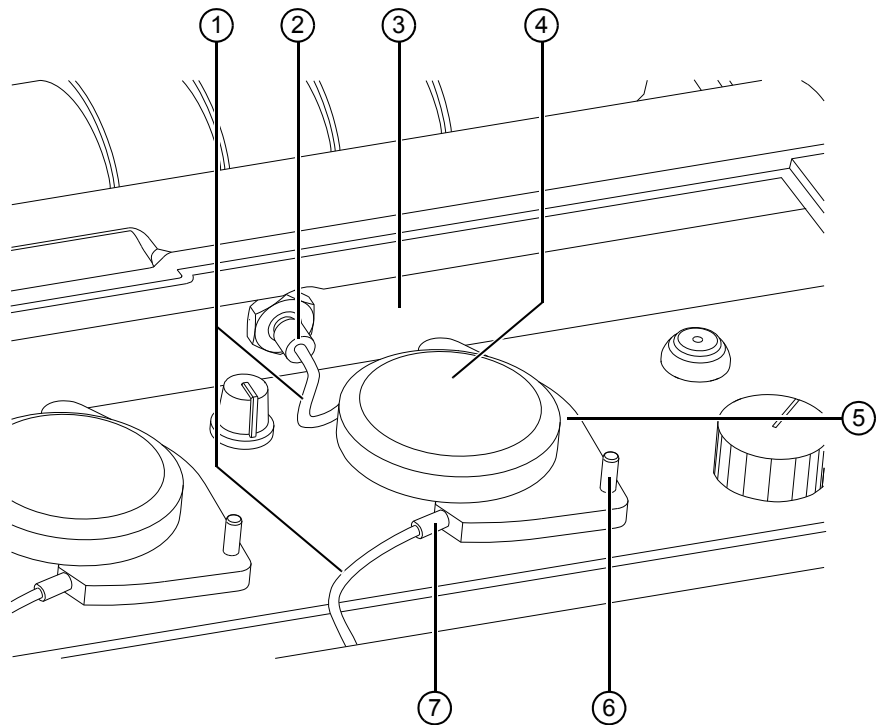
System can fail and staining of the smeared glass slides can be of inadequate quality.

- Always wipe the platen from right to left.

6. Wipe the platen with a dry, soft, disposable, lint-free, absorbent cloth or tissue from right to left.
7. Press the priming button again. → The green light in the priming button goes off and the pumps stop rotating.

Remove pump tubing

8. Dispose of the disposable, absorbent cloths.
9. Left of the pump assemblies, turn the pump tubing release knob to the unlock position, see Chapter 4.1.1.
10. Disconnect each tube from its cannula.
11. On the rear of the middle panel, disconnect the tube from the nipple. An example pump assembly is displayed in Figure 7-1.



- 1 Tube
- 2 Nipple
- 3 Middle panel
- 4 Pump assembly
- 5 Pump arm
- 6 Pump arm handle
- 7 Plastic cuff

Figure 7-1 Removing the pump tubing, rear view

12. Push the pump arm handle away from the pump assembly as far as possible.
13. Hold the pump arm handle in this position and pull the plastic cuff from the pump arm until the tube is completely removed.
14. Execute step 11 to step 13 for each tube.
15. If you want to prepare the system for non-operation, close the lid, otherwise skip this step.

16. If you want to install a new Hematek Pump Tube Set, go to Chapter 7.3.2.

7.3.2 Installing the pump tubing

You will need:

- 1 new Hematek Pump Tube Set
- Optional: 1 new Hematek Cannula Set

To install the pump tubing, proceed as follows:

1. Remove the three tubes from their packaging. Each tube is identified with a number, which corresponds to the fluid carried by the tube:

- **1** for stain
- **2** for buffer
- **3** for rinse

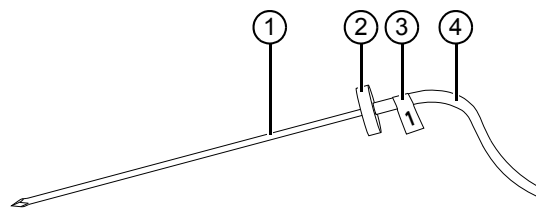
2. Raise the lid.

3. Check if the cannulas appear damaged or bent.

- If so: Go to step 4.
- If not: Go to step 5.

4. Replace all cannulas that appear damaged or bent with new ones. If you are installing the pump tubing for the first time, skip this step.

5. Connect the labeled end of each tube to the short end of a cannula, see Figure 7-2.



- 1 Cannula
- 2 Guard
- 3 Label
- 4 Tube

Figure 7-2 Connecting tubes to cannulas

Note: If you are re-using any cannulas, make sure the cannula previously used for stain is used only with the stain tube.

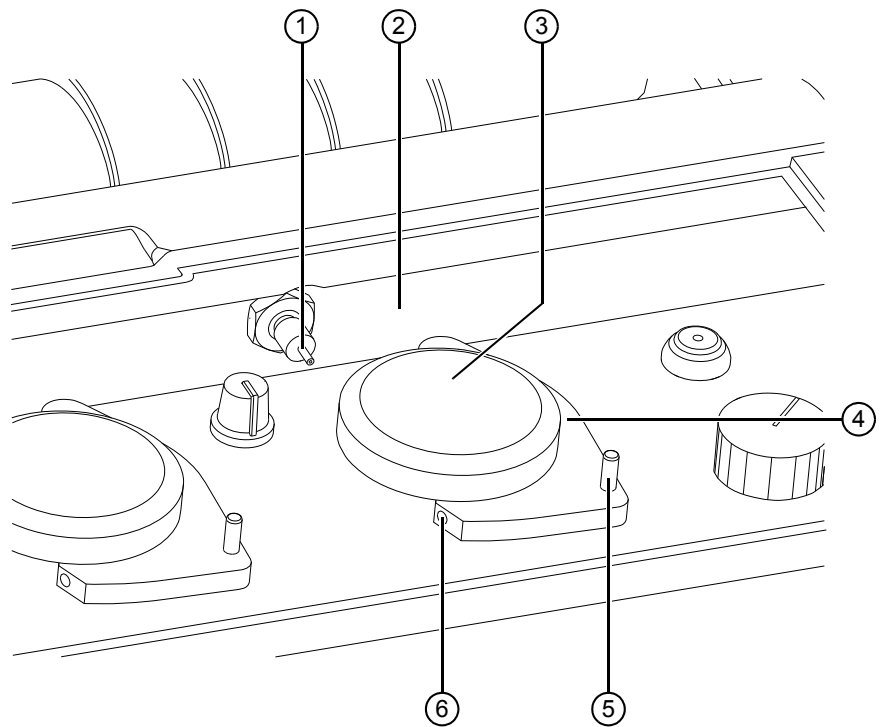
Replace cannulas

Connect tubes to cannulas

6. Make sure that you push each tube until it is flush against the guard of the cannula.

Thread tubes through pump arms

7. Left of the pump assemblies, turn the pump tubing release knob to the unlock position, see Chapter 4.1.1.
8. Extend each new tube to its respective pump assembly (in numerical order from right to left).
9. Push the pump arm handle away from the pump assembly as far as possible, see Figure 7-3.



- 1 Nipple
- 2 Middle panel
- 3 Pump assembly
- 4 Pump arm
- 5 Pump arm handle
- 6 Hole in the pump arm

Figure 7-3 Installing the pump tubing, rear view

10. Thread the free end of the tube into the hole in the pump arm.
11. Push the tube through the hole in the pump arm until the plastic cuff is flush against the pump arm.
12. Release the pump arm handle.

Connect tubes to nipples

13. On the rear of the middle panel, connect the tube to its proper nipple.

14. Make sure that at least 7 mm (1/4 in) of the tube is connected to the nipple.
15. Execute step 9 to step 14 for each tube.
16. Left of the pump assemblies, turn the pump tubing release knob to the lock position, see Chapter 4.1.1.

Insert cannulas into bottles

17. Insert the appropriate cannula into its respective bottle in the Hematek Stain Pak by puncturing the center of the indentation in the visible corner of the bottle.

Vent bottles

18. Remove the cannula, turn it 1/4 turn, and insert it again into the same puncture. The double puncture creates a slightly larger hole for venting.
19. Push the cannula down until the guard at the top touches the plastic container.
20. Decide if you want to have additional venting.
 - If so: Go to step 21.
 - If not: Go to step 24.
21. Remove the cannula.
22. With the cannula, make a second hole in the top of the bottle, near the indentation.
23. Set the cannula back in the puncture within the indentation of the bottle.
24. Repeat step 17 to step 23 for each bottle.
25. Close the lid.

Prepare staining

26. Prime the pump tubing, see Chapter 5.2.
27. Load four priming slides, see Chapter 5.3.
28. Check if the capillary gap between the priming slides and the platen is properly filled with stain, buffer, and rinse during the staining of the priming slides. Little patches in the corners could remain dry.
 - If so: You can now load smeared glass slides, see Chapter 5.4.
 - If not: Go to Chapter 8.5.1.

7.4 Replacing the underplaten tubing

The underplaten tubing is the tubing between the spouts under the platen and the nipples on the front side of the middle panel.

7.4.1 Removing the underplaten tubing

To remove the underplaten tubing, proceed as follows:

 **WARNING****Risk of very serious irreversible effects through inhalation of methanol, through contact with skin, and if methanol is swallowed**

Death or serious injury can result.

- Wear appropriate personal protective equipment; that is, gloves, protective clothing, safety glasses and mask.
- Pay attention to the manufacturer's information regarding the gloves' compatibility with the materials and liquids used.
- Avoid contact with eyes and skin.
- In case of contact with eyes or skin, immediately rinse the affected area with plenty of water for at least 15 minutes.
- In the event of an accident or if you feel unwell, seek medical advice immediately.
- Refer to the Material Safety Data Sheet of the product containing methanol for more information on first aid measures.

 **WARNING****Risk of burns by combustion of flammable liquids. Methanol is highly flammable.**

Death or serious injury can result.

- Do not use methanol in the proximity of sources of ignition, for example, ovens, hot plates, burners, radiators, or open flames.
- Refer to Material Safety Data Sheets of the product containing methanol for details concerning any special precautions related to the handling of methanol.

NOTICE**Pollution by improper waste disposal**

Damage to the environment can result.

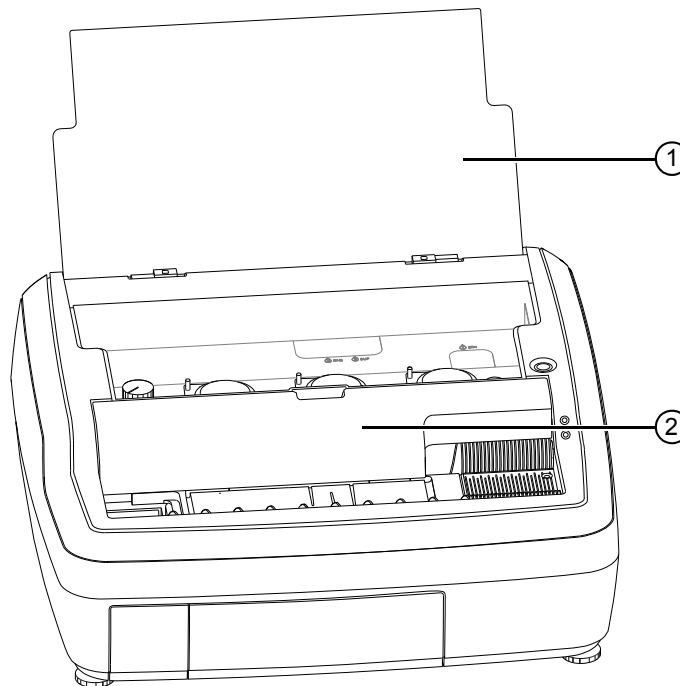
- Dispose of glass slides, consumables, spare parts and liquid waste according to laboratory standards and national and local standards and regulations.

Empty underplaten tubing

1. Raise the lid.
2. Remove the three cannulas from the Hematek Stain Pak.
3. Place the tips of the cannulas on a disposable, absorbent cloth to soak up fluids.
4. Left of the pump assemblies, press the priming button, see Chapter 4.1.1. → The green light in the priming button goes on and the pumps start rotating.
5. Wait until the pump tubes are empty and no more fluid accumulates on the platen.
6. Press the priming button again. → The green light in the priming button goes off and the pumps stop rotating.
7. Dispose of the disposable, absorbent cloth.

Remove middle cover

8. On top of the system, at the right side, press the power switch. → The green power light in the power switch goes off, and the fan and the conveyor spirals stop.
9. Remove the middle cover from the system, see Figure 7-4.

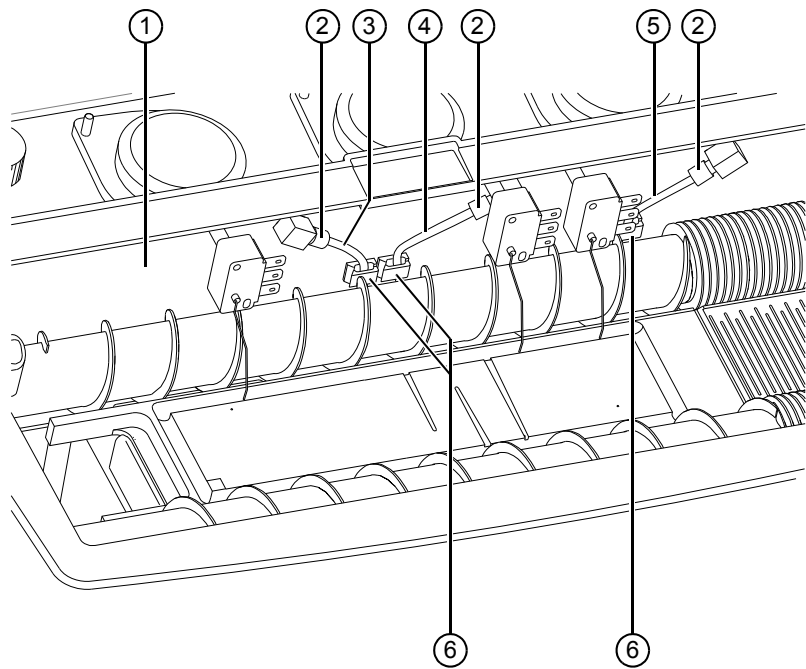


- 1 Lid
2 Middle cover

Figure 7-4 Removing the middle cover

Disconnect underplaten tubing

10. On the middle panel, disconnect the rinse, buffer, and stain tubes from the nipples.

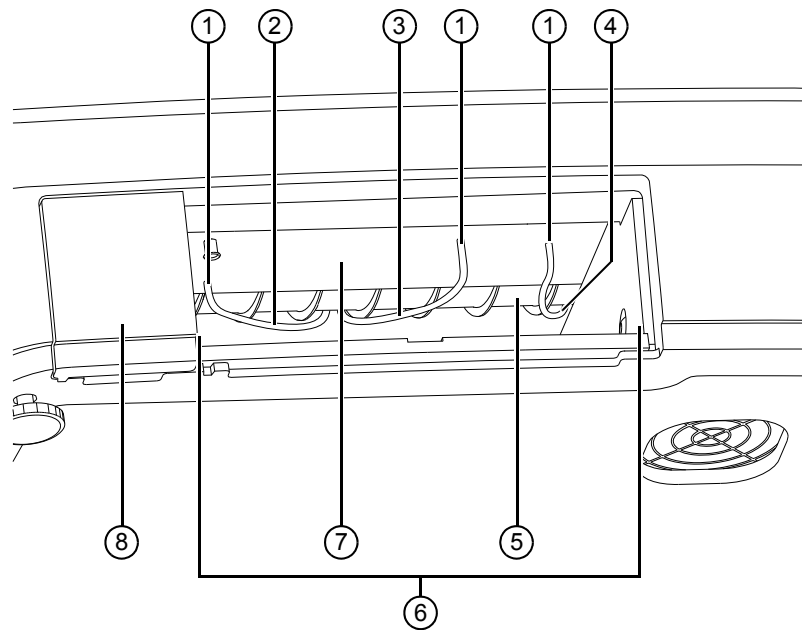


- 1 Middle panel
- 2 Nipples
- 3 Rinse tube
- 4 Buffer tube
- 5 Stain tube
- 6 Tube clamps

Figure 7-5 Disconnecting the underplaten tubing from the nipples

- 11. Open the tube clamps.
- 12. Remove the tubes from the tube clamps.
- 13. Remove and clean the waste tank, see Chapter 6.5.

14. Reach underneath the platen through the waste tank area, see Figure 7-6.



- 1 Spouts
- 2 Rinse tube
- 3 Buffer tube
- 4 Stain tube
- 5 Rear conveyor spiral
- 6 Waste tank area
- 7 Platen
- 8 Slide drawer

Figure 7-6 Waste tank area, bottom view

- 15. Pull the rinse, buffer, and stain tubes free from behind the rear conveyor spiral.
- 16. Disconnect the tubes from the spouts under the platen.
- 17. Dispose of the tubes.
- 18. If you want to install a new Hematek Underplaten Tubing Set, go to Chapter 7.4.2, otherwise set the waste tank back in place.

7.4.2 Installing the underplaten tubing

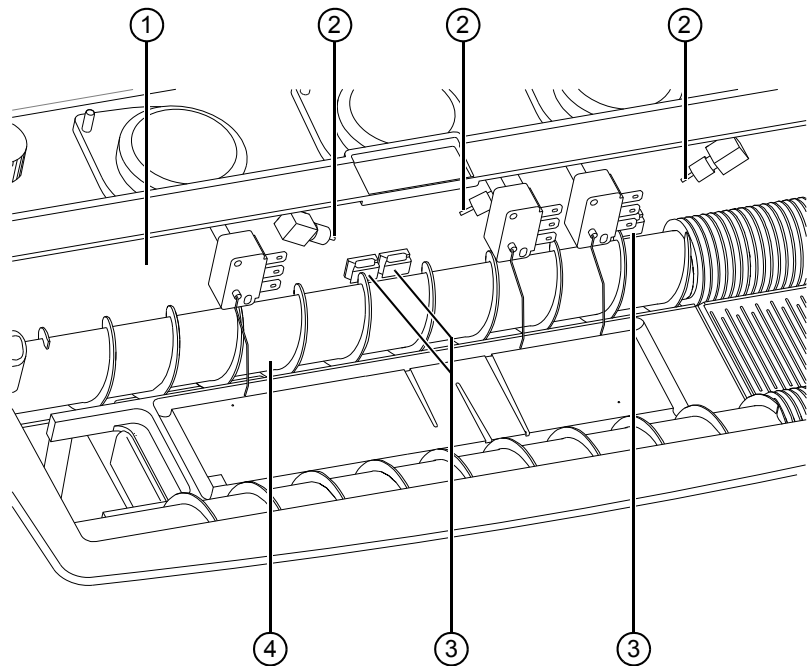
You will need:

- 1 new Hematek Underplaten Tubing Set

To install the underplaten tubing, proceed as follows:

Connect tubes to nipples

1. On the middle panel, connect one of the new tubes of the underplaten tubing to each nipple.



- 1 Middle panel
- 2 Nipples
- 3 Tube clamps
- 4 Rear conveyor spiral

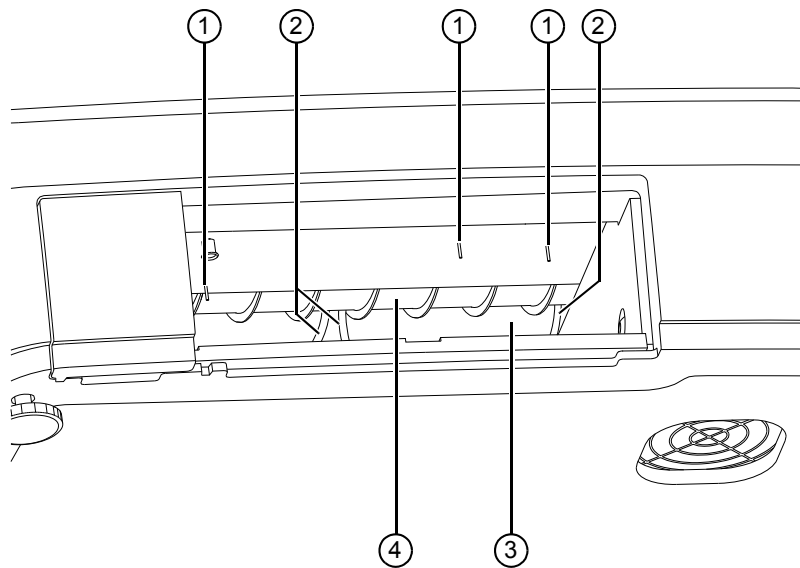
Figure 7-7 Connecting the underplaten tubing to the nipples

2. Make sure that at least 7 mm (1/4 in) of each tube is connected to a nipple.

Insert tubes into tube clamps

3. Open the tube clamps.
4. Insert the tubes into the tube clamps.
5. Close the tube clamps.

- Thread each tube between the middle panel and the rear conveyor spiral until it extends under the platen, see Figure 7-8.



- Spouts
- Tubes
- Middle panel
- Rear conveyor spiral

Figure 7-8 Connecting the underplaten tubing to the spouts

Connect tubes to spouts

- Connect the tubes to the spouts under the platen. The tube connected to the right nipple must lead to the right spout. The tube connected to the middle nipple must lead to the middle spout. The tube connected to the left nipple must lead to the left spout.
- Check all connections to make sure the underplaten tubing is securely in place.

- Set the waste tank back in place.

Set middle cover back in place

- Set the middle cover back in place.
- Close the lid.

8 Troubleshooting

When stained blood smears are not of the desired quality, the first tendency is to assume the fluids or the slide stainer is at fault. However, other factors could be the cause of the poor quality of stained blood smears. The following list can help isolate the problem prior to checking the system:

- Was the blood thoroughly mixed before making the smear?
- Is the blood old or does it contain an incorrect anticoagulant?
- Is the blood smear too thick, too thin, or does it spread unevenly?
- Is the feathered edge of the smear end at least 1.5cm (5/8in) from the end of the glass slide?
- Was the blood smear thoroughly dry before staining?
- Are the glass slides clean? Even new glass slides are not necessarily clean.
- Are the glass slides flat? Variable thickness of a given glass slide can cause uneven staining.
- Is the microscope clean and adequately illuminated? A dirty microscope or inadequate lighting can give the impression of a poorly stained blood smear.

8.1 Troubleshooting chart

This chapter lists possible problems relating to electrical and mechanical operations that could occur during system operation together with probable causes and corrective measures. If the measures recommended do not solve the problem, contact the Siemens service.

Problem	Probable cause	Corrective measure
System does not start when the power switch is pressed.	Main switch is not set to position I.	Set the main switch to position I, see <i>Main switch</i> on page 4-11.
	Power cord is not plugged into the socket at the rear of the system.	Plug the power cord into the socket at the rear of the system.
	Power cord is not plugged into a power outlet.	Plug the power cord into a power outlet with a ground contact.
	Line fuses are blown.	Replace the line fuses, see Chapter 8.6.
	Circuit breaker in electrical circuit of building is tripped.	Reset the circuit breaker.
	Electrical failure of the system	Contact the Siemens service.
Yellow low stain light goes on.	Hematek Stain Pak is empty.	Install a new Hematek Stain Pak, see Chapter 7.2.

Table 8-1 Troubleshooting

8 Troubleshooting

Problem	Probable cause	Corrective measure
Yellow low stain light goes on but Hematek Stain Pak is not empty.	Hematek Stain Pak is not properly positioned in the pocket at the rear of the system.	Reposition the Hematek Stain Pak in the pocket so it moves freely up and down on the right end.
Yellow low stain light fails to go on and Hematek Stain Pak is empty.	Hematek Stain Pak is not properly positioned in the pocket at the rear of the system.	Reposition the Hematek Stain Pak in the pocket so it moves freely up and down on the right end.
	Fill level detector is not operating correctly.	Contact the Siemens service.
Red waste tank light goes on.	Waste tank is full.	Empty, rinse and replace the waste tank, see Chapter 6.5.
	Waste tank is removed.	Empty, rinse and replace the waste tank, see Chapter 6.5.
Pumps run but do not deliver fluids.	Pump tubing is unlocked.	Set the pump tubing release knob to the lock position, see <i>Pump tubing release knob</i> on page 4-6.
	Hematek Stain Pak is empty.	Install a new Hematek Stain Pak, see Chapter 7.2.
	Sensing switch fingers are not properly adjusted.	Check the adjustment of the sensing switch fingers, see Chapter 8.4.
	Cannula openings are clogged.	Remove cannulas from the Hematek Stain Pak and clean away debris with a soft, disposable, lint-free, absorbent cloth or tissue soaked with methanol.
	Cannulas are damaged.	Replace cannulas.
	Pump tubing has been pulled off the cannulas or the nipples.	Connect the tubes to the cannulas or the nipples, see Chapter 7.3.2.
	Pump tubing is clogged, worn or perforated.	Replace the pump tubing, see Chapter 7.3.
	Underplaten tubing has been pulled off the spouts under the platen.	Connect the tubes to the spouts under the platen, see Chapter 7.4.2.
One or more pumps do not run.	Underplaten tubing is clogged, worn or perforated.	Replace the underplaten tubing, see Chapter 7.4.
	Sensing switch fingers are not properly adjusted.	Check the adjustment of the sensing switch fingers, see Chapter 8.3.
Fluids overflow on either side of a glass slide.	Sensing switch is defective.	Contact the Siemens service.
	Pump volumes are not correct.	Correct the pump volumes, see Chapter 8.5.2.

Table 8-1 Troubleshooting (continued)

Problem	Probable cause	Corrective measure
Staining is uneven.	System was accidentally unplugged or power failure occurred during staining.	Remove all glass slides from the platen and reprocess them, see Chapter 5.4.
	System is not properly leveled.	Level the system, see Chapter 8.2.
	Mixing grooves on the platen are dirty.	Clean the platen, see Chapter 6.4.
	Platen has not been primed before staining glass slides.	Load priming slides before staining smeared glass slides, see Chapter 5.4, step 2.
	Fluids are not evenly delivered.	Vent the bottles of the Hematek Stain Pak, see <i>Vent bottles</i> on page 7-2.
	Stain tube or cannula is clogged.	Clean the stain tube and cannula, see Chapter 6.3.
	Pump tubing is worn or perforated.	Replace the pump tubing, see Chapter 7.3.
	Pump volumes are not correct.	Correct the pump volumes, see Chapter 8.5.2.
Staining is pale.	System was accidentally unplugged or power failure occurred during staining.	Remove all glass slides from the platen and reprocess them, see Chapter 5.4.
	Pump tubing has not been primed before staining smeared glass slides.	Prime the pump tubing, see Chapter 5.2.
	Hematek Stain Pak is deteriorated or outdated.	Install a new Hematek Stain Pak, see Chapter 7.2.
	Sensing switch fingers are not properly adjusted.	Check the adjustment of the sensing switch fingers, see Chapter 8.3.
	Proper stain-to-buffer ratio has not been achieved.	Check the stain-to-buffer ratio, see Chapter 8.5.3.
	Rinse volume is too high.	Check the rinse volume together with the stain-to-buffer ratio, see Chapter 8.5.3.
	Stain volume is adjusted too high. Increasing stain volume may decrease stain intensity because of an incorrect stain-to-buffer ratio.	Correct the pump volumes, see Chapter 8.5.2.
	Glass slides stick together because they are not dry.	Glass slide drying system does not operate properly. Contact the Siemens service.
Conveyor spirals do not operate.	– Contact the Siemens service.	

Table 8-1 Troubleshooting (continued)

8.2 Leveling the system

To level the system, proceed as follows:

1. Place the system on a firm, level work surface.
2. Raise the lid, see Figure 8-1.

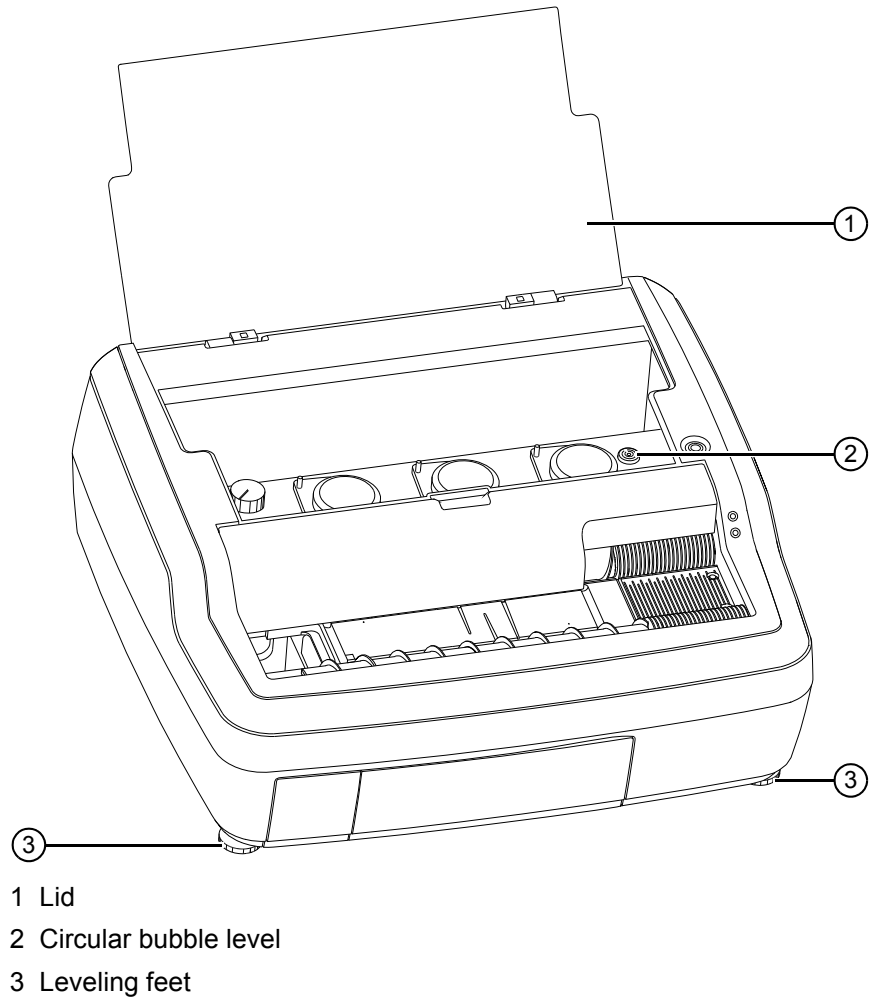


Figure 8-1 Leveling the system

3. Turn the two leveling feet located under the front corners of the system to raise or lower the system to a level position.
4. At the right side of the system, observe the circular bubble level to check when the leveling feet have been properly adjusted and the system is level.
5. Repeat step 3 and step 4 until the bubble in the circular bubble level is centered within the inscribed circle.

8.3 Checking the adjustment of the sensing switch fingers

You will need:

- 4 spare glass slides

To check the adjustment of the sensing switch fingers, proceed as follows:

1. Start the system, see Chapter 5.1 to Chapter 5.2.

NOTICE

If glass slides are not placed correctly in the grooves of the conveyor spirals, this can cause them to break

Damage to the system can result.

- Glass slides must be inserted into the grooves of the conveyor spirals so they are parallel to the slide loading lines inscribed on the platen, see *Slide loading lines* on page 4-8.
-
2. Load 4 spare glass slides into the grooves of the conveyor spirals. → The system performs the staining.
 3. Check if the stain pump is activated after approximately 50% of a glass slide width has passed over the stain orifice.
 - If so: Go to step 4.
 - If not: Go to Chapter 8.4.
 4. Check if the buffer pump is activated after about 3 mm (1/8in) of a glass slide has crossed over the buffer orifice.
 - If so: Go to step 5.
 - If not: Go to Chapter 8.4.
 5. Check if the rinse pump is activated just as the leading edge of a glass slide crosses over the rinse orifice.
 - If so: You can now load smeared glass slides, see Chapter 5.4.
 - If not: Go to Chapter 8.4.

8.4 Adjusting the sensing switch fingers

The sensing switch fingers must be properly positioned in order to accurately activate the pumps.

You will need:

- 1 spare glass slide

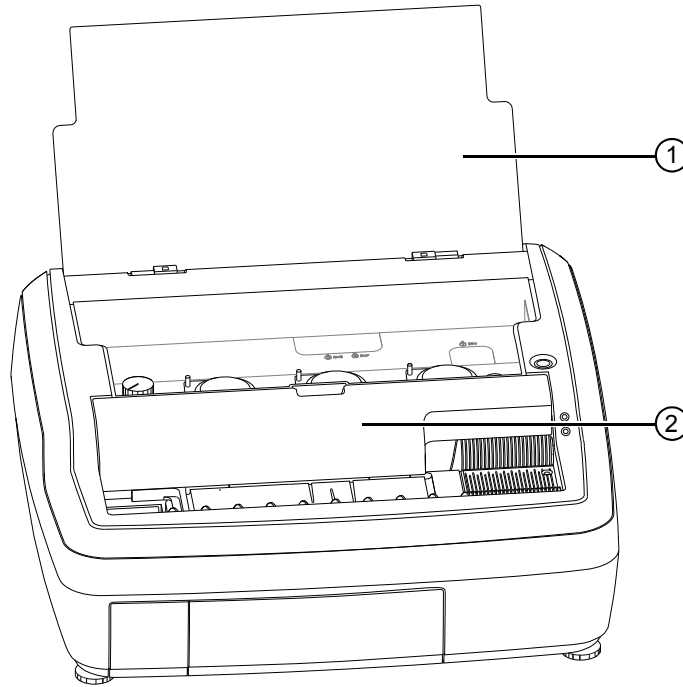
To adjust the sensing switch fingers, proceed as follows:

Switch off system

1. On top of the system, at the right side, press the power switch. → The green power light in the power switch goes off, and the fan and the conveyor spirals stop.

Remove middle cover

2. Raise the lid.
3. Remove the middle cover from the system, see Figure 8-2. → The three sensing switch fingers are exposed.



- 1 Lid
- 2 Middle cover

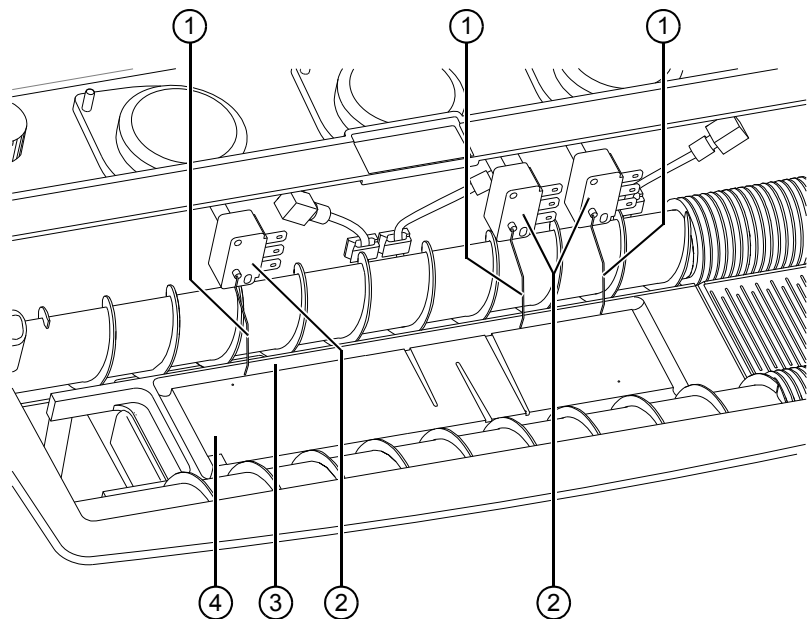
Figure 8-2 Removing the middle cover

Check sensing switch fingers

4. Check if each sensing switch finger points straight down into the center of the back trough of the platen, see Figure 8-3.

Note: The sensing switch fingers should not touch the bottom of the back trough.

- If so: Go to step 7.
- If not: Go to step 5.



- 1 Sensing switch fingers
- 2 Sensing switches
- 3 Back trough
- 4 Platen

Figure 8-3 Checking sensing switch fingers

Adjust sensing switch fingers

5. Support the sensing switch finger that is not upright near the center of the wire with one hand.
6. With the other hand, bend the sensing switch finger slightly to the left or to the right as necessary. If bending to the right, bend the sensing switch finger no more than 7 mm (1/4 in) past perpendicular.
7. Lay a spare glass slide lengthwise along the rear edge of the platen and slowly push the glass slide from right to left past each sensing switch finger.
8. Listen for a slight click as the respective sensing switch is activated.
9. Check if the sensing switch is activated before the sensing switch finger is lifted onto the top of the glass slide.
 - If so: Go to step 12.
 - If not: Go to step 10.
10. Support the sensing switch finger near the center of the wire with one hand.
11. With the other hand, bend the sensing switch finger slightly backward no more than 7 mm (1/4 in) past perpendicular.

Check adjustment of sensing switch fingers

12. Check the adjustment of the sensing switch fingers again, see Chapter 8.3.
13. If the adjustment of the sensing switch fingers does not result in correct timing, contact the Siemens service.

Set middle cover back in place

14. Set the middle cover back in place.
15. Close the lid.

8.5 Adjusting the pump volumes

When glass slides are not satisfactorily stained or pump volumes do not appear to be optimum, check the staining process first. If necessary, correct and verify the pump volumes.

8.5.1 Checking the staining process

To check the staining process, proceed as follows:

1. Raise the lid.

Note: After completing each of the following steps, load several spare smeared glass slides and check the result. If any of these steps corrects the situation, you do not need to correct the pump volumes.

2. At the right side of the system, observe the circular bubble level to check if the leveling feet have been properly adjusted and the system is level. The bubble in the circular bubble level should be centered within the inscribed circle.
 - If so: Go to step 4.
 - If not: Go to Chapter 8.2.
3. Make sure the Hematek Stain Pak has been vented, see Chapter 7.2, step 9 to step 14.
4. Clean the platen, see Chapter 6.4.
5. Make sure that there is no residue in the two mixing grooves, see Chapter 4.1.2.
6. Clean the drain troughs, see Chapter 6.6.
7. Check the adjustment of the sensing switch fingers, Chapter 8.3.
8. Replace the pump tubing, see Chapter 7.3.
9. Replace the underplaten tubing, see Chapter 7.4.
10. Correct the pump volumes, see Chapter 8.5.2.

8.5.2 Correcting the pump volumes

You will need:

- 5 priming slides
- 15 spare smeared glass slides

To correct the pump volumes, proceed as follows:

NOTICE

If glass slides are not placed correctly in the grooves of the conveyor spirals, this can cause them to break

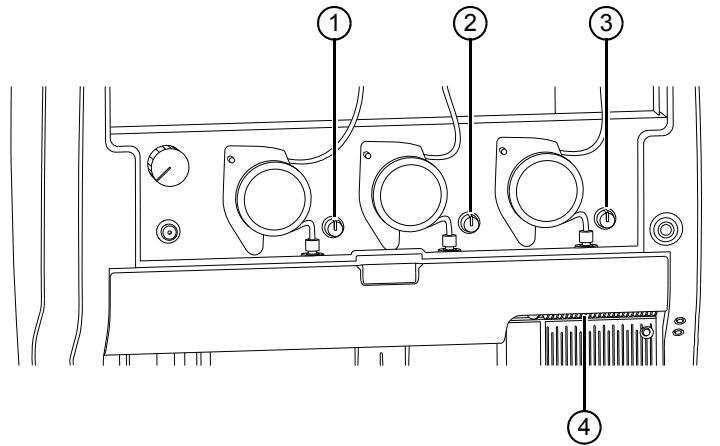
Damage to the system can result.

- Glass slides must be inserted into the grooves of the conveyor spirals so they are parallel to the slide loading lines inscribed on the platen, see *Slide loading lines* on page 4-8.

Adjust amount of stain

1. Prime the pump tubing, see Chapter 5.2.
2. Load five priming slides, see Chapter 5.3, into the grooves of the conveyor spirals with the marked side facing in the opposite direction of conveyance. → The system primes the platen and performs the staining.
3. Load five smeared glass slides immediately following the priming slides.
4. Adjust the amount of stain.
 - If the stain does not fill the capillary space between the platen and the smeared glass slide, turn the stain adjustment knob clockwise, see Figure 8-4.

- If the stain overflows on either side of the smeared glass slide, turn the stain adjustment knob counter-clockwise, see Figure 8-4.



- 1 Rinse adjustment knob
- 2 Buffer adjustment knob
- 3 Stain adjustment knob
- 4 Rear conveyor spiral

Figure 8-4 Adjusting the pump volumes

5. Check if proper fill has been achieved on two consecutive smeared glass slides.
 - If so: Go to step 6.
 - If not: Repeat step 4 and step 5.
6. Load three priming slides into the grooves of the conveyor spirals with the marked side facing in the opposite direction of conveyance. → The system primes the platen and performs the staining.
7. Load five smeared glass slides immediately following the priming slides.
8. Adjust the amount of buffer.

Note: When a glass slide passes the buffer section of the platen, mixing of the stain and buffer occurs because of the mixing grooves. This is where the proper stain-to-buffer ratio is most important. The glass slide looks under-filled as it travels over the mixing grooves because the capillary gap is slightly greater.

- If the glass slide is past the mixing grooves and moves on to the smooth portion of the platen, immediately before the rinsing area, and the stain and buffer mixture does not fill the capillary space under the glass slide, then turn the buffer adjustment knob clockwise, see Figure 8-4.
- If the stain and buffer mixture extends out from either side of the smeared glass slide, turn the buffer adjustment knob counter-clockwise, see Figure 8-4.

Adjust amount of buffer

- If the second mixing groove is completely flooded with the stain and buffer mixture, turn the buffer adjustment knob and the stain adjustment knob counter-clockwise slightly, see Figure 8-4.

Adjust amount of rinse

9. Examine the stained glass slides under a microscope.

Note: Any change in the rinse setting can cause a slight color change due to the small amount of methanol in the rinse.

Occasional small voids can occur on the stained glass slides after proper filling. These voids are acceptable and will not adversely affect stain quality. Do not try to compensate for small voids by increasing the amount of stain. Doing so can upset the optimum stain-to-buffer ratio and can affect the stain intensity.

- If excess stain is left on the stained glass slides appearing as precipitation under the microscope, turn the rinse adjustment knob clockwise, see Figure 8-4.
- If the staining of the stained glass slides is pale due to over-washing, turn the rinse adjustment knob counter-clockwise, see Figure 8-4.

Check staining

10. Load three priming slides into the grooves of the conveyor spirals with the marked side facing in the opposite direction of conveyance. → The system primes the platen and performs the staining.
11. Load five smeared glass slides immediately following the priming slides.
12. Check if the capillary space between the platen and the smeared glass slides fills properly with stain in the staining area.
 - If so: Go to step 13.
 - If not: Go back to step 4.
13. Check if the capillary space between the platen and the smeared glass slides fills properly with a stain and buffer mixture just before the rinsing area.
 - If so: Go to Chapter 8.5.3.
 - If not: Go back to step 8.

8.5.3 Verifying the pump volumes

The pump volumes are verified by checking the rinse volume for a specific amount of glass slides and by checking the stain-to-buffer ratio.

You will need:

- 1 beaker
- 2 10mL graduated cylinders
- 1 25mL graduated cylinder
- 10 blank glass slides

To verify the pump volumes, proceed as follows:

 **WARNING**

The Hematek Stain Pak contains methanol. Risk of very serious irreversible effects through inhalation, in contact with skin, and if swallowed

Death or serious injury can result.

- Keep the containers of the Hematek Stain Pak tightly closed.
- Wear appropriate personal protective equipment; that is, gloves, protective clothing, safety glasses and mask.
- Pay attention to the manufacturer's information regarding the gloves' compatibility with the materials and liquids used.
- Avoid contact with eyes and skin.
- In case of contact with eyes or skin, immediately rinse the affected area with plenty of water for at least 15 minutes.
- In the event of an accident or if you feel unwell, seek medical advice immediately and show the label if possible.
- Refer to the Hematek Stain Pak labeling and to Material Safety Data Sheets for more information on first aid measures. Material Safety Data Sheets are available from Siemens.

 **WARNING**

Risk of burns by combustion of flammable liquids. The Hematek Stain Pak contains methanol which is highly flammable.

Death or serious injury can result.

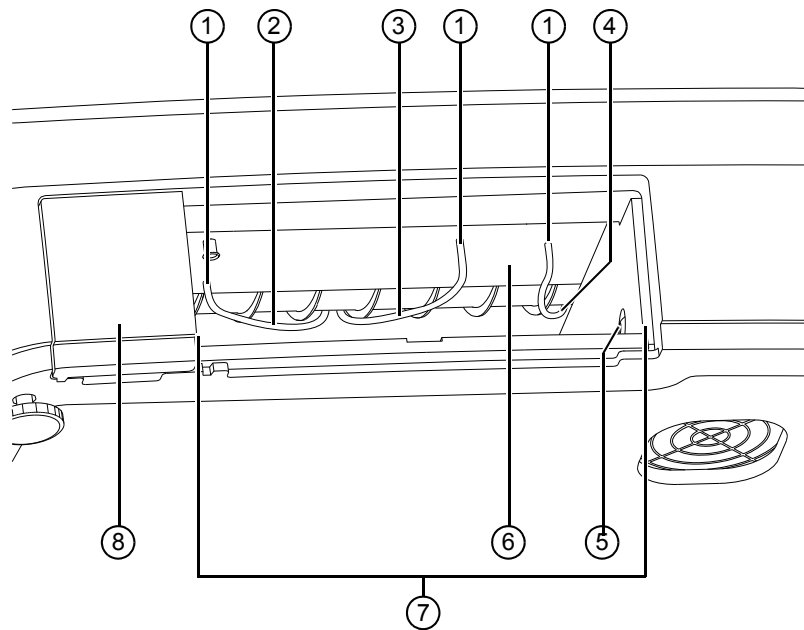
- Do not install and operate the system in the proximity of sources of ignition, for example, ovens, hot plates, burners, radiators, or open flames.
- Refer to the Hematek Stain Pak labeling and to Material Safety Data Sheets for details concerning any special precautions related to the handling of Hematek Stain Paks. Material Safety Data Sheets are available from Siemens.

Remove waste tank

1. Remove the waste tank, see Chapter 6.5.

Disconnect tubes

2. Reach underneath the platen through the waste tank area, see Figure 8-5.



- 1 Spouts
- 2 Rinse tube
- 3 Buffer tube
- 4 Stain tube
- 5 Service button
- 6 Platen
- 7 Waste tank area
- 8 Slide drawer

Figure 8-5 Waste tank area, bottom view

Prime pump tubing

3. Disconnect rinse, buffer, and stain tubes from the spouts under the platen.
4. Press the service button.
5. Place the free tube ends into the beaker.
6. Prime the pump tubing, see Chapter 5.2.

Process blank glass slides

7. Place the free ends of the stain and buffer tubes into separate 10mL graduated cylinders.

8. Place the free end of the rinse tube into a 25mL graduated cylinder.

NOTICE

If glass slides are not placed correctly in the grooves of the conveyor spirals, this can cause them to break

Damage to the system can result.

- Glass slides must be inserted into the grooves of the conveyor spirals so they are parallel to the slide loading lines inscribed on the platen, see *Slide loading lines* on page 4-8.

9. Load 10 blank glass slides.

10. Wait until the glass slides have been delivered into the slide drawer.

Record volumes

11. Record the volume of rinse, stain, and buffer pumped into each cylinder.

Check rinse volume

12. Check if the rinse volume is approximately 10mL for 10 blank glass slides.

Check stain-to-buffer ratio

13. Calculate the stain-to-buffer ratio. For an example of the calculation of the stain-to-buffer ratio, see Chapter 9.2.1.

14. Check if the stain-to-buffer ratio is between 1:2 and 1:3.

Note: If the stain-to-buffer ratio is slightly out of the range of 1:2 to 1:3 but the capillary space between the platen and the glass slides is filling properly, good mixing is occurring, and the stained glass slides are acceptable under the microscope, the stain-to-buffer ratio should not be corrected.

15. Proceed as follows:

- If the rinse volume is approximately 10mL for 10 blank glass slides **and** the stain-to-buffer ratio is between 1:2 and 1:3, go to Chapter 8.5.3.1.
- If the rinse volume deviates significantly from 10mL for 10 blank glass slides **and/or** the stain-to-buffer ratio is not between 1:2 and 1:3, go to Chapter 8.5.3.2.

8.5.3.1 Recorded volumes fall within specified ranges

If the rinse volume is approximately 10mL for 10 blank glass slides **and** the stain-to-buffer ratio is between 1:2 and 1:3, proceed as follows:

1. Connect the tubes to the spouts under the platen. The tube from the stain pump must lead to the right spout. The tube from the buffer pump must lead to the middle spout. The tube from the rinse pump must lead to the left spout.

2. Check all connections to make sure the underplaten tubing is securely in place.
3. Set the waste tank back in place.

8.5.3.2 Recorded volumes do not fall within specified ranges

If the rinse volume deviates significantly from 10 mL for 10 blank glass slides **and/or** the stain-to-buffer ratio is not between 1:2 and 1:3, proceed as follows:

1. If you already corrected the pump volumes, contact the Siemens service.
2. Otherwise, connect the tubes to the spouts under the platen. The tube from the stain pump must lead to the right spout. The tube from the buffer pump must lead to the middle spout. The tube from the rinse pump must lead to the left spout.
3. Check all connections to make sure the underplaten tubing is securely in place.
4. Set the waste tank back in place.
5. Correct the pump volumes, see Chapter 8.5.2.

8.6 Replacing the line fuses

You will need:

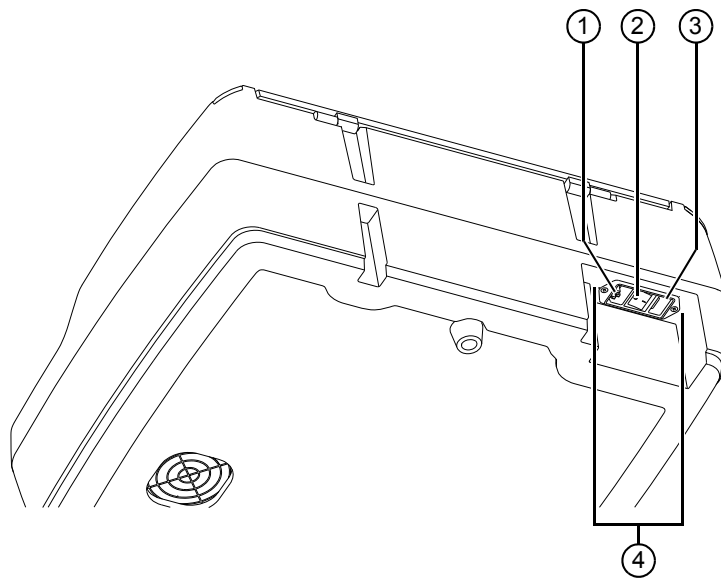
- 2 new line fuses, 250V, 1.0A, 5 mm x 20mm, Type T
- 1 small, blade-type screwdriver

To replace the line fuses, proceed as follows:

Unplug system

1. On top of the system, at the right side, press the power switch. → The green power light in the power switch goes off, and the fan and the conveyor spirals stop.

- At the rear of the system, set the main switch to position **O**, see Figure 8-6.



- Socket
- Main switch
- Line fuse compartment
- Power module

Figure 8-6 Removing the line fuses, rear view

WARNING

Electric shock by contact with live parts

Death or serious injury can result.

- Unplug the power cord before opening the system.

Remove used line fuses

- Unplug the power cord from the power module.
- On the side near to the main switch, pry open the line fuse compartment using a small, blade-type screwdriver.
- Carefully remove the fuse holder.
- Remove the used line fuses.

NOTICE

Damage to the slide stainer due to inadequate line fuses

Slide stainer can break down.

- Only use Siemens spare parts.

Replace line fuses

7. Insert new line fuses into the fuse holder.
8. With the lid facing in the direction of the main switch, put the fuse holder back into the fuse compartment. Push in all the way.

Connect power source

9. Plug the power cord into the power module.
10. Set the main switch to position I, see Figure 8-6.

9 Appendix

This chapter describes the principle of operation of the system and the technical specifications of the system.

9.1 Principle of operation

As the glass slides move along the platen, with the smeared side down, the system performs the following steps:

Staining glass slides

When a glass slide contacts the first of three sensing switch fingers, the respective sensing switch is activated. After a specific time delay, the stain pump starts delivering the stain. The capillary space between the glass slide and the platen is filled.

The stain pump delivers a specific amount of stain, according to the setting of the stain adjustment knob. The surplus of stain is drained into the waste tank.

Buffering glass slides

When the glass slide contacts the second sensing switch finger, the respective sensing switch is activated. After a specific time delay, the buffer pump starts delivering the buffer. The capillary space between the glass slide and the platen is filled. The stain and buffer move around the mixing grooves and hence fully intermingle.

The buffer pump delivers a specific amount of buffer according to the setting of the buffer adjustment knob. The surplus of buffer is drained into the waste tank.

Rinsing glass slides

When the glass slide contacts the third sensing switch finger, the respective sensing switch is activated. After a specific time delay, the rinse pump starts delivering the rinse. The capillary space between the glass slide and the platen is filled. The rinse washes the glass slides from the stain and buffer mixture.

The rinse pump delivers a specific amount of rinse, according to the setting of the rinse adjustment knob. The surplus of rinse is drained into the waste tank.

Drying glass slides

After rinsing is completed, the glass slide is dried by a flow of air from a low velocity blower.

Delivering glass slides

The glass slide is delivered into the slide drawer.

9.2 Staining process

The system produces stained glass slides of consistent quality in a continuous process. This is accomplished by having a fixed length of time in each of the three phases of stain, buffer, and rinse, as well as a predetermined ratio of stain-to-buffer volumes in the buffer phase.

A properly stained glass slide is the result of an interactive process involving the pump volumes, the mixing process, and the stain-to-buffer ratio. The system is pre-set to a stain-to-buffer ratio of approximately 1:2.5 and a rinse volume of approximately 1.0mL per glass slide when each adjustment knob is at its centering catch. The stain-to-buffer ratio can be adjusted from 1:2 to 1:3.

9.2.1 Example for the calculation of the stain-to-buffer ratio

Examples for recorded volumes of the stain and buffer are displayed in Table 9-1.

Fluid	Recorded volume
Stain	1.6mL
Buffer	3.5mL

Table 9-1 Examples for recorded volumes

The stain-to-buffer ratio is calculated from the recorded volumes as follows:

$$\text{Stain-to-buffer ratio} = 1 : \frac{\text{Buffer volume}}{\text{Stain volume}} = 1 : \frac{3.5\text{mL}}{1.6\text{mL}} = 1 : 2.19$$

The stain-to-buffer ratio is used to verify the pump volumes, see Chapter 8.5.3.

9.3 Technical specifications

Physical

Dimensions (L x W x H)	46.0cm x 54.0cm x 22.0cm (18.1in x 21.3in x 8.7in)
Required space for ventilation	10cm (3.9in) on all sides
Weight	20kg (44.1lbs)
Sound level	60dBA at operator's position
Glass slide capacity	Input: 23 glass slides in the grooves of the conveyor spirals Output: approximately 65 glass slides in the slide drawer
Waste tank capacity	Min. content of one Hematek Stain Pak
Throughput	1 glass slide per minute

Electrical

Operating voltage	100 to 240V, AC
Main frequency	50/60Hz
Current	0.25A
Power consumption	50W
Degree of ingress protection according to IEC 60529	IP20
Line fuses	250V, 1.0A, 5mm x 20mm, Type T

Environmental

Operating temperature	18 to 30°C (64 to 86°F)
Operating humidity	20 to 85%
Storage and transportation temperature	5 to 40°C (41 to 104°F)
Storage and transportation humidity	10 to 90%, non-condensing
Altitude (maximum)	2000m (6560ft)

Glass slides

Dimensions (L x W x H)	75mm x 25mm x 1mm or 3.0in x 1.0in x 0.04in
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Addendum to the instruction manual

If you obtain an addendum to the instruction manual, file it with this instruction manual.

