Operating Manual

Midas® III-Plus

Automated slide stainer for use in hematology and bacteriology laboratories

Features

- Small footprint and low maintenance
- Up to 30 slides or coverslips uniformly stained in minutes
- Medium-throughput staining up to 1,000 slides per day
- Automatic electronic self test at start up
- Versatile stainer with 9 user-defined programs each containing up to 29 processing steps
- Ideally suited for Wright, Giemsa, Wright-Giemsa, Pappenheim, Hemacolor®, Leishman, Gram, Kinyoun, and AFB staining applications

MilliporeSigma

Sigma-Aldrich®

Notice

We provide information and advice to our customers on application technologies and regulatory matters to the best of our knowledge and ability, but without obligation or liability. Existing laws and regulations are to be observed in all cases by our customers. This also applies in respect to any rights of third parties. Our information and advice do not relieve our customers of their own responsibility for checking the suitability of our products for the envisaged purpose.

IVD

EMD Millipore Corporation
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Burlington, MA 01803 U.S.A.

Made in U.S.A.

Part No. 5.06115.0001

Table of Contents

Warnings and Precautions

- **WARNING:** READ THIS MANUAL CAREFULLY BEFORE USING the Midas® III-Plus Automated Stainer
- Upon receipt of the Midas® III-Plus Automated Stainer, inspect the shipping carton. Notify the shipping carrier and our Technical Service department immediately of any damage.
- To improve the product performance and to increase the ease of use, several software and hardware functions may have been enhanced after this manual was printed. If you find any discrepancy with actual operation of the system and the description given in the manual, please contact our Technical Service Department.
- For continued protection against fire hazard, replace fuse with a fuse of the same type and rating.

Caution! Electric Shock Hazard.
Disconnect line cord before servicing. Refer servicing to a qualified service personnel.

- If you need assistance in adjusting the water pressure regulator, please contact our technical service department.
- Drying slides after fixation ensures optimum stain performance and quality. For the best staining, use **Deionized** or **Distilled Water**.
- Do not dispose of stain into the overflow basin and drain. Remove the stain vessel and dispose of the stain in compliance with all current local, state and federal regulations.
- Maximum flow rate should not exceed 2,000 mL/min.
- For stat work, you can stop the stainer after the last rinse, then remove and air-dry the specimens.
- For infectious materials, heat-fix specimens over a flame prior to staining.
- Heat intensity can be increased and decreased by operation (Service Mode 10). Care should be taken to make gradual changes so as not to risk damage to the slide sample.

Hazardous Reagents

Many reagents of a hazardous nature are employed for slide preparation. Laboratory personnel are strongly advised to be familiar with these hazards prior to using the Midas® III-Plus Automated Stainer.

Cleaning: Apply aqueous solutions to a clean cloth for cleaning of all working and non-working surfaces. Sterilization of Midas® III-Plus Automated Stainer or its individual components is not required. For disinfection, use a 1:10 dilution of Clorox®* bleach solution (or equivalent, etc.) on an absorbent cloth as recommended by the manufacturer's label instructions.

Spillage: In the event of spillage of any fluid or reagent, the system must be disconnected from the main power supply immediately and not reconnected nor used until examined and tested by an Authorized Service Engineer. Failure to do this may result in a fire hazard.

Servicing: Midas® III-Plus Automated Stainer contains no user serviceable components. Contact our Technical Service department or an authorized service engineer for all service requirements.

* Clorox®: follow manufacturer's guidance for proper use as a disinfectant.

Safeguards and Inspection

Safety Instructions

Attention! Make sure to comply with safety instructions and warnings in this chapter. Make sure to read these instructions, even if you are already familiar with the operation and use of other Midas® products.

- This instruction manual includes important information related to the operating safety and maintenance of the system; it is an important part of the product.
- To ensure safe operation, the operator MUST observe the instructions and warnings contained in this Operating Manual.
- Obtain, review and retain the SDS for the reagents used from the manufacturers of the reagents. Follow the safety precautions and disposal recommendations provided in SDS.

Attention! The protective devices on both system and accessories may neither be removed nor modified. We recommend that ONLY authorized and qualified service personnel repair the system and access the system's internal component.

- The safety and operating instructions must be retained for future reference.
- All warnings on the system and in the operating manual must be followed.

- Do not use any attachments not approved by the product manufacturer as they may cause hazards, damage the system and void the warranty.
- Do not use any accessories not recommended by the product manufacturer as they may damage the system and void the warranty.
- This system must be operated from the type of power source indicated on the marking label and the instructions.
- This system is equipped with a grounded three-wire plug. The system must be connected to a grounded outlet for safety.
- Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them. Pay particular attention to cords at plugs, receptacles, and the point where they exit the system.
- Situate the stainer in well-ventilated area and away from the wall.
- Situate the stainer such that the Power Inlet and the Power Off switches are easily accessible at all times while the stainer power is turned on.
- Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.
- Do not attempt to service this system yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
- When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer. Unauthorized substitutions may result in fire, electric shock or other hazards and void the warranty.

Additional Safety Instructions to Prevent Injury from the Moving Mechanism

For safe operation of the unit, for the safety of the operator and other personnel in the vicinity of the unit and for laboratory safety, the following safety measures must be implemented.

- Do not obstruct the mechanism with hand, arm or any other body parts while the unit is powered on.
- Do not place any sample slide racks into any processing reagent stations. Always load the slide racks at Station 5, the Home Station.
- Do not remove any sample slide racks from any processing reagent stations. Always wait until the slide racks are delivered to Station 5, the Home Station.
- Turn the power off while changing or replenishing the reagents.
- Turn the power off while cleaning the stainer.
- In addition to the above measures, the installation of the optional plastic hood enclosure and keeping it closed during the processing runs will provide additional protection against accidental injury by the moving mechanism.

Additional Safety Instructions to Handle the Samples, Chemicals and Reagents

For safe operation of the system, for the safety of the operator and other personnel in the vicinity of the unit and for laboratory safety, the following safety measures must be implemented.

- Keep the stainer and the reagents away from the open flames.
- Do not smoke near the stainer or the reagents.
- To minimize the exposure to the toxic fumes of the reagents, place the stainer under a fume hood.

Flammable Liquids! Use caution when handling solvents! Make sure the premises are adequately ventilated! Explosion hazard!

- Avoid spillage while filling and/or changing the reagents.
- Wipe away any spilled reagents immediately. In case of long-term exposure, the system surfaces are only conditionally resistant to solvents.
- While the stainer is not in use, keep the reagent containers covered with the Reagent Container Lids provided with the stainer.
- Do not eat, drink or smoke near the stainer.
- Follow general laboratory safety procedures and practices for handling organic solvents.

Biohazard! Follow general laboratory safety procedures and practices for handling samples to process from Biohazard handling perspective.

Biohazard! Before shipping the stainer for any purpose, always decontaminate following general laboratory safety procedures and practices for handling samples to process from Biohazard handling perspective.

Flammable Liquids! Follow general laboratory safety procedures and practices for handling and disposal of the flammable reagents used in processing of the slides and used for cleaning the system.

- Protective gloves should be worn by the operator since the operator could come in contact with potentially infectious substances.
- Follow reagent manufacturer’s guidance for safely handling the reagents.
- Comply with your local and national regulations for the disposal of the reagents and waste.

Warnings—Markings on the System

Attention!

Markings on the system showing the warning triangle indicate that the correct operating instructions (as defined in this manual) must be followed when operating or replacing the item marked. Failure to adhere to these instructions may result in an accident, personal injury, damage to the system or accessory equipment.

Warning—Transport and Installation

Attention! The system may only be transported in an upright position.

- Install the system on an even surface which must be absolutely level and can support 100 lb (46 kg) weight.
- Do not expose the system to direct sunlight (windows).
- The system MUST be connected to an earthed mains power outlet socket. The system must not be connected to an extension cord without protective earth conductor.
- The system must be set up in a well-ventilated area, free from any ignition sources.

Warning—Handling Reagents

Flammable Liquids! Be careful when handling solvents!

- Always wear rubber gloves and safety goggles when handling the chemicals used in this system.
- Reagents used for tissue staining can be both toxic and/or flammable.
- Dispose of waste solvents with care according to local regulations and the waste management policy of the company or institution.

Warnings—Operating the System

Attention!

The Midas® III-Plus Automated Stainer may only be operated by trained laboratory personnel, according to its designated use and as per the present instruction manual.

- In case of emergency, switch off mains and unplug the power cord.
- While working with reagents (filling/emptying the reagent stations, working on the system while the lid/s is/are open) appropriate protective gear (lab coat, gloves, safety goggles) must be worn.
- Risk of fire, when working with an open flame (Bunsen burner) immediately next to the system (solvent fumes). Therefore, keep a safe distance!

If a staining program is to be interrupted for an extended period of time, leave slide racks in the water station, in order to prevent them from drying out.

Warnings—Cleaning and Maintenance

Attention!

Prior to each maintenance and/or cleaning, switch the system off and disconnect main power. Do not clean the system with solvents containing acetone or xylene. No liquid may be spilled into the internal components of the system—neither during operation nor cleaning.

- When working with cleaning detergents, comply with all safety instruction by the manufacturer of the product and the laboratory management policy.
- Do not autoclave reagent containers.
- Spilled solvents (reagents) have to be wiped away immediately! In case of long-term exposure, the plastic hood enclosure is only conditionally resistant to solvents!

To clean the enclosure, use mild household detergents; see safety instruction above for non-appropriate ingredients!

Inspection

Follow these instructions carefully:

- Carefully inspect the outer carton for any visible damage. If any damage is noticed, contact the shipping carrier and file a damage report before unpacking the stainer.
- Inspect the system for any visible damage. If any shipping damage is visible, retain all packing material intact with the stainer and file a claim with the final carrier.
- Retain all the packaging material for the duration of the warranty period.

Section 1: Introducing the Midas® III-Plus Automated Stainer

Definition of Symbols

Attention: This symbol on the system and in the manual showing the warning triangle indicate that the correct operating instructions (as defined in this manual) must be followed when operating or replacing the item marked. Failure to adhere to these instructions may result in an accident, personal injury, damage to the system or accessory equipment.

Hot Surface: Surfaces may be very hot to the touch. Some instrument surfaces, which become hot during operation are marked with this warning label. DO NOT TOUCH THESE SURFACES. Touching these surfaces may cause burns.

Protective Conductor Terminal Symbol: For the safety of the operator, ensure that the earth ground is always connected at this terminal.

Caution: Electric Shock Hazard Disconnect line cord before servicing. Refer servicing to qualified service personnel. To avoid the risk of injury from electric shock, do not open this enclosure.

Flammable Liquids: Handle flammable liquids with care. Ensure that there are no open flames or sources of sparks or flames near these liquids. Ensure that they do not get hot such that they can emit noxious fumes. Handle and dispose of these liquids based on the manufacturer's recommendations and follow the local regulations for disposal.

Power Supply ON Indication: Push the Power ON/OFF switch in the direction marked with this symbol to turn the unit power on.

Biohazard: Samples processed on this instrument may be biohazard. Use proper procedures and safety procedures to handle biohazard.

Alternating Current Symbol

Power Supply OFF Indication: Push the Power ON/OFF switch in the direction marked with this symbol to turn the unit power off.

The following symbols and their definitions are provided for reference only.

SN	Serial number	IVD	*In vitro* diagnostic medical device	EC REP	Authorized representative in the European Community
REF	Catalogue number	CONTROL	Control		Caution, consult accompanying documents
LOT	Batch code	CONTROL +	Positive control		Contains sufficient for <n> tests
	Manufacturer	CONTROL −	Negative control		Temperature limitation
	Date of manufacture	STERILE	Sterile		Upper limit of temperature
	Use by (YYYY-MM-DD or YYYY-MM)	STERILE	Sterilized using steam or dry heat		Lower limit of temperature
	Do not reuse	STERILE EO	Sterilized using ethylene oxide		For IVD performance evaluation only
	Consult instructions for use	STERILE R	Sterilized using irradiation		WEEE Recycling
	Biological risks	STERILE A	Sterilized using aseptic processing technique		

Introducing the Midas® III-Plus Automated Stainer

Intended Use

The Midas® III-Plus Automated Stainer is an automated slide stainer used for staining slides to aid in diagnosis.

The Midas® III-Plus Automated Stainer has nine user definable programs each containing up to 29 possible processing steps. For added convenience, it performs an automatic electronic self test when turned on and a mechanical self test as required by the operator.

An optional recirculating water bath is available for use with the Midas® III-Plus Automated Stainer and should be used in hematology unless a dedicated deionized water line is available. A water bath can be used in bacteriology (tap water desirable for bacteriology).

The instrument must be operated only according to the instructions contained in this manual and only for its intended use as defined above. Any other use of the instrument is considered improper and voids the warranty!

System Function

Specimen slides are loaded into removable slide carrier, and the carrier is mounted onto the carrier arm of the tower. Stains and fixatives are added to staining vessels and inserted into the stations on the stainer.

During operation, the tower holding the slide carrier moves from station to station according to a programmed sequence. The carrier arm dips the slides by moving up and down automatically every three seconds in the staining vessel. The Dipping Mode can be turned on or off for Stations 1 through 6 by the operator. If Station 5 has been programmed, the autorinse feature turns the water on and off when the staining cycle is complete. If Station 6 has been programmed, the slides are dried with warm air (temperature adjustable from room temp at 65 °C).

When the program is complete the tower moves back to the Station 5, its “home position”. The Midas® III-Plus Automated Stainer gives an audible beep six times to let the operator know that the process is complete.

Indication for Use

For *in vitro* (IVD) diagnostic use in hematology and bacteriology laboratories. The Midas® III-Plus Automated Stainer features compact design and microprocessor control for flexibility in staining applications. Up to 30 slides can be stained uniformly in minutes.

Intended User: The Midas® III-Plus Automated Stainer may be operated only by laboratory personnel who are trained to handle biological samples that can be infectious and trained to handle flammable reagents. The instrument may be operated only according to the instructions contained in this manual.

Specifications

Functional Characteristics

Staining control	Microprocessor—Dipping mechanism ON/OFF selectable at all stations
Slide carrier capability	10, 20, and 30 carriers available
Available programs	9 user programmable, 29 steps in each; 1 test program
Staining vessel capacity	300 mL (standard) 150 mL, 3 chamber reagent container (optional accessory)
Available stations	6 in total, 4 staining/reagent, 1 running water rinse, 1 warm forced-air dry, or 6 staining/reagent stations
Available program application time	1 second to 99 minutes, 59 seconds per program step with 29 steps per program
Coverslip carrier capability	20 coverslips, 22 x 22 mm

Available Options

Available Options	Quantity per Pack	Cat. No.
Recirculating water bath	1	64000WB-94
Vessels and lids (300 mL)	8	64054W-95
3 chamber vessel with lid (150 mL) **(New)**	1	15250
Coverslip carrier	1	64053-94
10 slide carrier **(New)**	1	15251
20 slide carrier	1	64052-94
30 slide carrier	1	64052E-94
Plastic enclosure with door	1	5.06117.0001
110 volt power cord, Plug Type B (US, Canada, Mexico, Colombia, Peru, Guatemala, and Caribbean)	1	RW918003
220 volt power cord, Plug Type I (Argentina)	1	RW922030
220 volt power cord, Plug Type L (Chile)	1	RW922035
220 volt power cord, Plug Type N (Brazil)	1	RW922040

Electrical Characteristics

Power input	
Voltage	AC, 115 volts or 230 volts (external switch selectable), 50 or 60 Hz
Current	5 amps max for 120 volts input, 5 amps max for 230 volts input
Watts	600 watts max at 120 volts
Fuse rating	5 amp x 250 volt Slo-Blo or Time delay fuse for both 110 and 230 volt operations
Heating station	
Heater	375 watts, AC driven
Blower	Less than 15 watts, AC driven (CB1 fan)
Internal circuit protection	5 amp circuit breaker (CB2 heater)
Water valve	24 volts DC
Power output	GFI protected power outlet for external water bath pump, 120 volts AC output, auto-transformer output
Internal circuit protection	1 amp circuit breaker (CB1, GFI)
Display	5 volts DC, max 0.5 amp, vacuum fluorescent display, 2 lines x 16 characters per line presentation
Keypad	Membrane keypad, 20 keys

Rinse Station

Rinse station flow rate	Application range 500–2,000 mL/minute

Mechanical Characteristics

Enclosure	Two parts, top and bottom enclosures
Reagent containers	All reagent containers (including drying and rinse station containers) are made of polypropylene.
Rear panel	Aluminum

Physical Characteristics

Length	21 inches (53 cm)
Width	18 inches (45 cm)
Height	15 inches (38 cm)
Weight	28 lb (13 kg)

Operating Environmental Conditions (Indoor Use Only)

Ambient temperature	15–35 °C
Relative humidity	< 75% non-condensing
Ambient pressure	28–32 inches (70–80 mm) of Hg
Altitude	< 2,000 meters (6,000 feet)

Storage/Transportation Conditions

Temperature	10–40 °C (50–102 °F)
Humidity	15%–80% non-condensing
Pressure	28–32 inches (70–80 mm) of Hg

Installation Category

In reference to installation category as defined in UL 61010-1 standard, Midas® III-Plus Automated Stainer is defined as Category II system.

Pollution Degree

In reference to pollution degree as defined in UL 61010-1 standard, Midas® III-Plus Automated Stainer is categorized as a Pollution Degree 2 System.

Midas® III-Plus Automated Stainer Overview

A. Midas® III-Plus Automated Stainer

B. Stainer with optional plastic enclosure

C. Rear panel

Automated slide stainer for use in hematology and bacteriology laboratories

- Compact design and microprocessor control for flexibility in staining applications
- Small footprint or coverslips uniformly stained in minutes
- Medium-throughput staining up to 1,000 slides per day
- Ideally suited for Wright, Giemsa, Wright-Giemsa, Pappenheim, Hemacolor®, Gram and AFB staining applications

D. Figure 2. Midas® III-Plus Automated Stainer

E. Regulator adjust*

1. Water bath inlet
2. Caution: Electric Shock Hazard. Disconnect line cord before servicing. Refer service to qualified service personnel.
3. Water supply inlet, 75 psi max
4. Regulator adjust*
5. "Electrical equipment for laboratory use" UL 61010-1, 23HB, E214098. UL Mark for Canada and the United States
6. GFI Outlet to be used with Midas® III-Plus Water Bath only, 115 vac, 50/60 Hz, 1 amp max
7. Warning: For continued protection against fire hazard, replace fuse with fuse of the same type and rating.
8. ON and OFF ("I" = On/"O" = OFF on the switch face)
9. Power cord inlet plug
10. Power 115 vac/230 vac, 50/60 Hz, 5 amp max, fuse: 5A, 250 vac ± Slo-Blo
11. 115 vac/230 vac line voltage selector
12. Drain

* Regulator adjust: all units are tested to work at a water pressure of 80 psi or less and be capable of delivering at least 2,000 mL per minute. In the event the line pressure is higher, it is possible that you may not get adequate water flow. To correct the situation, the water pressure regulator needs to be adjusted. If you need assistance in adjusting the water pressure regulator, please contact an authorized service center.

Section 2: Installing the Midas® III-Plus Automated Stainer

Upon receipt of the Midas® III-Plus Automated Stainer, inspect the shipping carton. Notify the shipping carrier and our Technical Service department* immediately of any damage.

The Midas® III-Plus Automated Stainer is shipped in foam inside a primary and secondary carton. Upon unpacking, it should contain the following parts in good condition:

Description	Quantity/Pack
Midas® III-Plus Automated Stainer	1
20 position slide carrier	1
Operating manual	1
Polypropylene (white) and lids	8
Drying vessel	1
Spare fuses (5A)	2
Warranty card	1
110 volt power cord (US, Canada, Mexico, Colombia, Peru, Guatemala, and Caribbean)	1
Reinforced tubing with fitting (for connection to one water source and maintenance of optional water bath)	

* To notify our Technical Service department, call 1-800-325-5832.

The Warranty Card must be filled in completely and returned in order for the warranty to be effective.

- Return of the warranty card will provide notification of new product information and updates. It also gives your laboratory the ability to purchase an optional service contract at warranty expiration.
- Retain all packing materials. The Midas® III-Plus Automated Stainer should be packed and shipped in the original carton if shipment becomes necessary.

Attention! This symbol on the instrument and in the manual showing the warning triangle indicate that the correct operating instructions (as defined in this manual) must be followed when operating or replacing the item marked. Failure to adhere to these instructions may result in an accident, personal injury, damage to the instrument or accessory equipment.

Installation Procedure

1. Unpack the Midas® III-Plus Automated Stainer and place it in a horizontal alignment near the appropriate water source.

   Horizontal Alignment

   For safety of the system and the operator, ensure that all system feet are in contact with the bench where the system is installed.

   The system is horizontally aligned at the factory on a level bench top. If the bench surface where the system is being installed is not horizontally leveled or perfectly flat, the system should be re-aligned.

   System feet are height adjustable:

   - Loosen the locknuts above the feet using a 7/16 inch open wrench.
   - Adjust the system feet until the instrument is in a level and stable position on the bench. Re-tighten the locknuts.

2. If you have purchased the optional circulating water bath, refer to the Water Bath Manual in Section 7 (page 50) to complete the installation procedure.

3. To install the Midas® III-Plus Automated Stainer to a dedicated water source, attach the end of the 1/4 inch ID reinforced tubing without the fitting to the water source. Attach the end with the fitting to the port labeled Water Supply Inlet on the back panel of the Midas® III-Plus Automated Stainer (see Figure 2, page 13).

   The water supply pressure must be less than 75 psi. If the water pressure is less than 15 psi, the water supply should be connected to the Water Bath Inlet.

4. Protruding from the rear panel of the stainer is a large drain tube, which is centrally attached to the stainer. Ensure the large drain tube lies flat on the counter and that the open end is lower than the stainer. Drainage occurs by gravity:

   i. If the large drain tube is crimped or blocked, correct the problem.

   ii. If the incoming water pressure (flow rate) is too high, the drain pan may fill faster than the large drain tube can accommodate.*

* Immediately turn the water pressure off and allow to drain. It is possible the water may overflow inside the stainer and damage the unit.

5. Plug the power cord into the back panel of the Midas® III-Plus Automated Stainer and the other end into a wall outlet. A surge suppressor is recommended for laboratories that experience electrical spikes and/or frequent power interruptions.

Attention! The instrument MUST be connected to an earthed mains power outlet socket.
It is recommended that the Midas® III-Plus stainer be plugged into a wall socket that has Ground Fault Circuit Interruption (GFCI) protection—as an additional electrical safeguard.

Attention! To disconnect the power from the unit, unplug the power cord from the unit.

6. Level the stainer as follows:
   i. Place a stain vessel containing water into a station on the stainer.
   ii. If the stain vessel water level indicates that the stainer is not level*, locate the nuts on the legs at each corner. Manually turn each to raise or lower the appropriate corner(s). Use the water level as a guide.

   The Midas® III-Plus Automated Stainer will automatically control the incoming water flow rate and ensure that it does not exceed 2,000 mL/minute. During program execution, the water flow rate as selected, 500, 1,000, 1,500 or 2,000 mL/minute by the operator will be maintained. During the "valve test" in Service Mode 9, the flow rate of 2,000 mL/minute is maintained.

7. Ensure the open end of the large drain tube is not clogged and can drain the unit properly by performing the following check:
   i. Turn the water supply ON. If using the optional water bath, connect the water bath to the Water Bath Inlet and plug the water bath into the GFI protected power outlet in the rear of the Midas® III-Plus Automated Stainer.
   ii. Turn the Midas® III-Plus Automated Stainer ON and wait until it initializes.
   iii. Press SVC, ⌂, ⌂, ⌂ (Service Mode 9, a "value test"), ENTER, ⌂ (up 500, 1,000, 1,500 or 2,000 mL/ minute—push ENTER to start water flowing). This sequence selects the "valve test" and turns the valve ON and if used, the optional water bath pump. Check the open end of the large drain tubing. It should be below the level of the Midas® III-Plus Automated Stainer.
   iv. Make sure that the water drains freely.
   v. Press the STOP key twice to turn OFF the valve and exit the Service Mode.

You are now ready to begin setup and programming of the Midas® III-Plus Automated Stainer.

Figure 3.
Keypad

* Immediately turn the water pressure off and allow to drain. It is possible the water may overflow inside the stainer and damage the unit.

Section 3: Operating the Midas® III-Plus Automated Stainer

Controls and Indicators

PROGRAM	Enter processing steps for a program
REVIEW	View each successive programmed processing step Push ENTER to view each processing step Push PROGRAM to write over incorrect steps Push ENTER to the end of the program
RUN	Starts execution of a program
STOP	Pauses the stainer and raises the tower (Press RUN to continue or 1X, 2X, 3X. Program will stop and the arm will go to the Home Position)
ENTER	Enters selected processing steps into system memory
CLEAR	Push PROG button and Program Number then ENTER Press CLEAR to start programming the new sequence To clear an incorrect entry, use "0" or write over the entry
SVC Push SVC ⇧ ⇩ to the correct Service Number	**Used to enter Service Mode** 1. Up/Down Test 2. Dipping Test 3. Left/Right Station Test 4. Find Home Test 5. Left/Right Motor Speed 6. Left/Right Motor Test 7. Up/Down Motor Speed 8. Fan/Heater Test 9. Value Test 10. Set Temperature 11. Set Drying Mode
KEY ⇧ ⇩	Used to navigate
NUMBER PAD	Used to select program numbers and processing steps

Unit Display Run Information

Display	Function
PROGRAM NUMBER	Indicates program currently being run or reviewed.
STATION NUMBER	Indicates Station currently being run or reviewed.
STATION TIME REMAINING (STA is displayed on keypad)	Indicates time remaining in program at Station being used. (Also time in Station in review)
DIPPING STATUS/ AGITATION	Displays DIP for dipping, no dipping (---) (by temperature area)
STEP NUMBER	Indicates step currently being run or reviewed.
TEMP, °C	Indicates temperature currently being run or reviewed. (Displayed to the right in review area)
TOTAL TIME REMAINING	Indicates total time remaining in the program.

Attention! Consult accompanying documents.
See page 23 for complete description of the Service Modes.

Midas® III-Plus Automated Stainer Set-up

Before beginning setup procedure, install the Midas® III-Plus Automated Stainer according to the instructions in Section 2.

Loading Slides

1. Lay the slide carrier on its side. Slide up the metal retaining plate on the slide carrier.
2. Load the slides into the carrier with the smear end away from retaining plate.
   - The slide carrier can hold from 1 to 20 slides in any slots. (Optional 10 and 30 slide carrier available)
3. Slide down the retaining plate to hold the slides in the carrier.
4. Mount the slide carrier onto the two rods of the tower arm. Gently and firmly slide the carrier back until the magnetic catch engages. **(Caution: Do not move arm left or right or up or down.)**

Operation Notes

The Midas® III-Plus Automated Stainer should be programmed when first installed according to the instructions in this section. It is not necessary to program again, except to change existing processing steps. Even when the stainer is turned off or power is interrupted the programs are stored in memory.

- When power is applied to the stainer, the unit initializes the slide carrier arm to its Home Position (Station 5), then displays a scrolling marquee.
- To pause a run in progress, press STOP. Press RUN to continue the run where it left off. To stop and reset the system, press STOP. Press STOP 3 additional times and the tower will return to the Home Position (Station 5).
- The Rinse Station is activated approximately 20 seconds prior to its use and turns off approximately 2 minutes after its use, or at the end of the cycle.
- The Drying Station (Station 6) continues to run approximately 2 minutes after the run has completed.

Self Test Program

Program 0 is a self test program for the stainer. To run the self test, press RUN, 0, ENTER. The sequence for Program 0 is:

Station	Time
5	10 seconds
4	10 seconds
3	10 seconds
2	10 seconds
1	10 seconds
2	10 seconds
3	10 seconds
4	10 seconds
5	10 seconds
6	3 minutes

Programming the Midas® III-Plus Automated Stainer

Entering a Program

1. Turn power on by using the ON/OFF switch on back of unit by the power cord and wait for the unit to initialize.
2. Press PROG to enter the programming mode.
3. The stainer has 9 available programs numbered 1 through 9. Select a program number and press that number on the keypad.
   a. Selected program number is displayed. Press ENTER.
      i. If the Midas® III-Plus Automated Stainer already has a protocol stored under the selected program number, it will display
   b. Press CLEAR for new program.
   c. Press CLEAR to start programming the new sequence.
4. Enter the Station Number corresponding to the vessel location desired. Station 1 through 6 are available. Press that number on the keypad. Press ENTER.
   a. In the Home Position the tower arm is at Station 5. Station 1 is the furthest right station. Count to the left to determine the corresponding Station Numbers for programming. Station numbers are marked on the platform.
   b. Rinse vessel is stationary at Staion 5. Drying Station is stationary at Station 6.
5. Enter the required time for the selected station, 00:01 99:59 (minutes:seconds). Press ENTER.
6. Using the  arrows select agitation or no agitation.
7. If Station 5 is selected, the Midas® III-Plus Automated Stainer will ask for the flow rate selection after programming the Agitation Mode. Use  to select the rinse water flow rate from the choices of 0, 500, 1,000, 1,500 and 2,000 mL/minute. When desired flow rate is displayed, press ENTER to make the selection.
8. Press ENTER
   a. The first Station is now programmed. The display is cleared for the next Station.
9. Repeat steps 4 through 7 for each step in the staining sequence.
   a. The programmed sequence can contain up to 29 steps, in any order.
10. After the final step is programmed and the unit is displaying a blank step, press STOP to save the program.

Sample Program

Program Number 5

Step Number	Station Number	Time (minutes: seconds)	Agitation Selected	Flow Rate (Station 5 only)
1	2	00:10	Yes	
2	4	00:10	No	
3	5	00:30	Yes	1,500 mL/minute

To enter this program, press the following keys while in Standby Mode.

- PROG, 5, ENTER (and CLEAR if asked by the Midas® III-Plus Automated Stainer) to select Program Number 5.
- 2, ENTER (to select Station 2 for Step 1)
- 1, 0, ENTER to select 10 second duration.
- ENTER to select Agitation (No Agitation push ⇧ or ⇩)

At this point Step 1 is completely programmed and the Midas® III-Plus Automated Stainer is ready for Step 2 Station Number.

By pressing the following keys, program the rest of the steps.

- Step 2: 4, ENTER, 1, 0, ENTER, ⇧ or ⇩, ENTER.
- Step 3: 5, ENTER, 3, 0, ENTER, ENTER, ⇧ ⇧ ⇧, ENTER (1,500 mL/minute)

At this point all 3 steps have been programmed and the Midas® III-Plus Automated Stainer is displaying Step 4.

Press STOP to exit the Programming Mode. The Midas® III-Plus Automated Stainer will save the program.

Running a Program

1. Load the staining vessels into the appropriate Station for the program being run.
2. Load the slides into the slide carrier and slide carrier onto the tower arm.
3. Turn on the stainer and wait for the unit to initialize. (The On/Off Switch is by the input power cord. The On position is indicated by I and the Off position is indicated by O on the switch face.)
4. Press RUN.
5. Press PROG (1–9) for the desired program, press ENTER. The run will start, the arm will initialize, and the tower will move to the first Station in the sequence. As the slide carrier runs in each Station, the unit will display run information.
6. To pause the run, press STOP.
   - To continue the run, press RUN.
   - To cancel the run, press STOP. Wait for tower to go to vertical Home Position and then press STOP 3 times to reset to Home Position.
7. An audible beep sounds six times at the completion of the program and the Standby Mode is entered. (Scrolling marquee will appear)

Reviewing a Program

1. Press REVIEW.
2. Press the number of the program to be reviewed.
   - The Program Number is displayed.
3. Press ENTER.
   - The first step in the program sequence is displayed. Including the Program Number, Station Number, DIP if agitation is selected and "---" if agitation is deselected, Station time in minutes:sections, flow rate in mL/minute if Station 5 is selected and temperature in °C if Station 6 is selected.
4. Continue to press ENTER to look at all steps in the programming sequence. Once all steps in the current sequence are displayed, the Midas® III-Plus Automated Stainer will display:

   END OF PROGRAM

   5

   5 is the Program Number being reviewed.

5. If ENTER is pressed again, the Midas® III-Plus Automated Stainer will start displaying the program again starting from the first step.
6. Press STOP to exit the Review Mode.
7. To edit, press PROG. When the information about a step is displayed and you want to change the selection for that step (e.g. Station Number, time, agitation, or flow rate).

Changing an Existing Program

To change a Station Number or time of a programmed step:

1. Press REVIEW.
2. Press the number of the program where change is desired.
3. Press ENTER to view the first step of the program. Continue to press ENTER until the step where the change desired is located.
4. Press PROG. The Midas® III-Plus Automated Stainer will display the Station Number for the selected step. Change the Station Number by pressing the desired Station Number and ENTER. If you do not want to change the Station Number just press ENTER.
5. Enter new time by pressing 0000 and then new time using number keys followed by ENTER.
6. Change agitation if desired by pressing  or  keys followed by ENTER. Just press ENTER if no change is needed.
7. If Station 5 is being edited, change flow rate if desired by pressing  or  keys followed by ENTER. Just press ENTER if no change is needed.
8. At this point, the Midas® III-Plus Automated Stainer will display the next step for modification. If no other changes are needed, press STOP to save the program and enter the STAND BY Mode, or push ENTER to view the remainder of the program, or press REVIEW to continue with the Review Mode. If changes to any other step(s) are desired or if additional step(s) are desired, continue the edit process.

Dipping Mechanism

The Midas® III-Plus Automated Stainer has the capability of either dipping the slides up and down or remaining stationary in the stain vessel. This feature is individually selectable for Stations 1 through 6.

NOTE: During routine programming operations, this function automatically defaults to dipping activated.

To activate or deactivate the dipping function;

1. Press REVIEW.
2. Press the number (1–9) of the program to be edited.
   - Program number selected is displayed.
3. Press ENTER.
4. The first step in programming the dipping mechanism will appear (above temp °C).
   - "Dip" will be indicated if active.
   - "---" will be indicated if inactive.

   To change the program, press PROG. Each station number will appear consecutively. At each station, enter agitation requirements by pressing the ⇧ for agitation and ⇩ for no agitation.

Service Mode Description for the Midas® III-Plus Automated Stainer

The Midas® III-Plus Automated Stainer software provides 11 Service Modes to test the performance of various functions as well as to set working parameters. The Service Modes are intended to facilitate testing and setting the unit.

To select the Service Modes, press the SVC key. The software displays the name of the first Service Mode. The operator can scroll through the entire list of the Service Modes by pressing ⇧ or ⇩. To select a specific Service Mode press the ENTER key. Once the mode is selected, by pressing ⇧ or ⇩ keys, the user can activate the Service Mode function or scroll through the available options for the selected parameter value. To select the desired value of a parameter, press ENTER to select the displayed options. The STOP key terminates the selected Service Mode and by pressing STOP, the software goes back in the Standby Mode. Prior to exiting the Service Modes, the mechanism may reinitialize to the Home Position.

Service Modes

1	UP/DOWN TEST	SVC ▽ ENTER 1	When selected, this mode moves the arm mechanism to the top if the UP arrow key is pressed, and moves to the bottom position if the DOWN arrow key is pressed. This Up/Down motion takes place at the current station position; the arm does not move Station position during this test. Press STOP to end.
2	DIPPING TEST	SVC ▽ ENTER 2	When this mode is selected, the arm will move up and down in its normal dipping motion, at the current Station position. (3 seconds up or down) Press STOP 2 times to end.
3	L/R STATION TEST	SVC ▽ ENTER 3	The arm will move between Station 3 to 4 to 2 and to Station 4 to 2 continuously until function is stopped. Press STOP ▽ or STOP to end.
4	FIND HOME TEST	SVC ▽ ENTER 4	The Midas® III-Plus Automated Stainer moves the arm mechanism to the Home Position (Station 5, UP position) when this mode is selected. Press STOP ▽ or STOP to end.
5	L/R MOTOR SPEED	SVC ▽ ENTER 5	Set the speed of the Left/Right Drive Motor. The optimum speed for this motor is 200. The speed can be increased in increments of 5. Maximum speed is 255 and the lowest speed is 50. The speed can be changed by pressing the △ ▽ and pressing ENTER. Press STOP ▽ or STOP to end.
6	L/R MOTOR TEST	SVC ▽ ENTER 6	This Service Mode activates the Left/Right Motor Drive to move it towards Station 5 from Station 6. Do not activate this test if already in the Station 1 position. Press STOP △ ▽ and STOP to go to standby.
7	U/D MOTOR SPEED	SVC ▽ ENTER 7	Press △ ▽ to set the speed. Set the speed of Up/Down drive motor. The optimum speed for this motor is 1,100. The speed can be increased in increments of 50. Maximum speed is 1,250 and the lowest speed is 500. Press ENTER to save, △ ▽ or STOP to go to standby. ⚠ **If speed is too HIGH, the arm will fail to rise when the slide carrier is full.**
8	FAN/HEATER TEST	SVC △ ENTER 8	During this Service Mode, the operator can turn ON △ and OFF ▽ the heater and the blower. When the heater and blower are ON, the Midas® III-Plus Automated Stainer controls the temperature of the air to be within 5 °C of the point set in Service Mode 10. It displays current temperature in the drying vessel in °C and °F, in the second line of the display. In the first line of the display, two numbers will be displayed, LOW and HI, to be used by the factory technician to evaluate the performance of the heating stystem. Press STOP to Service Mode △ ▽ STOP to standby.
9	VALVE TEST	SVC △ ENTER 9	For testing the water flow in Station 5, use the Service Mode 9. Push the SVC button, push the arrow to Service Mode 9 (valve test). Press enter then arrow down to 2,000 mL/minute. Push enter to start the Water Value test. You should get the actual flow within ±100 mL/minute automatically controlled to 2,000 mL per minute (in about 1 minute). Press STOP to go back to Service Mode. Press STOP again for the software to go back to standby. Press △ ▽. Press ENTER to start Water Value Test. Press STOP △ ▽. Press STOP to go to standby.

10	SET TEMPERATURE	SVC ENTER 10	Press to the Temperature Set Point. The Midas® III-Plus Automated Stainer allows the operator to set the temperature at the Drying Station within a range of 20 °C and 65 °C in increments of 1 °C. The temperature set point selected in this mode is used during the drying process at Station 6 during a normal run, as well as during Service Mode 8 (FAN-HEATER TEST). If the temperature is set at or below the room temperature, the heater will not turn on. (Average temperature is 45 °C). Press ENTER to save and STOP to go to standby.
11	SET DRYING MODE	SVC ENTER 11	Press to select Drying Mode. The Midas® III-Plus Automated Stainer provides two Drying Modes at Station 6. “Slides Mostly Up” Mode is optimum for drying the slides at this Station. “Normal Agitation” allows the use of Station 6 as any other reagent station. Set the temperature to 20 °C. Once the Drying Mode is selected, the Midas® III-Plus Automated Stainer will use that mode for all programs for Station 6 agitation until changed by the operator. Press STOP to go to standby.
12	REPEAT PROGRAM 9		The Midas® III-Plus Automated Stainer provides a way to repeat Program 9 over and over again to help troubleshoot intermittent problems. Any program stored in 9 will be repeated again and again while updating a cycle counter at the end of each completed sequence. Press STOP 3 times to exit the program execution and to exit the Service Mode.
13	ADJUST TEMPERATURE OFFSET		This Service Mode allows the user to set an offset value for the temperature to bring the measured value closer to the actual value (if necessary). The user can set an offset value between -9 and +9 °C in an increment of 1 °C. The displayed temperature is the offset value added to the measured (by Midas® III-Plus Automated Stainer) temperature. For example, if the actual temperature is 42 °C and Midas® III-Plus displays 40 °C set the offset value to +2 degrees.
14	CALIBRATE FLOW SENSOR		This Service Mode allows the user to calibrate the flow sensor to bring the measured value closer to the actual value (if necessary). The user can calibrate the sensor at the most frequently used flow rate and the same correction factor will apply to all four flow-rate selections. A correction up to ±10 % can be implemented in this Service Mode. To calibrate Midas® III-Plus Automated Stainer flow rate, select this Service Mode, select the flow rate that is most critical, measure the actual flow rate, select the actual rate by using Up/Down Arrow keys and press ENTER. Midas® III-Plus Automated Stainer will calculate and display the correction factor. This correction factor will be applicable for all 4 flow rates.
15	OPTIONAL PASSWORD		Midas® III-Plus Automated Stainer software allows the end user to protect the settings with an optional password. The password protection prohibits a user from accessing two modes.

Section 4: Applications for the Midas® III-Plus Automated Stainer

This section contains the following recommended staining protocols for use on the Midas® III-Plus Automated Stainer:

- Harleco® Hemacolor® Stain Solution
- Hemacolor® Rapid Staining of Blood Smears
- Harleco® Wright Stain solution
- Wright's Stain Solution
- Giemsa Stain Solution
- Harleco® Wright Giemsa Stain Solution
- Harleco® Wright Giemsa Stain Solution, Fuccillo
- May-Grünwald's Stain Solution
- Pappenheim Stain Solution
- Leishman's Stain Solution
- Harleco® Gram Stain Solution
- Gram Stain Solution
- AFB Stain Solution
- TB-fluor Stain Solution
- Kinyoun Stain Solution with Fuchsin

These staining protocols reflect work done in the controlled environment of our research laboratories. They are guidelines from which to develop protocols that fit conditions in your laboratory. Call our Technical Service department at 1-800-325-5832 for assistance in developing protocols.

Application Notes

- At the end of this manual (page 49) you will find blank application forms to use with your laboratory's stain protocols.
- We recommend using deionized water to rinse slides for hematology procedures including HemaColor®, Wright, Giemsa, Wright Giemsa Stain, Fuccillo Modification, May-Grünwald, Pappenheim, and Leishman Staining applications. The optional recirculating Water Bath is advantageous for laboratories where a dedicated deionized water source is not available.
- Reagent stability for any stain or solution depends on use and exposure to air. For this reason, we recommend all solutions be covered when not in use.
- Stopping a program before the drying cycle is complete may prevent the Rinse Station from emptying. Remove the slide carrier and press RUN; this will complete the program and empty the Rinse Station. (After drying is complete, dryer will remain on for 2 minutes.)

WARNING: Do not dispose of stain into the overflow basin and drain. Remove the stain vessel and dispose of the stain in compliance with current local, state and federal regulations.

Harleco® HemaColor® Stain Solution

Ordering Information

Description	Size	Cat. No.
HemaColor® Stain Solution Set	3 x 500 mL	65044-93
HemaColor® Stain Solution 1	4 L	65044A-85
HemaColor® Stain Solution 2	4 L	65044B-85
HemaColor® Stain Solution 3	4 L	65044C-85

Not available in all countries. Contact your local dealer for details.

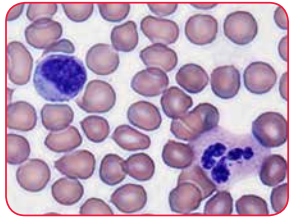
Protocol

All Stations default to dipping activated. This is the suggested staining protocol for the use of Harleco® Stains.

Solution	Station No.	Time
HemaColor® Stain Solution 1	2	30 seconds
Dry*	6	1 minute
HemaColor® Stain Solution 2	3	7 seconds
Rinse	5	5 seconds
HemaColor® Stain Solution 3	4	8 seconds
Rinse	5	1 minute
Dry	6	3 minutes

*** NOTES:**

- Drying slides after fixation ensures optimum stain performance and quality.
- For the best staining, use **Deionized** or **Distilled Water.**



Hemacolor® Rapid Staining of Blood Smears

Ordering Information

Description	Size	Cat. No.
Hemacolor® Set	3 x 500 mL	1.11661.0001
Package components:		
The staining kit contains 3 x 500 mL bottles and 6 buffer tablets		
Reagent 1: Hemacolor® Solution 1 fixing solution, 500 mL		
Reagent 2: Hemacolor® Solution 2 color reagent red, 500 mL		
Reagent 3: Hemacolor® Solution 3 color reagent blue, 500 mL		
Hemacolor® Buffer tablets pH 7.2 acc. to WEISE, 6 tablets		

Preparation

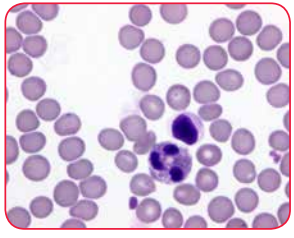
Buffer Solution:
1 Buffer tablet pH 7.2 to 1 L deionized or distilled water.

Reagents 1, 2, and 3 are ready-to use:
Dilution of the solution is not necessary and merely produces a deterioration of the staining result and their stability.

Protocol

This is the suggested staining protocol for the use of our stains.

Solution	Station No.	Time	Dipping Mode
Hemacolor® Stain Solution 1	1	30 seconds	On
Hemacolor® Stain Solution 2	2	3 seconds	On
Hemacolor® Stain Solution 3	3	6 seconds	On
Buffer Solution	4	10 seconds	On
Buffer Solution	5	10 seconds	On
Dry	6	3 minutes	Off



Harleco® Wright Stain Solution

Ordering Information

Description	Size	Cat. No.
Wright Stain Solution	1 L	740-75
	4 L	740-85
	10 L	740-86
Buffer, Phosphate pH 6.4	1 L	1217-75
	4 L	1217-85
Buffer, Phosphate pH 6.8	1 L	1218-75
	4 L	1218-85
Buffer, Phosphate pH 7.0	1 L	1219-75
	4 L	1219-85
HemaColor® Stain Solution (fixative)	4 L	65044A-85

Not available in all countries. Contact your local dealer for details.

Preparation

Stain/Buffer Mixture:

- Place 50 mL of Wright Stain Solution into vessel.
- Add 75 mL phosphate buffer pH 6.4.
- Add 175 mL deionized or distilled water.
- Mix and let stand 10 minutes before use.

NOTES:

- For more basophilic staining, use a pH 6.8 or 7.0 buffer.
- Stain and/or stain/buffer times may need to be adjusted if pH of buffer is changed.
- Maximum rinse water flow rate should not exceed 2,000 mL/minute.
- For the best staining, use **Deionized** or **Distilled Water.**

Protocol

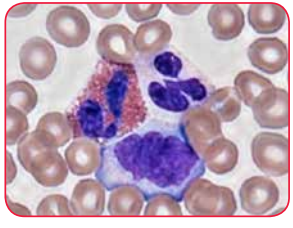
All Stations default to dipping activated. This is the suggested staining protocol for the use of Harleco® Stains.

For Peripheral Blood Smears

Solution	Station No.	Time
Fixative	2	30 seconds
Wright Stain Solution	3	3 minutes
Stain/Buffer Mixture	4	6 minutes
Rinse	5	1.5 minutes
Dry	6	3 minutes

For Bone Marrow Aspirates

Solution	Station No.	Time
Fixative	2	30 seconds
Wright Stain Solution	3	10 minutes
Stain/Buffer Mixture	4	20 minutes
Rinse	5	1.5 minutes
Dry	6	3 minutes



Wright's Stain Solution

Ordering Information

Description	Size	Cat. No.
Wright's eosin methylene blue solution	100 mL	1.01383.0100
	500 mL	1.01383.0500
	2.5 L	1.01383.2500
	100 mL (US)	1.01383.0107
	500 mL (US)	1.01383.0507
	2.5 L (US)	1.01383.2507
Buffer tablets pH 7.2 acc. to WEISE	100 tablets	1.09468.0100

Preparation

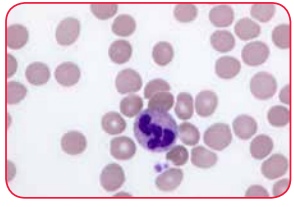
Buffer Solution:
1 Buffer tablet pH 7.2 to 1 L deionized or distilled water.

Wright's Working Solution:
Mix 50 mL Wright's Stain Solution with 30 mL buffer solution pH 7.2 and 220 mL deionized or distilled water carefully.

Protocol

This is the suggested staining protocol for the use of our stains.

Solution	Station No.	Time	Dipping Mode
Wright's eosin methylene blue solution	2	3 minutes	On
Wright's Working Solution	3	20 minutes	On
Buffer Solution	4	1 minute	On
Dry	6	3 minutes	Off



Giemsa's Stain Solution

Ordering Information

Description	Size	Cat. No.
Giemsa's azur eosin methylene blue solution	100 mL	1.09204.0100
	500 mL	1.09204.0500
	1 L	1.09204.1000
	2.5 L	1.09204.2500
Buffer tablets pH 7.2 acc. to WEISE	100 tablets	1.09468.0100
Buffer tablets pH 6.8 acc. to WEISE	100 tablets	1.11374.0100
Buffer tablets pH 6.4 acc. to WEISE	100 tablets	1.11373.0100
Methanol for analysis EMSURE®	1 L	1.06009.1000
	2.5 L	1.06009.2500

Preparation

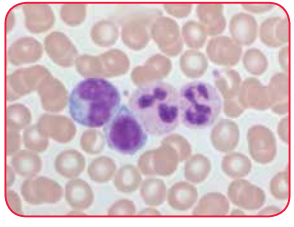
Buffer Solution:
1 Buffer tablet to 1 L deionized or distilled water.

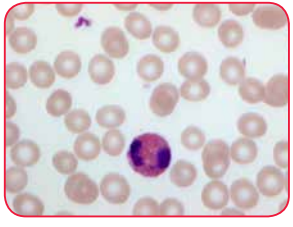
Giemsa's Working Solution:
Add 25 mL Giemsa Stain Solution to 275 mL Buffer Solution. Mix carefully and let stand for 10 minutes. Filter before use.

Protocol

This is the suggested staining protocol for the use of our stains.

Solution	Station No.	Time	Dipping Mode
Methanol	2	3 minutes	On
Giemsa's Working Solution	3	20 minutes	On
Buffer Solution	4	1 minute	On
Running tap water (Flow 1,500)	5	2 minutes	On
Dry	6	3 minutes	Off





Harleco® Wright Giemsa Stain Solution

Ordering Information

Description	Size	Cat. No.
Wright Giemsa Stain Solution	1 L	742-75
	10 L	742-86
Buffer, Phosphate pH 6.4	1 L	1217-75
	4 L	1217-85
Buffer, Phosphate pH 6.8	1 L	1218-75
	4 L	1218-85
Buffer, Phosphate pH 7.0	1 L	1219-75
	4 L	1219-85
HemaColor® Stain Solution (fixative)	4 L	65044A-85

Not available in all countries. Contact your local dealer for details.

Preparation

Stain/Buffer Mixture:

- Place 50 mL of Wright Giemsa Stain Solution into vessel.
- Add 250 mL phosphate buffer pH 6.4.
- Mix and let stand 10 minutes before use.

NOTES:

- For more basophilic staining, use a pH 6.8 or 7.0 buffer.
- Stain and/or stain/buffer times may need to be adjusted if pH of buffer is changed.
- Maximum rinse water flow rate should not exceed 2,000 mL/minute.
- For the best staining, use **Deionized** or **Distilled Water.**

Protocol

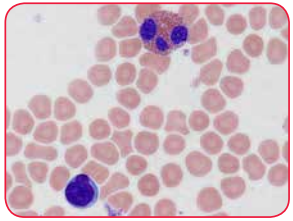
All Stations default to dipping activated. This is the suggested staining protocol for the use of Harleco® Stains.

For Peripheral Blood Smears

Solution	Station No.	Time
Fixative	2	30 seconds
Wright Giemsa Stain Solution	3	2 minutes
Stain/Buffer Mixture	4	2 minutes
Rinse	5	2 minutes
Dry	6	3 minutes

For Bone Marrow Aspirates

Solution	Station No.	Time
Fixative	2	30 seconds
Wright Giemsa Stain Solution	3	10 minutes
Stain/Buffer Mixture	4	20 minutes
Rinse	5	2 minutes
Dry	6	3 minutes



Harleco® Wright Giemsa Stain Solution, Fuccillo

Ordering Information

Description	Size	Cat. No.
Wright Giemsa Stain Solution, Fuccillo	1 L	64571-75
	4 x 500 mL	64571-95
	4 L	64571-85
Buffer, Phosphate pH 6.4	1 L	1217-75
	4 L	1217-85
Buffer, Phosphate pH 6.8	1 L	1218-75
	4 L	1218-85
Buffer, Phosphate pH 7.0	1 L	1219-75
	4 L	1219-85
HemaColor® Stain Solution (fixative)	4 L	65044A-85

Not available in all countries. Contact your local dealer for details.

Preparation

Stain/Buffer Mixture:

- Place 50 mL of Wright Giemsa Stain Solution into vessel.
- Add 250 mL phosphate buffer pH 6.4.
- Mix and let stand 10 minutes before use.

NOTES:

- For more basophilic staining, use a pH 6.8 or 7.0 buffer.
- Stain and/or stain/buffer times may need to be adjusted if pH of buffer is changed.
- Maximum rinse water flow rate should not exceed 1,500 mL/minute.
- For the best staining, use **Deionized** or **Distilled Water.**

Protocol

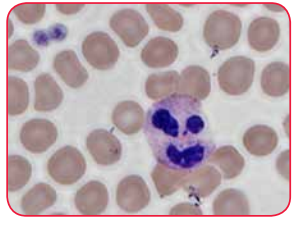
All Stations default to dipping activated. This is the suggested staining protocol for the use of Harleco® Stains.

For Peripheral Blood Smears

Solution	Station No.	Time
Fixative	2	30 seconds
Wright Giemsa Stain Solution	3	1.5 minutes
Stain/Buffer Mixture	4	3 minutes
Rinse	5	1.5 minutes
Dry	6	3 minutes

For Bone Marrow Aspirates, using Buffer pH 6.4

Solution	Station No.	Time
Fixative	2	30 seconds
Wright Giemsa Stain Solution	3	10 minutes
Stain/Buffer Mixture	4	20 minutes
Rinse	5	1.5 minutes
Dry	6	3 minutes



For Bone Marrow Aspirates, using Buffer pH 6.8

Solution	Station No.	Time
Fixative	2	30 seconds
Wright Giemsa Stain Solution	3	4 minutes
Stain/Buffer Mixture	4	8 minutes
Rinse	5	1.5 minutes
Dry	6	3 minutes

May-Grünwald's Stain Solution

Ordering Information

Description	Size	Cat. No.
May-Grünwalds's eosine-methylene blue solution modified	100 mL	1.01424.0100
	500 mL	1.01424.0500
	1 L	1.01424.1000
	2.5 L	1.01424.2500
Buffer tablets pH 7.2 acc. to WEISE	100 tablets	1.09468.0100

Preparation

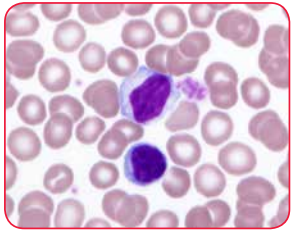
Buffer Solution:
1 Buffer tablet pH 7.2 to 1 L deionized or distilled water.

May-Grünwald's Working Solution:
Mix 50 mL May-Grünwald's Stain Solution with 30 mL buffer solution pH 7.2 and 220 mL deionized or distilled water carefully.
Let stand for 10 minutes. Filter before use.

Protocol

This is the suggested staining protocol for the use of our stains.

Solution	Station No.	Time	Dipping Mode
May-Grünwald's eosin-methylene blue Solution	2	3 minutes	On
May-Grünwald's Working Solution	3	20 minutes	On
Buffer pH 7.2	4	1 minute	On
Dry	6	3 minutes	Off



Pappenheim Stain Solution

Ordering Information

Description	Size	Cat. No.
May-Grünwald's eosine-methylene blue solution modified	100 mL	1.01424.0100
	500 mL	1.01424.0500
	1 L	1.01424.1000
	2.5 L	1.01424.2500
Giemsa's azur eosin methylene blue solution	100 mL	1.09204.0100
	500 mL	1.09204.0500
	1 L	1.09204.1000
	2.5 L	1.09204.2500
Buffer tablets pH 7.2 acc. to WEISE	100 tablets	1.09468.0100
Buffer tablets pH 6.8 acc. to WEISE	100 tablets	1.11374.0100

Preparation

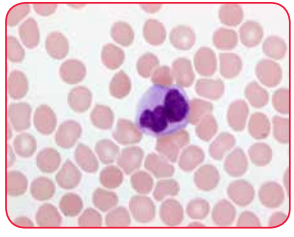
Buffer Solution:
1 Buffer tablet pH 7.2 or pH 6.8 to 1 L deionized or distilled water.

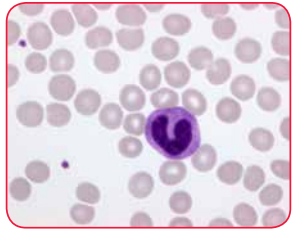
Giemsa's Working Solution for Pappenheim:
Add 15 mL Giemsa's Stain Solution to 285 mL Buffer Solution. Mix carefully and let stand for 10 minutes. Filter before use.

Protocol

This is the suggested staining protocol for the use of our stains.

Solution	Station No.	Time	Dipping Mode
May-Grünwald's eosin-methylene blue solution modified	1	3 minutes	On
Giemsa's Working Solution for Pappenheim	2	20 minutes	On
Buffer Solution	3	2 minutes	On
Buffer Solution	4	2 minutes	On
Dry	6	3 minutes	Off





Leishman's Stain Solution

Ordering Information

Description	Size	Cat. No.
Leishman's eosin methylene blue solution modified	500 mL	1.05387.0500
	500 mL (US)	1.05387.0507
	20 x 1 L	1.05387.1022
Buffer tablets pH 7.2 acc. to WEISE	100 tablets	1.09468.0100

Preparation

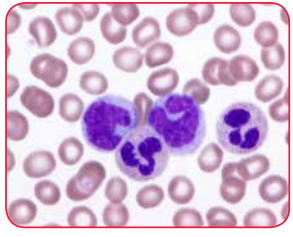
Buffer Solution:
1 Buffer tablet pH 7.2 to 1 L deionized or distilled water.

Leishman's Working Solution:
Mix 50 mL Leishman's Stain Solution with 30 mL buffer solution pH 7.2 and 220 mL deionized or distilled water carefully. Let stand for 10 minutes. Filter before use.

Protocol

This is the suggested staining protocol for the use of our stains.

Solution	Station No.	Time	Dipping Mode
Leishman's eosin methylene blue solution	2	3 minutes	On
Leishman's Working Solution	3	20 minutes	On
Buffer pH 7.2	4	1 minute	On
Dry	6	3 minutes	Off



Harleco® Gram Stain Solution

Ordering Information

Description	Size	Cat. No.
Gram Stain Solution Set	4 x 500 mL	65092-93
Crystal Violet, Gram Stain Solution	4 x 500 mL	65092A-95
	4 L	65092A-85
Safranin Stain Solution, Gram	4 x 500 mL	65092B-95
	4 L	65092B-85
Iodine Stain Solution, Gram	4 x 500 mL	65092D-95
	4 L	65092D-85
Decolorizer, Gram Stain Solution	4 x 500 mL	65092E-95
	4 L	65092E-85

Not available in all countries. Contact your local dealer for details.

Our laboratory determined decolorization time for Harleco® Gram Stain using an 80% isopropyl alcohol and 20% acetone decolorizing solution. Timing parameters may need to be modified when using a different decolorizing solution.

NOTES:

- Heat fix specimens over a flame prior to staining.
- For thicker smears such as sputum or blood cultures, protocol times may need to be adjusted.
- Maximum rinse water flow rate should not exceed 2,000 mL/minute.

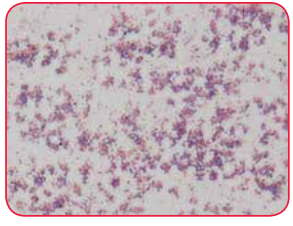
Protocol

All Stations default to dipping activated. This is the suggested staining protocol for the use of Harleco® Stains.

Routine Gram Stain Solutions

Solution*	Station No.	Time
Crystal Violet	1	10 seconds
Rinse	5	20 seconds
Iodine	4	10 seconds
Rinse	5	20 seconds
Decolorizer	3	7 seconds
Rinse	5	20 seconds
Safranin	2	10 seconds
Rinse	5	20 seconds
Dry	6	3 minutes

* To minimize carry-over, change stains after 20 runs and decolorizer daily.



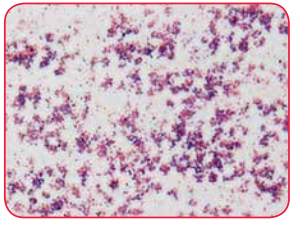
For Lighter or Stat Work

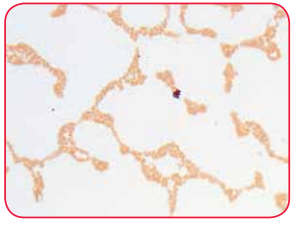
Solution*	Station No.	Time
Crystal Violet	1	5 seconds
Rinse	5	10 seconds
Iodine	4	5 seconds
Rinse	5	10 seconds
Decolorizer	3	7 seconds
Rinse	5	10 seconds
Safranin	2	5 seconds
Rinse	5	20 seconds
Dry	6	3 minutes

* For stat work, the stainer can be stopped after the last rinse, then the specimens can be removed and air-dried.

For Specimens Requiring Shorter Decolorization Times (i.e. Anaerobes)

Solution*	Station No.	Time
Crystal Violet	1	10 seconds
Rinse	5	20 seconds
Iodine	4	10 seconds
Rinse	5	20 seconds
Decolorizer	3	5 seconds
Rinse	5	20 seconds
Safranin	2	10 seconds
Rinse	5	20 seconds
Dry	6	3 minutes





Gram Stain Solution

Ordering Information

Description	Size	Cat. No.
Gram-color	5 x 500 mL	1.11885.0001
	5 x 500 mL (US)	1.11885.0007
Package components:		
The staining kit contains 5 x 500 mL bottles		
Reagent 1: Gram-color crystal violet solution, 500 mL		
Reagent 2: Gram-color Lugol's solution stabilized with PVP, 500 mL		
Reagent 3/4: Gram-color decolorizing solution each, 500 mL		
Reagent 5: Gram-color safranine solution, 500 mL		

Alternative combination of reagents are available:

Description	Size	Cat. No.
Gram's crystal violet solution	500 mL	1.09218.0500
	2.5 L	1.09218.2500
	500 mL (US)	1.09218.0507
	2.5 L (US)	1.09218.2507
Lugol's solution stabilized with PVP	1 L	1.00567.1000
	2.5 L	1.00567.2500
Lugol's solution	1 L	1.09261.1000
	2.5 L	1.09261.2500
Gram's decolorizing solution	500 mL	1.10218.0500
	2.5 L	1.10218.2500
Gram's safranine solution	500 mL	1.09217.0500
	2.5 L	1.09217.2500

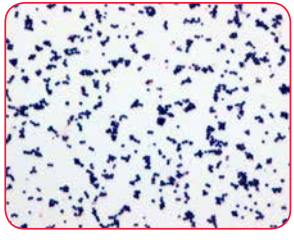
Preparation

Reagents are ready-to use:
Dilution of the solution is not necessary and merely produces a deterioration of the staining result and their stability.

Protocol

This is the suggested staining protocol for the use of our stains.

Solution	Station No.	Time	Dipping Mode
Reagent 1 (crystal violet solution)	1	1.5 minutes	Off
Running tap water (Flow 1,500 mL/min)	5	30 seconds	On
Reagent 2 (Lugol's solution stabilized)	2	3 minutes	Off
Running tap water (Flow 1,500 mL/min)	5	20 seconds	On
Reagent 3/4 (decolorizing solution)	3	5 seconds	Off
Running tap water (Flow 1,500 mL/min)	5	30 seconds	On
Reagent 5 (safranine solution)	4	1 minute	Off
Running tap water (Flow 1,500 mL/min)	5	1 minute	On
Dry	6	3 minutes	Off



AFB Stain Solution

Ordering Information

Description	Size	Cat. No.
Tb-color staining kit	4 x 500 mL	1.16450.0001
	4 x 500 mL (US)	1.16450.0007
Package components:		
The staining kit contains 4 x 500 mL bottles		
Reagent 1: Tb-color Sputofluol®, 500 mL		
Reagent 2: Tb-color carbol fuchsin solution, 500 mL		
Reagent 3: Tb-color hydrochloric acid in ethanol, 500 mL		
Reagent 4: Tb-color malachite green solution, 500 mL		

Instead of the staining kit 1.16450.0001, the following combination of reagents can be used:

Description	Size	Cat. No.
Sputofluol®	1 L	1.08000.1000
Tb-color carbol fuchsin solution	500 mL	1.08512.0500
	2.5 L	1.08512.2500
	2.5 L (US)	1.08512.2507
Hydrochloric acid in ethanol	1 L	1.00327.1000
	5 L	1.00327.5000
Tb-color malachite green (oxalate) solution	500 mL	1.10630.0500
	500 mL (US)	1.110630.0507

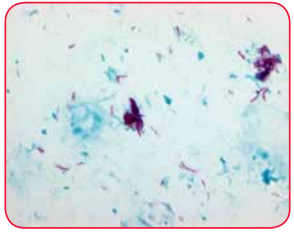
Preparation

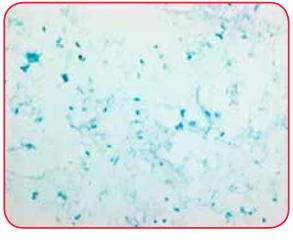
Reagents 2, 3, and 4 are ready-to use:
Dilution of the solution is not necessary and merely produces a deterioration of the staining result and their stability.

Protocol

This is the suggested staining protocol for the use of our stains.

Solution	Station No.	Time	Dipping Mode
Reagent 2 (carbolfuchsin solution)	1	5 minutes	Off
Running tap water (Flow 1,500 mL/min)	5	45 seconds	On
Reagent 3 (hydrochloric acid in ethanol)	2	15 seconds	Off
Running tap water (Flow 1,500 mL/min)	5	15 seconds	On
Reagent 4 (malachite green solution)	3	1 minute	Off
Running tap water (Flow 1,500 mL/min)	5	10 seconds	On
Dry	6	3 minutes	Off





TB-fluor Stain Solution

Ordering Information

Description	Size	Cat. No.
TB-fluor staining kit	6 x 500 mL	1.09093.0001
Package components:		
The staining kit contains: 6 x 500 mL bottles		
Reagent 1: TB-fluor Auramine-rhodamine solution, 500 mL		
Reagent 2: TB-fluor Decolorizing solution, 3 x 500 mL		
Reagent 3: TB-fluor Counterstaining solution ($KMnO_4$), 2 x 500 mL		

Preparation

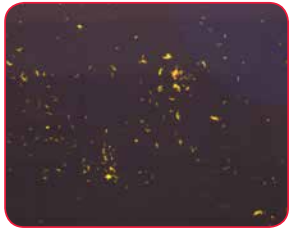
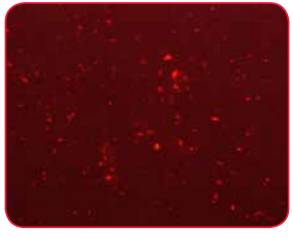
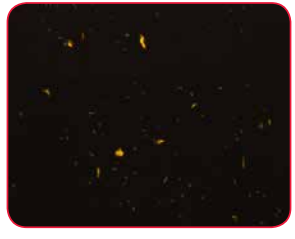
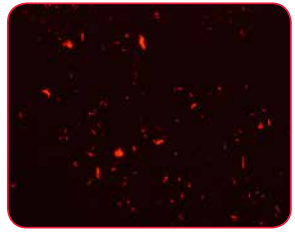
Reagents are ready-to use:
Dilution of the solution is not necessary and merely produces a deterioration of the staining result and their stability.

Due to its high viscosity, Reagent 1 (Auramine-rhodamine-solution) must be vigorously shaken before use.

Protocol

This is the suggested staining protocol for the use of our stains.

Solution	Station No.	Time	Dipping Mode
Reagent 1 (Auramine-rhodamine solution)	4	15 minutes	Off
Running tap water (Flow 1,500 mL/min)	5	10 minute	On
Reagent 2 (Decolorizing solution)	3	1 minute	On
Running tap water (Flow 1,500 mL/min)	5	5 minute	On
Reagent 3 (Counterstaining solution)	2	5 minutes	Off
Running tap water (Flow 1,500 mL/min)	5	5 minute	On
Dry	6	5 minutes	Off

Kinyoun Stain Solution with Fuchsin

Ordering Information

Description	Size	Cat. No.
Fuchsin (C.I. 42510) Certistain®	25 g	1.15937.0025
	100 g	1.15937.0100
Phenol GR for analysis ACS, Reag. Ph Eur	250 g	1.00206.0250
	1 kg	1.00206.1000
Hydrochloric acid in ethanol	1 L	1.00327.1000
	5 L	1.00327.5000
Ethanol denatured 1% methyl ethyl ketone	1 L	1.00974.1011
	2.5 L	1.00974.2511
Methylene blue (C.I. 52015) Certistain®	25 g	1.15943.0025
	100 g	1.15943.0100

Preparation

Liquid phenol:
Melt 10 parts phenol by warming and add 1 part distilled water.

Kinyoun solution:
Dissolve 10 g Fuchsin in 20 mL Phenol. Add 50 mL 96% Ethanol and 250 mL deionized or distilled water. Mix well and filter solution.

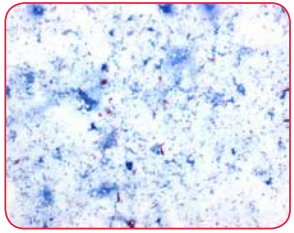
Methylene blue stock solution (1%):
Dissolve 1 g Methylene blue in 100 mL deionized or distilled water Mix well and filter.

Methylene blue working solution (0.1%):
Mix 30 mL of Methylene blue stock solution with 270 mL deionized or distilled water.

Protocol

This is the suggested staining protocol for the use of our stains.

Solution	Station No.	Time	Dipping Mode
Kinyoun Solution	1	5 minutes	On
Running tap water (Flow 1,500 mL/min)	5	45 seconds	On
Hydrochloric acid in ethanol	2	15 seconds	Off
Running tap water (Flow 1,500 mL/min)	5	15 seconds	On
0.1% Methylene blue, working solution	3	5 minutes	On
Running tap water (Flow 1,500 mL/min)	5	10 seconds	On
Dry	6	3 minutes	Off



Section 5: Keeping The Midas® III-Plus Automated Stainer Working

Technical Assistance and Service

To keep the Midas® III-Plus Automated Stainer clean and functional, perform the following maintenance procedures. Should the corrective action listed in the troubleshooting guide prove ineffective, technical assistance and service are available by calling our toll-free number Monday through Friday from 8:30 am to 5:00 pm EST.

Technical Service Department
EMD Millipore Corporation
400 Summit Drive, Burlington, MA 01803 U.S.A.
Call toll free: 1-800-325-5832
www.sigmaaldrich.com/askascientist

Maintenance and Cleaning

General Information

- DO NOT use excessive amounts of solvent for cleaning.
- DO NOT use metal scrapper or any sharp objects to scrape off any residue as this will damage the surface finish and paints.
- DO NOT use the system for purposes other than its intended function.
- DO practice good housekeeping and maintain the system in a clean condition.
- DO switch off the system before removing plug.
- DO ensure that replacement fuses are of the correct specification.

Preventative Maintenance Schedule

A manufacturer-suggested preventative maintenance schedule is outlined in the table below:

Maintenance Activity	Daily	Weekly	Monthly
Clean the keypad and the display window with a lint-free cloth.	X		
Clean outside surfaces of system and lid with soft cloth. Use cleaning detergent, if necessary.	X		
Remove and clean the reagent containers.		X	
Check electrical connections at rear panel of system.			X

At the end of the warranty period, enter into a service contract. For more information, please contact us at instrument.caredesk@emdmillipore.com.

Cleaning Procedures

Midas® III-Plus stainer system is designed to properly function under recommended settings. Please use the following instructions and cleaning procedures carefully.

- Disconnect line cord from stainer when cleaning. The stainer should always be disconnected from the mains power supply when cleaning, particularly if flammable solvents are used.
- Use only minimal quantities of cleaning solvent (such as glass cleaner, 1:10 dilution of Chlorox® bleach solution (or equivalent, etc.) on an absorbent cloth as recommended by the manufacturer's label instructions.
- Do NOT use Xylene or Xylene substitute as well as other decolorizing agents that can attack paint, plastic and other insulating materials. Do not use excessive amount of cleaning agent while wiping down the surfaces.
- Periodically clean the rinse containers and the drain areas of the stainer with 1:10 dilution of Chlorox® bleach solution bleach solution (or equivalent) to minimize any growth of fungus.

Notes

Interior: Remove the reagent containers. Wipe-clean the stainless-steel platform with a regular cleaner and then wipe-clean with water to remove the residue of the cleaner.

Transfer Arm: The transfer arm contains sensitive electronic components. Therefore, do not clean with any liquid but simply wipe down with a slightly moistened cloth.

Outside Surfaces: Clean the painted outside surface with a mild detergent and subsequently wipe down with a moistened cloth. Do not use any solvents for cleaning the outside surfaces.

Disposal of the System

The system or the parts of the system must be disposed of according to prevailing local applicable regulations. If you have purchased the Midas® III-Plus branded electrical or electrical products and are intending to dispose these products at the end of their useful life, please do not dispose of them with your facility waste. These electrical components should not be disposed of in a landfill or with municipal or household wastes. Instead, please be aware that we are making return and collection systems available to you. To learn more about our recycling and end of life Corporate Responsibility policy, please visit https://www.emdmillipore.com/US/en/responsibility/products/recycling-end-of-life/1gyb.qB.QxgAAAFAoTI.1ZZu,nav.

Fuse Replacement

Caution: Electric shock hazard

Disconnect line cord before servicing.

Refer servicing to qualified service personnel.

- Unplug power cord from wall outlet before checking or replacing fuses.
- Ensure the replacement fuse is the same ampere rating as the fuse it replaces

  Locate the following fuses/breakers labeled clearly on the back panel of the strainer (see Figure 2, page 13)
- Main (2) 5 A 250 vac =/- Slo-Blo

To replace a fuse(s)

1. Turn off and unplug the stainer from the wall outlet.
2. With a small screw driver, pry the fuse drawer out of the power entry module (located next to the line cord). There is a small notch on the left side of the drawer for prying.
3. Check the metal strip inside the fuse. If it has melted, replace fuse with another fuse of the same ampere rating.
4. Put the new fuse back into holder and slide back into the slot on the back panel. The assembly will snap into place.
5. Plug stainer into wall outlet and turn on.

Line Voltage Selection

Caution: Electric shock hazard

Disconnect line cord before servicing.

Refer servicing to qualified service personnel.

- Unplug power cord from the wall outlet before checking or replacing fuse(s).
- Ensure the replacement fuse is the same ampere rating as the fuse it replaces.
- The Midas® III-Plus Automated Stainer can operate using 110 or 220 volts.

To convert from 110 volts to 220 volts:

1. Turn off and unplug stainer.
2. On rear panel, locate LINE VOLTAGE SELECTION, set to 220 volts using small screwdriver.
3. Replace power cord adaptable to 220 volts outlets.

The Midas® III-Plus Automated Stainer Recirculating Water Bath (120 volts + AC 1 amp) can be plugged directly into stainer for 220 volts applications.

Line Voltage Selection	
For 108–125 vac (50–60 Hz)	5 amp, 250 volts, Slo-Blo
For 200–240 vac (50–60 Hz)	5 amp, 250 volts, Slo-Blo

Troubleshooting

Caution: Electric shock hazard

Disconnect line cord before servicing. Refer servicing to qualified service personnel.

Problem	Possible Cause	Corrective Action
Horizontal movement i.e., vibrates when moving.	Tower is too far left, past horizontal Home Position.	Push STOP. Turn off and unplug stainer. Move tower to the center of the stainer by pushing slowly and firmly at the tower base. Plug in and turn on. Tower should return to Home Position.
	Possible obstruction of horizontal tower drive path.	Push STOP. Turn off and unplug stainer. Inspect carefully the horizontal tower path for any obstructions, e.g., lids.
Vertical vibration while going up.	Speed too fast.	Go to Service Mode 7. Up/Down, Motor Speed, ENTER, arrow up or down to slow down speed and retry.
Vertical movement i.e., carrier arm drives past vertical up position and vibrates.	Carrier arm drives past vertical Home Position.	Push STOP. Turn off and unplug stainer. Firmly but slowly push the tower arm down approximately half way. Turn the stainer on and verify that it initializes properly.
Erratic vertical movement.	Bad motor or drive electronics.	Call our Technical Service Department at 1-800-325-5832.
Low flow rate or no flow of water into rinse vessel from a tap water source.	Insufficient water pressure from tap water supply.	Inspect all water supply connections, and reset if necessary. Make sure water supply is on.
	Crimp or blockage in the inlet hose.	Straighten tubing and remove any blockage.
	Stainer is not level.	Level the stainer. See instructions to level stainer in Section 2.
	Line pressure may be higher than necessary.	All units are tested to work at a water pressure of 80 psi or less and be capable of delivering at least 2,000 mL per minute. In the event the line pressure is higher, it is possible that you may not get adequate water flow. To correct the situation, the water pressure regulator needs to be adjusted. **If you need assistance in adjusting the water pressure regulator, please contact an authorized service center.**

Problem	Possible Cause	Corrective Action
Water humming or noise, vibration from water system	Air trapped in the system of high volume of air in the water	Noise is created when air is trapped in the system. First purge the air from the "quick disconnect tube" that attaches the water supply to the Midas® III-Plus Automated Stainer. One way to accomplish this is to turn the water on while the tube is not connected to the Midas® III-Plus Automated Stainer and carefully press the opening of the fitting while pointing the fitting in the sink/drain. This fitting has a check valve and the value will allow the flow of water (and air) when the front end is pressed. When all the air has been removed, release the fitting and the water flow will stop. Run the rest with hot water for a few minutes and the noise will go away. Once the noise is gone, this should not occur again unless the unit is disconnected and more air is trapped in the system.
	High water pressure.	Air in the water lines of the instrument may create a water hammer effect, causing noise. This can be corrected by bleeding the lines when the instrument is installed. This is accomplished by briefly pushing the Water Bath Inlet to release the air. Beware, when you push this fitting, water will flow onto the bench top, be sure to place a few paper towels under the fitting before pushing. The remaining item to check is the water flow rate. This can be measured by monitoring SVC Function 9 while adjusting the water source valve. This should be set as close to 2,000 mL/minute as possible.
No power or keypad LED display.	Check ON/OFF switch.	Turn off and unplug stainer. Inspect main power fuses and replace if necessary. See instructions to replace fuse in Section 5.
	Main fuse blown.	Try plugging the stainer into a different outlet. Inspect both ends of power cord and reset if necessary.
Low flow rate or no flow of water into the rinse vessel with water bath as water source.	Insufficient volume of water in bath.	The water level should cover the intake valve of the pump located inside the water bath cavity. At least 5 liters of deionized water are required. Inspect all water supply connections, straighten tubing and remove any blockages.
	Water bath is not level with the stainer.	Place water bath level with the stainer.
	Electrical supply to water bath is faulty.	Plug water bath directly into another electrical outlet to ensure pump is operational. Reset plug on the back panel of the stainer. Try connection to another electrical outlet. Use SVC Function 9, Value Test.

Problem	Possible Cause	Corrective Action
Ground Fault Test of Reset for Midas® III-Plus Water Bath outlet on back of Midas® III-Plus Automated Stainer	Ground Fault Indicator (GFI) is tripped.	Reset GFI on back panel of the stainer. To test the GFI, Run Program 0 and press ENTER.
	Water bath pump is air bound.	Turn off pump or stop stainer. Disconnect the WATER INLET tubing from the back panel of the stainer. Use reinforced tubing with fitting (male) into Water Bath Inlet (female) to open the line up. Hold the tubing straight up in the air. An air bubble will be expelled from the pump. Turn on valve test or run Program 0 to rinse and remove all air bubbles, making sure to place the tube in a sink or water bath. Push stop, remove the reinforced tubing, and reconnect the WATER INLET tubing to the stainer.
Stainer is leaking from underneath stainer.	Stainer is not level.	Level the stainer. See instructions to level the stainer in Section 2.
	Water bath is not level with the stainer.	Place the water bath level with the stainer.
	Crimp in large drain tube that causes water to back up and drain pan to overflow.	Inspect large drain tube for crimps or blockage. The large drain tube should be level with or lower than the stainer because drainage occurs by gravity (if drain tube is too long, cut the tubing to the correct length).
	Too much water in water bath.	Fill with no more than 5 liters of water or only up to the mark on the filter (top of the filter element).
Stainer is leaking from the back	WATER SUPPLY INLER or WATER BATH INLET connection is not seated correctly	WATER BATH INLET or WATER SUPPLY INLET located on the back panel of the stainer. Disconnect the inlet tube, inspect the 0-ring on the quick disconnect for position and condition. If O-ring is worn or damaged, replace. Reconnect inlet tube until it clicks.
Excess precipitate on slides.	Water bath filter is damaged or dirty.	Rinse water bath filter under warm running tap water to remove deposits and precipitates. If filter is damaged or worn, replace.
	Water in water bath contains deposits and precipitate.	Clean and rinse. Replace the water in the water bath.
	Flow rate is too low.	See instructions for setting the flow rate in Section 3. Go to the next higher setting (Review Program Number to Station 5, see page 19 Step 7).
	Rinse time is too short.	Increase rinse time by 30 second intervals until problem is resolved.

Problem	Possible Cause	Corrective Action
Heater is not drying.	Dry time is too short.	The recommended dry time is 3 minutes for all stain applications. **Heat intensity can be increased and decreased by operation (Service Mode 10). Care should be taken to make gradual changes so as not to risk damage to the slide sample.**
	Heat breaker tripped.	Reset heater breaker CB2 on the CPU PCB inside the unit. Contact qualified service personnel to reset the heater breaker CB2 on the CPU PCB.
	Water has entered heater unit.	Press STOP. Turn off and unplug stainer. Call our Technical Service Department at 1-800-325-5832.

Section 6: Midas® III-Plus Automated Stainer Accessories

Ordering Information

Description	Qty/pk	Cat. No.
System		
Midas® III-Plus Automated Stainer	1	64000H-94
Components		
Midas® Slide Carrier 10 Slides **(New)**	1	15251
Midas® Slide Carrier 20 Slides	1	64052-94
Midas® Slide Carrier 30 Slides	1	64052E-94
Midas® III-Plus Coverslip Carrier	1	64053-94
Midas® Coverslip Carrier	1	64053-94
Midas® Water Bath	1	64000WB-94
Midas® Water Bath Filters	2	64000WBF-95
Midas® Vessels and Lids (300 mL)	8	64054W-95
Midas® Vessel with lid (150 mL) **(New)**	1	15250
Midas® III-Plus Operating Manual	1	5.06115.0001
Midas® III-Plus Service Manual	1	5.06118.0001
Midas® Plastic Hood Enclosure	1	5.06117.0001
Midas® 110 volt power cord, Plug Type B (US, Canada, Mexico, Colombia, Peru, Guatemala and Caribbean)	1	RW918003
Midas® 220 volt power cord, Plug Type I (Argentina)	1	RW922030
Midas® 220 volt power cord, Plug Type L (Chile)	1	RW922035
Midas® 220 volt power cord, Plug Type N (Brazil)	1	RW922040

Description	Qty/pk	Cat. No.
Spare Parts		
Midas® CPU Board (without software)	1	RD11635-4
Midas® Display Board (without software)	1	RB11636-4
Midas® Interconnect Board	1	RB11634-4
Midas® Left/Right Sensor Board Assembly (Emitter and Detector)	1	RA11936
Midas® Up Down Sensor Board	1	RB11631-4
Midas® Power Supply Assembly with Connectors	1	RC11825
Midas® Torroid Assembly, wired (without bracket, washers)	1	RB11828
Midas® Rinse Vessel (only)	1	RC11759
Midas® Rinse Vessel Assembly	1	RC11771
Midas® Drying Position Vessel	1	RC11785
Midas® Fuses (5 amp Slo-Blo/250 vac)	2	RA11925
Midas® Water Valve, Wired (without fittings)	1	RB11843
Midas® Flow Sensor Assembly with Wiring	1	RB11824
Midas® Water Pressure Regulator	1	RX300030
Midas® Power Entry Module Assembly with Wiring	1	RB11854
Midas® GFI Outlet	1	RH520001
Midas® Bezel	1	RC11772-1

Description	Qty/pk	Cat. No.
Midas® Left/Right Motor, Wired	1	RB11827
Midas® Left/Right Motor with Connector, Plate, Screws and Pulley	1	RB11852
Midas® Up/Down Motor, Wired	1	RB11826
Midas® Up/Down Motor Assembly	1	RB11851
Midas® Bearing Assembly	1	RB11863
Midas® Belt	1	RP680023
Midas® Heater Assembly, Wired	1	RC11842
Midas® Blower Assembly, Wired	1	RC11822
Midas® Temperature Sensor Board Assembly	1	RB11940
Midas® Heater Blower Assembly without Temperature Sensor	1	RC11829
Midas® Water Bath Pump	1	RX003100
Midas® Stainer CPU Board Software	1	RA11928
Midas® Stainer Display Board Software	1	RA11930
Midas® Water Flow Control Software	1	RA11931
Midas® Keypad	1	RD11773

Description	Qty/pk	Cat. No.
Midas® Reinforced Tubing with Quick Disconnect	1	RB11894
Midas® Rear Panel Assembly	1	RD11762
Midas® Ground Strap	1	RB11848
Midas® Control Cable	1	RB11821
Midas® Up/Down Sensor Cable	1	RB11823

For more information, please visit our web site at **www.sigmaaldrich.com** or call 1-800-325-5832.

Blank Application Sheet

Program Number

Stain Procedure

Station	Time	Reagent

Comments

Blank Application Sheet

Program Number

Stain Procedure

Station	Time	Reagent

Comments

Section 7: Midas® III-Plus Water Bath Manual

Introduction

The optional Midas® III-Plus Water Bath is a free-standing unit that attaches directly to the Midas® III-Plus Automated Stainer. It eliminates the need for a dedicated water source. With the Midas® III-Plus Water Bath and Midas® III-Plus Automated Stainer connected, water is circulated from the water bath through the Rinse Station (Station 5) and back to the water bath. The submersible pump located inside the water bath pumps the water into the stainer. The water exits from the stainer through a drain in the back of the stainer and returns to the water bath. Drainage occurs by gravity.

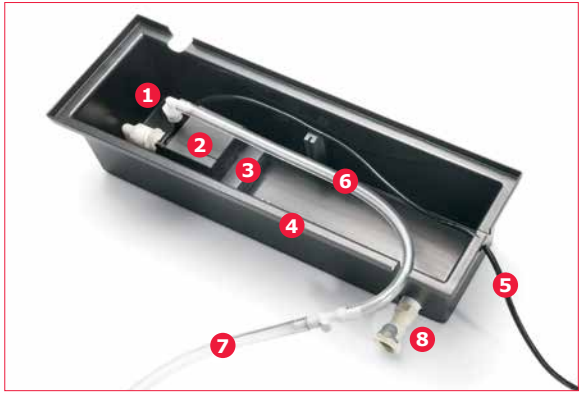


Figure 4. Midas® III-Plus Water Bath

1. Pump Inlet Fitting
2. Pump
3. Water Bath Filter
4. Tub
5. Power Cord Location
6. Tube Section to Pump
7. Tube Section to Midas® III-Plus Automated Stainer
8. Midas® III-Plus Drain Tube fits here

Installation Procedure

1. Remove Midas® III-Plus Water Bath from shipping container. Place the Water Bath on the same level as the Midas® III-Plus Automated Stainer. A Water Bath filter is included in the shipping container and the Water Inlet Tubing is attached to the pump.
2. Unwrap the pump from the water bath tub. Locate the pump as shown in Figure 4. Place the power cord and the Tube Section to Pump as shown in the figure. Connect “Tube Section to Midas® III-Plus” to the “Tube Section to Pump”. These two sections can be connected in only one way. Connect the other end of the “Tube Section to Midas® III-Plus” to the Midas® III-Plus Water Bath Inlet.
3. Attach the free end of the Water Inlet Tubing to the Midas® III-Plus Automated Stainer Water Bath Inlet. The port where the tubing is connected is clearly marked as “WATER BATH INLET” in the back of the Midas® III-Plus Automated Stainer. The fitting on the tube can mate with only one connector in the back of the Midas® III-Plus Automated Stainer.
4. Attach the large COLDER fitting provided with the water bath to the $^{5}/_{8}$ inch large drain tube coming from the Midas® III-Plus Automated Stainer. You can cut the excess length of the tube if necessary. Now connect the large drain tube to the Midas® III-Plus Water Bath.

5. Check the 5/8 inch large drain tube for crimps or blockage since this will impede drainage.
6. Locate the electrical outlet on the back panel of the Midas® III-Plus Automated Stainer. This outlet is marked "OUTLET TO BE USED WITH EMD BATH ONLY". Plug the Midas® III-Plus Water Bath power cord into this outlet.
7. Fill the water bath with 5 liters of deionized or distilled water. (Filter is marked for 5 liters.)
8. Insert the Water Bath filter into the slot in the center of the Water Bath.
9. To prime the Water Bath pump activate the VALVE TEST in Service Mode 9 at 2,000 mL/minute. If the water flow does not start due to any air bubbles in the pump, perform the following steps:

- Stop the pump. Press STOP.
- Connect the fitting with the reinforced tubing to the water supply connection tube (supplied with the Midas® III-Plus Automated Stainer) to the free end of the Water Inlet Tubing for the Midas® III-Plus Water Bath. This will open the check valve in the Water Inlet Tubing.
- Leave the entire length of the tubing under the water surface in the water bath.
- Activate the valve and the pump, select the VALVE TEST in the Service Mode 9 at 2,000 mL/minute. Now the water should flow freely in the water bath.
- Stop the pump. Press STOP.
- Disconnect the fitting from the water supply connection tubing and reconnect the free end of the Water Inlet Tubing from the Water Bath to the Midas® III-Plus Automated Stainer.
- Ensure that the drain water flows freely back to the Midas® III-Plus Water Bath.

10. Cover the water bath with the lid.

Operational Notes

- The Midas® III-Plus Water Bath operates automatically when the Midas® III-Plus Automated Stainer is in use.
- Twenty seconds before the slide carrier arm is programmed to arrive at Station 5, the water automatically begins circulation.
- The water bath power cord should not be plugged directly into the wall outlet. If it is plugged directly into the wall outlet, the water bath will run continuously.
- The pump continues to run for 2 minutes after the rinse cycle is complete to ensure that the rinse station remains clean.

Maintenance

Daily

Drain and refill the water bath at the beginning of each day as follows:

- Disconnect the Water Inlet Tubing from the Midas® III-Plus Automated Stainer and attach the fitting from the water supply tubing to the free end of the Water Inlet Tubing. This will open the check valve in the tubing connector.
- Place the free end of the tubing in a suitable container to collect the water to be drained.
- Activate the valve and the pump by selecting the VALVE TEST in Service Mode 9 at 2,000 mL/minute. Now the water should flow freely in the drain container from the water bath.
- When the water bath is almost empty, tilt it forward by raising the back edge of the water bath to drain out most of the water.
- Dispose of water in accordance with local, state, and federal regulations.
- Remove the water bath filter and clean by placing under running tap water. Rub gently to remove any residue.
- Prime the pump and Water Inlet Tubing. See Prime the Pump Procedure outlined on page 55.
- If you want to rinse the container, disconnect the large drain tubing from the water bath. There may be some water still in the drain tube. To minimize spillage, place the drain tube back in the Midas® III-Plus Automated Stainer tube.

Weekly

1. Drain the Midas® III-Plus Water Bath as per daily maintenance.
2. Fill the water bath with a 7% bleach solution. Program the stainer to rinse at Station 5 for 5 minutes. (Refer to Section 3 for programming instructions.) This will allow the dilute bleach solution to circulate for 5 minutes.
3. Drain bleach solution from water bath. Rinse the water bath cavity with copious amounts of water to remove bleach residue.
4. Fill the water bath with deionized or distilled water.
5. Run the program entered in Step 2 using water only. This will rinse any residual bleach from the system.
6. Drain the Midas® III-Plus Water Bath. Repeat Steps 4–6.
7. Fill the Midas® III-Plus Water Bath with 5 liters of deionized or distilled water.

Ordering Information

Description	Qty/pk	Cat. No.
Replacement water bath filters	2	64000WBF-95

Procedure to Prime the Water Bath Pump

1. Make sure that the Midas® III-Plus Automated Stainer drain tube is connected to the Drain Tube Fitting of the Midas® III-Plus Water Bath. Names of various tubings and connectors are shown in Figure 5A.
2. Ensure that the drain water flows freely back to the water bath.
3. Disconnect “Tube Section to Midas® III-Plus” from the “Tube Section to Pump” of the water bath as shown in 5B.
4. Attach “Braided Tube” (supplied with water bath and/or with Midas® III-Plus) to the “Tube Section to Pump” as shown in 5C.
5. While keeping the “Braided Tube” above the level of the pump as shown in 5D, fill the Water Bath with 5 liters of distilled or deionized water.
6. While pointing the open end of the “Braided Tube” in the Water Bath, activate the valve and the pump by selecting the VALVE TEST in Service Mode 9 at 2,000 mL/minute. The water should flow freely.
7. If the water flow does not start because the pump did not prime due to trapped air, turn the pump off by pressing STOP. Raise the open end of the “Braided Tube” and empty the entire water column back into the Water Bath tub as shown in D).
8. Repeat Steps 6 and 7 until the pump primes.
9. Once the pump is primed and a good water stream is established, run the pump for about 60 seconds and then turn it off. Disconnect the “Braided Tube” and connect the “Tube Section to Midas® III-Plus”.
10. Run the Valve Test again until 2,000 mL/minute ± 200 mL flow rate is achieved for about 60 seconds.
11. Cover the Midas® III-Plus Water Bath with the lid.
12. The pump is primed and Midas® III-Plus Automated Stainer and Water Bath are ready for use.

Figure 5.

1. Tube Section to Pump
2. Tube Section to Midas® III-Plus
3. Fitting for Drain Tube
4. Braided Tube/Accessory Tube

A) B) C) D)

Standard Warranty

The applicable warranty for the products listed in this publication may be found at **www.sigmaaldrich.com** (within the “Terms and Conditions of Sale” applicable to your purchase transaction).

IVD

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To Place an Order or Receive Technical Assistance

In the United States and Canada, call toll-free at 1-800-325-5832.
Outside the United States and Canada, contact your local dealer to place an order or for assistance.

For Technical Assistance, contact: **www.sigmaaldrich.com/askascientist**

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