

HistoPro® 414
Linear Slide Stainer
Operator's Manual

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1 Important Information

1.1 Intended Use:

HistoPro[®] 414 Linear Slide Stainer (the Stainer) is to be used for the automated preparation of routine histological and cytological stains. It is intended for use in pathology laboratories to assist with the following tasks:

- Staining thin tissue sections or cytological specimens on slides.
- Staining frozen sections.

The Stainer may be operated only according to the instructions contained in this manual. Any other use of the Stainer is considered improper!

1.1 Qualification of Personnel

- HistoPro[®] 414 may be operated by trained laboratory personnel only.
- All laboratory personnel designated to operate HistoPro[®] 414 must read this Operating Manual carefully and must be familiar with all technical features of the Stainer before attempting to operate it.

1.2 Warranty Information

RUSHABH Instruments' (RI) HistoPro[®] 414 Automated Slide Stainer is warranted against defects in materials and workmanship, under its prescribed use and operating conditions, for a period of twelve months from the date of shipment. RI will repair or replace products that prove to be defective within the warranty period without charge **when shipped prepaid** to the RI office.

If the product is not registered by filling out and sending the warranty card to RUSHABH Instruments, it will be warranted for a period of twelve months from its manufacturing date.

Warranty Exceptions

- ◆ Consumables – bulbs, fuses, tubing, reagent containers, slide carriers, and other items of an expendable nature are not covered under this agreement.
- ◆ Failure or the damage caused by User's failure to provide ample electrical power at constant voltage, consistent with the specifications of the product is not covered under this agreement.
- ◆ Scratches, dents, and similar surface finish damage during normal use of the system are not covered under this agreement.
- ◆ Failure or the damage caused by any use other than the intended use specified in this Manual, Misuse and unauthorized repairs or alterations are not covered under this agreement.

- ◆ Acts of nature such as lightning strikes and floods are not covered under this agreement and should be covered under owner's separate insurance policy.

All RI products are sold on the condition that they be used and disposed of only within the scope of currently recognized, critical standards related to human health and the physical environment.

EXCEPT FOR THE WARRANTY ABOVE, RI MAKES NO OTHER WARRANTY OF ANY KIND WITH REGARD TO ITS PRODUCTS WHETHER EXPRESS, ARISING BY OPERATION OF LAW, OR IMPLIED BY COURSE OF DEALING, USAGE OF TRADE, OR OTHERWISE, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

RI SHALL NOT IN ANY CIRCUMSTANCE BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

Contact our Technical Service Department for more information regarding your warranty.

Technical Service Department
RUSHABH Instruments, LLC.
1750A Costner Drive
Warrington, PA 18976
Phone: (215) 491-0081

1.3 Definition of Various 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.
	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.
	Biohazard. Samples processed on this system may be biohazard. Use proper procedures and safety procedures to handle biohazard.
	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 these liquids based on the manufacturer's recommendations and follow the local regulations for disposal.
	Alternating current symbol.
	Protective Conductor Terminal Symbol. For the safety of the operator, ensure that the earth ground is always connected at this terminal.
	Power Supply ON indication. Push the Power ON/OFF switch in the direction marked with this symbol to turn the unit power on.
	Power Supply OFF indication. Push the Power ON/OFF switch in the direction marked with this symbol to turn the unit power off.

1.4 Other Notes:

- **WARNING: Please read this manual carefully before using the HistoPro[®] 414 Automated Slide Stainer.**
- **The manufacturer reserves the right to alter the HistoPro[®] 414 specifications without notice.**
- **In order 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.**



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 HistoPro[®] 414 Automated Slide Stainer.

Cleaning: Apply aqueous solutions to a clean cloth for cleaning of all working and non-working surfaces. Sterilization of HistoPro[®] 414 or its individual components is not required.

Spillage: In the event of spillage of any fluid or reagent, the system must be disconnected from the mains supply immediately and not reconnected or used until examined and tested by an Authorized Service Engineer. Failure to do this may result in a fire hazard.

Servicing: HistoPro[®] 414 Automated Slide Stainer contains no user serviceable components. Contact our Technical Service Department or an Authorized Service Engineer for all service requirements.

2 Stainer Components and Specifications

The HistoPro® 414 is an automated linear stainer designed for stand-alone use, and can be used for staining frozen tissue sections in histology labs as well as anatomical pathology laboratories.

It is ideal for use in staining samples from either Mohs technique laboratories or sections from frozen section laboratories or general surgical pathology. In addition it is intended to be used in hematology, cytology, as well as performing routine H&E stains.

The user loads the slides in a carrier that can hold up to 4 slides at a time. The stainer provides 14 reagent stations that can be used as reagent stations or running rinse water stations and has an Exit Tank that can hold up to four processed slide carriers. Up to three rinse stations can be installed at any position (see Section 4.2.4 for more details)

The slides will remain in each reagent station for a fixed programmable time that is applicable to all stations during staining. Station time, number of dips and start position are programmable.

2.1 Overview of Functional Areas of the Stainer

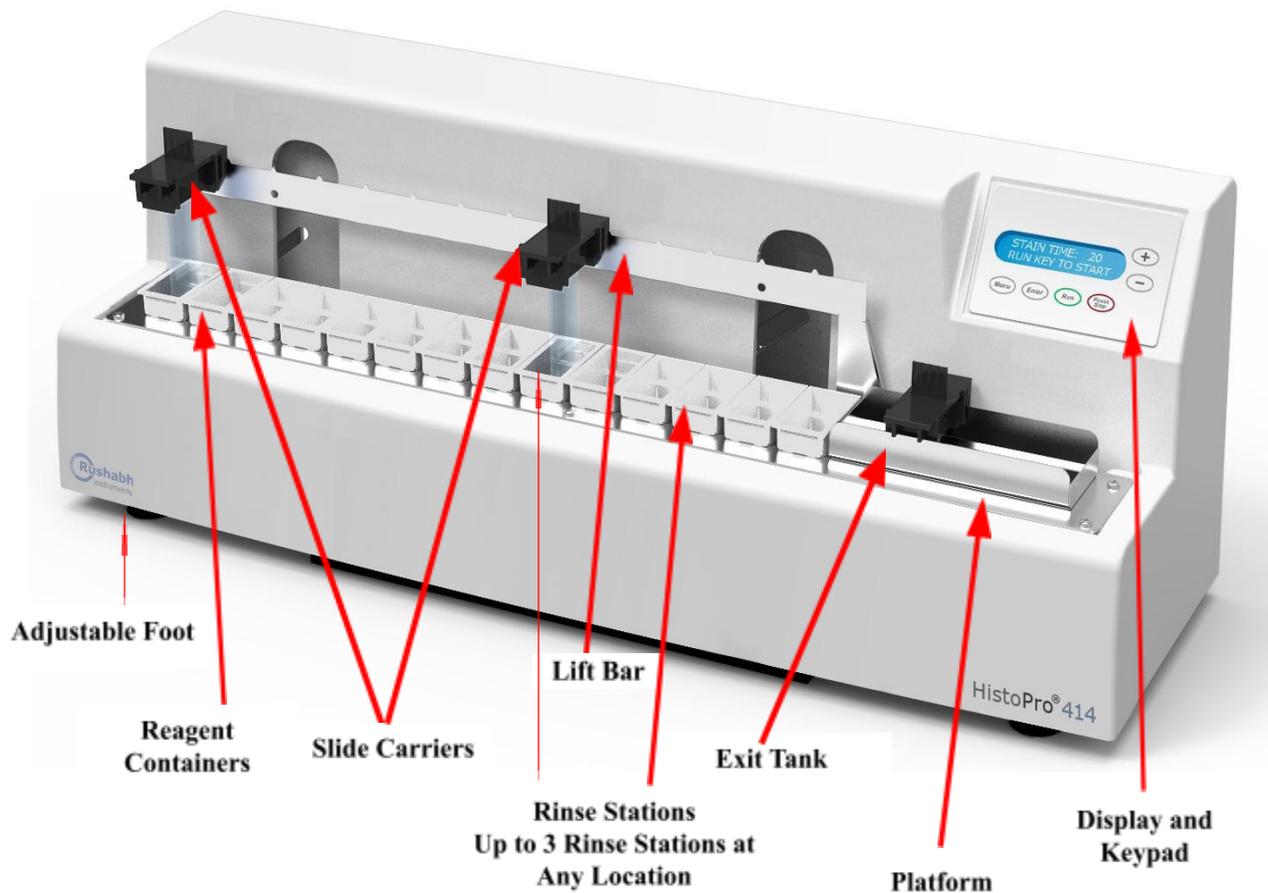


Figure 1: Front View of Stainer

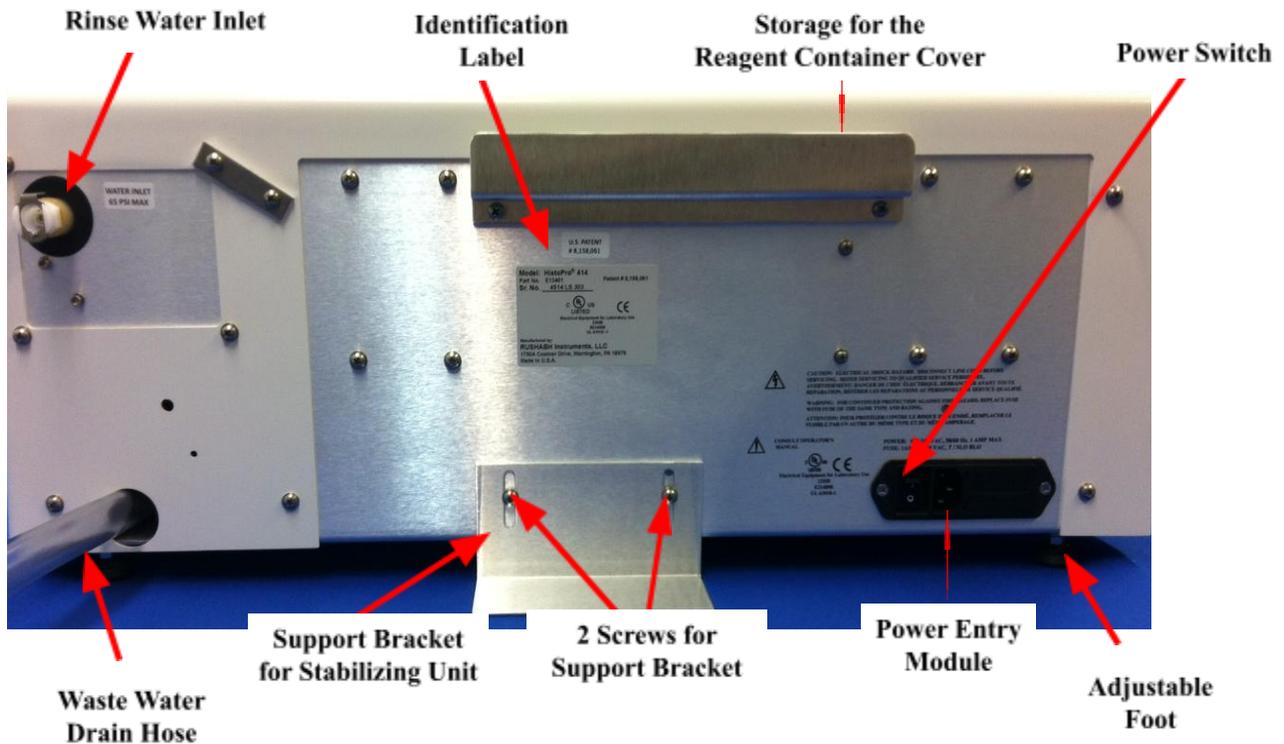


Figure 2: Rear View of the Stainer

2.2 System Overview

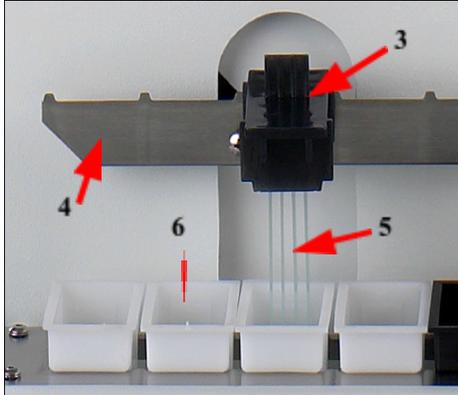
Refer to Figure 1 and Figure 2 for the overview of the Stainer. The HistoPro® 414 Linear Stainer has the following functional areas.



Keypad and Display:

A membrane keypad with 6 keys (Item 2) allows the user to set up the processing parameters and also allows the user to start and stop the processing runs.

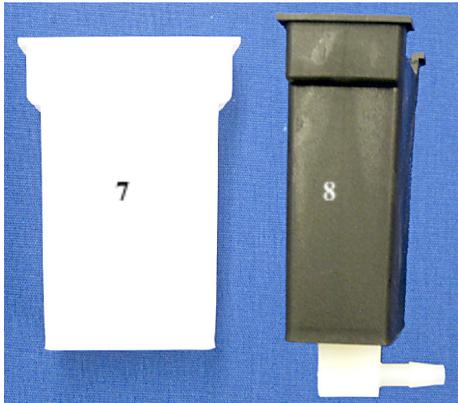
A 2 line x 16 Character LCD display (Item 1) provides the slide processing status as well as Processing Parameters of the Stainer. The user is directed to take various actions as necessary.



Slide Carrier and Lift Bar:

The user loads the slides (Items 5) for staining in the slots of the slide carrier (Item 3). The user then places the slide carrier onto the Lift Bar (Item 4) and over the First Reagent Container.

The Lift Bar moves the slide carriers from one station to the next station (Item 6). Eventually, the Lift Bar deposits each slide carrier in the Exit Tank.



Reagent Container and Rinse Container:

Each reagent container can hold up to 50 mL of the reagent for staining and processing.

A total of 14 reagent (Item 7) and 3 rinse containers (Item 8) can be arranged to customize the stainer to carry out a specific staining protocol. Each of the 14 processing positions must have either a reagent container or a rinse container present.

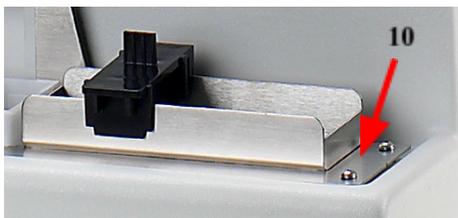
The rinse containers allow the slides to be subject to running rinse water while the slides are being processed.



Exit Tank:

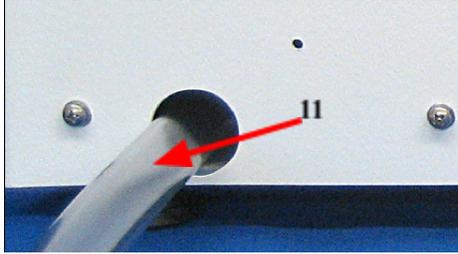
The Exit Tank (Item 9) holds the processed slides. It can hold up to 4 slide carriers.

As soon as 4 slide carriers are placed in the Exit Tank, the Stainer pauses subsequent processing until the slide carriers are removed.



Platform:

The platform (Item 10) holds the reagent containers, rinse containers and the Exit Tank in fixed locations to ensure the proper operation of the Stainer. All 14 containers (either reagent container or rinse container) and the Exit Tank must be placed on the platform to ensure proper operation of the Stainer.



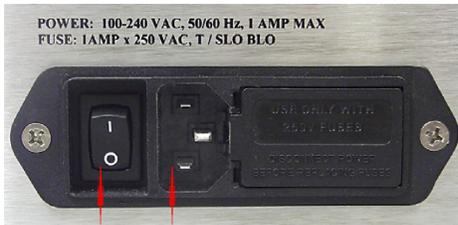
Waste Water Drain Hose:

The waste water drain hose (item 11) must be inclined downwards to ensure that rinse water flows into a waste container or the sink and does not collect in the Stainer.



Rinse Water Supply:

A connection port (Item 12) for the rinsing water supply is located on the rear of the Stainer. A mating fitting is provided with the Stainer to connect rinse water source to the Stainer.



Main Switch and Power Inlet:

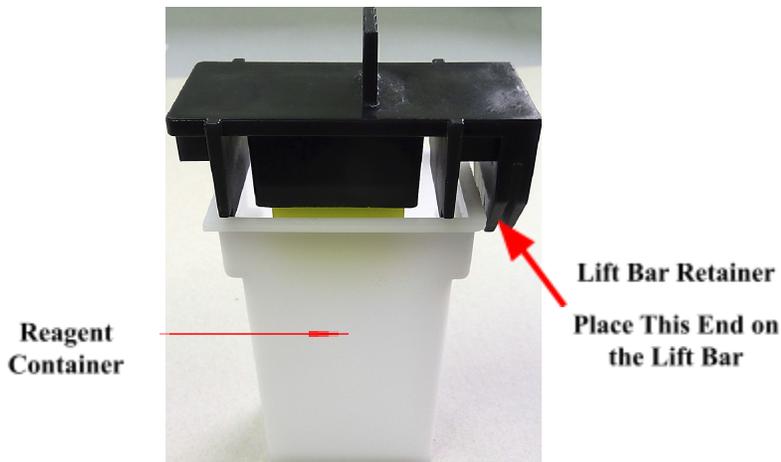
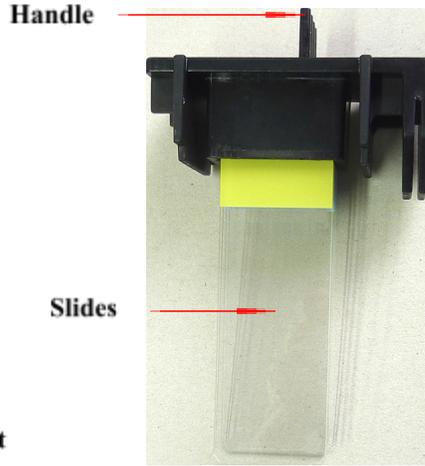
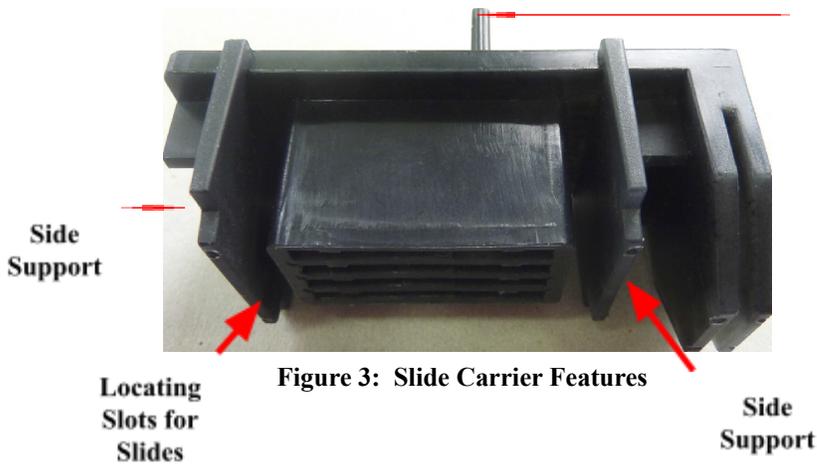
The Stainer is connected to the mains power supply by the power supply cord at the receptacle (Item 14), and activated with the main switch (Item 13).

The Stainer can be operated with alternative current at 100, 120, or 230 Volts with a power frequency of 50/60 Hz.

13 14

2.3 Functional Areas of the Slide Carrier

Refer to Figure 3 and Figure 4 for proper placement of the slides in the slide carriers. While placing a slide carrier with slides for staining on the Lift Bar, ensure that the Side Supports of the slide carrier are positioned such that the slide carrier rests over the container as shown in Figure 5 and Figure 6.



2.4 Technical Specifications

General	
Certification:	UL, cUL, CE
IEC 61010 classification	Protective class 1 Pollution degree 2 Overvoltage installation category II:
Input Power	
Nominal Voltage:	100 V – 230 V +/- 10% AC
Nominal Frequency:	50 to 60 Hz
Power Draw:	25 watts max
Fuse Rating	1.0 Amp, 250VAC, Time Delay/Slo Blo
Operating Environment	
Operating Environment	Indoor, Histology, Pathology Laboratory
Operating temperature range:	15 °C to 30 °C
Relative humidity:	20% to 80%, non-condensing
Altitude	≤ 6500 ft (Ambient pressure. 29 – 31 inch Hg
Dimensions and weights	
Dimensions, (W x D x H)	24.5" (62 Cm) x 8.5" (22 cm) x 11" (28 cm)
Unit weight without reagents, unpacked:	Approx. 35 lbs (16 kg)
Shipping Weight	Approx. 45 lbs (21 kg)
Performance	
Staining Time	2 sec to 300 sec, same time for all stations
Loading capacity:	Max. 4 slide carriers
Reagent Stations:	Max. 14
Number of Rinse Stations	Up to 3 (with 3 rinse stations, only 11 reagent stations are available)
Water flow rate at rinse station	250 ml +/- 100 ml, depending on number of rinse stations and inlet pressure
Reagent container volume:	50 ml
Agitation:	0 to 3 dips per station for station times > 4 sec.
Capacity of the slide carriers:	Max. 4 slides per slide carrier
Capacity of the exit tank	Max. 16 slides (4 slide carriers)

2 Safeguards and Inspection

2.1 Safety Instructions



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 HistoPro® products.

- This instruction manual includes important information related to the operating safety and maintenance of the system and it is an important part of the product.
- This system has been built and tested in accordance with the following safety regulations on electrical measuring, control, regulating and laboratory devices.
 - IEC 61010 – 1, 2nd Edition
- In order to ensure safe operation, the operator **MUST** observe the instructions and warnings contained in this Operator Manual.
- If additional instructions are required for accident prevention and environmental protection based on the location of the system operation (e.g. local regulations, laws and lab procedures and practices) this manual must be supplemented by appropriate instructions to ensure the compliance with these additional requirements.
- Obtain, review and retain the MSDS for the reagents used from the manufacturers of the reagents. They are also available on the Internet: <http://www.msdsonline.com>. Follow the safety precautions and disposal recommendations provided in MSDS.



Attention! The protective devices on both system and accessories may neither be removed nor modified. Only authorized and qualified service personnel may repair the system and access the system's internal components.

- All the safety and operating instructions must be read before the system is operated.
- The safety and operating instructions must be retained for future reference.
- All warnings on the system and in the operating manual must be followed.
- All operating and use instructions must be followed.
- Do not use any attachments not recommended 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 the safety of the operator.
- 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.
- Locate the Stainer in well-ventilated area and away from the wall.
- Ensure that the Power Inlet and the Power Off Switch 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 any existing warranty.

2.2 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 the 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 1, the Load Station.
- Do not remove any sample slide racks from any processing reagent stations. Always wait until the slide racks are delivered to Station 24, the Unload Station.
- Turn the power off while changing or replenishing the reagents.
- Turn the power off while cleaning the Stainer.

2.3 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 system and for the 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.
- To minimize the exposure to the toxic fumes of the reagents, you can also connect an optional hose to the exhaust port of the unit located in the rear top left hand corner and locate the other end of the hose under a fume hood.
-  Warning! 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.

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



- 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.



- Follow general laboratory safety procedures and practices for handling and disposal of the flammable reagents used in the processing of the slides and used for cleaning the system.
- For safe operation, for the safety of the operator and other personnel in the vicinity of the unit and for the laboratory safety, 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 the waste.

2.4 Warnings

The safety devices installed in this system by the manufacturer only constitute the basis for accident prevention. Primarily responsible for accident-free operation is above all the institution which owns the system and, in addition, the designated personnel who operates, services or repairs the system.

To ensure trouble-free operation of the system, make sure to comply with the following instructions and warnings.

Warning – Transport and Installation

	<ul style="list-style-type: none">● Attention! The system may only be transported in an upright position.● Install the system on an even laboratory bench which must be absolutely level and can support 40 lbs (18 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 will automatically adjust to the required voltage and frequency at the place of installation.● The system must be set up in a well-ventilated area, free from any ignition sources.● The chemicals to be used in the HistoPro[®] 414 are both flammable and noxious. Do not operate the system in rooms with explosion hazard.● If there is a significant difference in temperature between the warehousing and the installation site of the system and if at the same time there is a high air humidity level, condensation water may form. In this case, a waiting period of at least four hours must be observed before the system is
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	<p>switched on. Failure to adhere to this waiting period may result in damage to the system.</p> <ul style="list-style-type: none"> ● Ensure that the system is installed on a vibration-free bench top. ● Ensure that there are no significant variations in the room temperature. ● Do NOT locate the system in direct sunlight or under a source of a light with high ultra violet light content
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Warning – Handling reagents

 	<ul style="list-style-type: none"> ● Attention! Be careful when handling solvents! ● Always wear rubber gloves and safety goggles when handling the chemicals used in this system. ● Reagents used for tissue infiltration 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.
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Warnings – Operating the system

 	<ul style="list-style-type: none"> ● Attention! The HistoPro[®] 414 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. ● Make sure to operate the system either with the activated carbon filter or with the exhaust air hose. Even when the system is operated according to its designated use, hazardous solvent fumes develop, which are damaging to the operator's health and do also pose a risk of fire! ● Risk of fire, when working with an open flame (Bunsen burner) immediately next to the system (solvent fumes)! Therefore, keep a safety distance of 6 feet (2 meters)! ● If a staining program is to be interrupted for an extended period of time, do not leave any slide racks in the tap water stations, in order to prevent them from drying out.
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Warnings – Cleaning and maintenance

	<ul style="list-style-type: none"> ● Attention! Prior to each maintenance and/or cleaning, switch the system off and disconnect mains 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 during cleaning. ● When working with cleaning detergents, comply with all safety instruction by the manufacturer of the product and the laboratory management policy. ● Wash the reagent containers in the dishwasher at a temperature of max. +65°C (149°F). Use a standard detergent for laboratory dishwashers.
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	<ul style="list-style-type: none"> ● At any rate avoid washing the containers at higher temperatures, as the stations may become deformed! ● Spilled solvents (reagents) have to be wiped away immediately! In case of long-term exposure, the enclosure surfaces are only conditionally resistant to solvents! ● To clean the enclosure use mild household detergents; -see safety instruction above for non-appropriate ingredients!
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2.5 Inspection

- The HistoPro[®] 414 is carefully quality controlled prior to shipping. The highest quality packaging materials have been used to ensure that the equipment is well protected during shipping. Please follow these inspection 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. *Failure to report visible damage may forfeit any claims for internal damages.*
- 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. *Discarding any packaging materials prior to the carrier's inspection may void any shipper liability.*
- Retain all the packaging material for the duration of the warranty period.

2.5 Components Checklist

Each HistoPro[®] 414 Automated Slide Stainer comes with the following components. If an item is missing, please contact RUSHABH Instruments' Customer Service immediately at (215) 491-0081.

RI P/N	Description	Quantity
E13401	HistoPro [®] 414 Slide Stainer	1
13072	Reagent containers (white)	14
13073	Slide carrier	3
13074	Rinse containers (black)	3
W918003	Power cord, USA	1
B11894-2	Water inlet hose	1
13228	Exit Tank	1
11348	Reagent container cover	1
13362	Support Bracket	1
H300301	Spare fuse (set of 2)	1
13070	Operator Manual	1
13098	Tubing, fitting, tie wrap kit	1

3 Installation Procedures

Follow the instructions provided as "SAFEGUARDS" and "INSPECTION" procedures.

2.6 Unpacking the Stainer

1. Cut through the packing tape on the top edge of the box.



2. Remove the Accessories, packaging material and operating manual.



3. Use the molded foam pads to pull the Stainer out of the box and place it on a firm laboratory bench.



4. Pull the molded foam pads away from the sides of the Stainer. Remove the protective film from the Stainer.



5. The Stainer must now be set up for correct use in accordance with the instructions specified in this Operating Manual

2.7 Setup

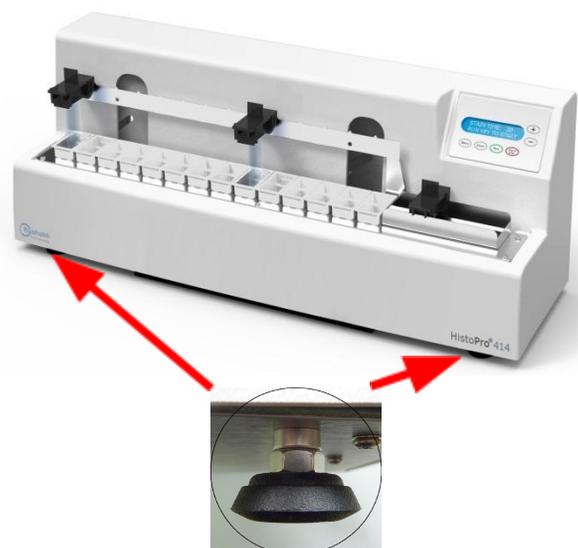
2.7.1 Horizontal Alignment

For safe and accurate work, it is important that all Stainer feet are in uniform contact with the installation surface.

The stainer is horizontally aligned at the factory. If a completely level or horizontal surface is not available at the installation site, the Stainer must be realigned.

For this purpose, the Stainer feet are height adjustable.

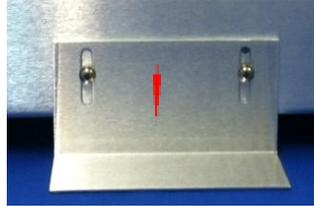
- For alignment, loosen the locknuts using a size 7/16" open-end wrench
- Adjust the Stainer feet until the Stainer is in a stable position at the installation location according to requirement.
- Retighten the locknuts.



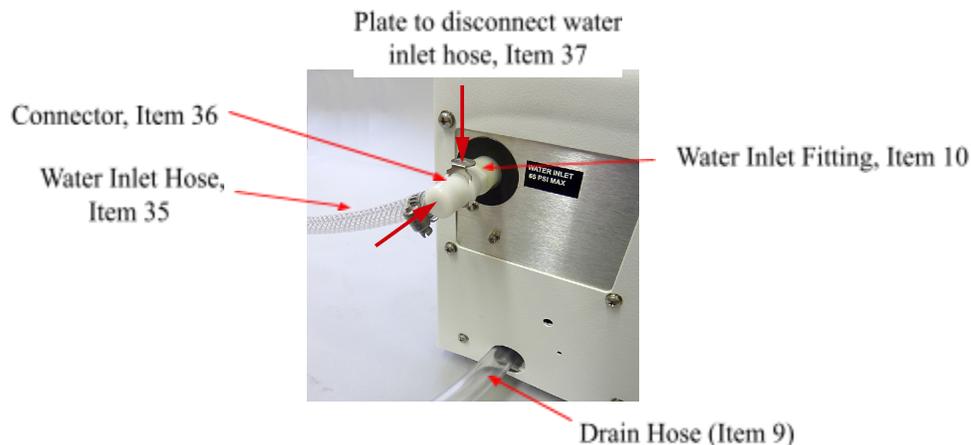
2.7.2 Mounting the Support Bracket

To ensure that the Stainer cannot tip over when its keys are pressed, the support bracket must be mounted on the rear.

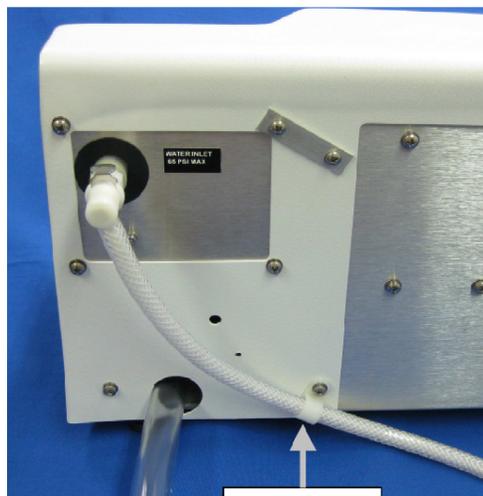
- To do this, first unscrew the two Philips head screws with a screwdriver. Place them together with the two associated washers.
- Place the support bracket against the rear of the Stainer. Reinsert but *do not fully tighten* the two screws.
- Press the support bracket down onto the support surface until a face of the plate lies flush with the bench surface. Then tighten the support bracket in this position.



2.7.3 Water Connection



- Run the drain hose (Item 9) into a suitable collecting tank or waste basin. Make sure that the hose is not kinked and that the water is able to drain freely downwards.
- Then connect the water inlet hose to the stainer.
- To do this, push the connector (Item 36) into the water inlet fitting (Item 10) on the Stainer until it clicks into place. To detach the hose, press on the plate and pull the connector back.
- Secure the water inlet hose as shown in the figure below with the hose clamp provided with the hose.



Secure the water inlet hose at this location as shown.

- Connect the other end of the hose to a suitable water tap. *Do not open the water supply yet!*
- To learn more about adjustment of the rinsing water flow rate, please refer to section 4.2.9

2.7.4 Installing the Rinsing Water Containers

Up to three rinsing stations may be provided on the stainer. The rinsing water containers can be located at any of the 14 reagent stations.

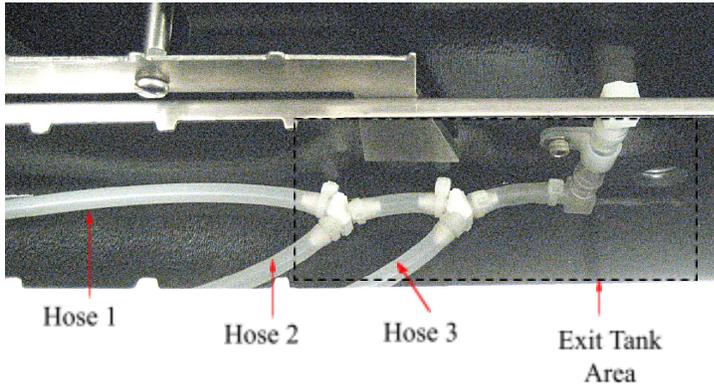
The equipment supplied includes three hoses with Y-connectors. The cable ties on these Y-connectors must not be removed. Also, do not detach the Y-connectors from the associated hoses.

Watertight, functional rinsing stations in accordance with the desired staining protocol can be set up with the aid of additional cable ties, hoses, plugs and connectors that are also included in the scope of delivery.



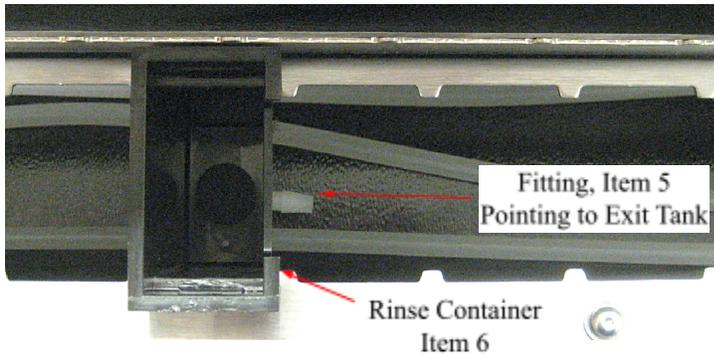
While the rinsing stations are being set up, it must be ensured that the rinsing water containers are positioned horizontally on the platform, and all hoses are lying horizontally on the bottom of the drainage tank. The rinsing water hoses must not be subjected to any kind of pulling or stretching stresses.

Follow the instructions below to install the rinse containers. Please note that the figure shows black ground for better contrast.



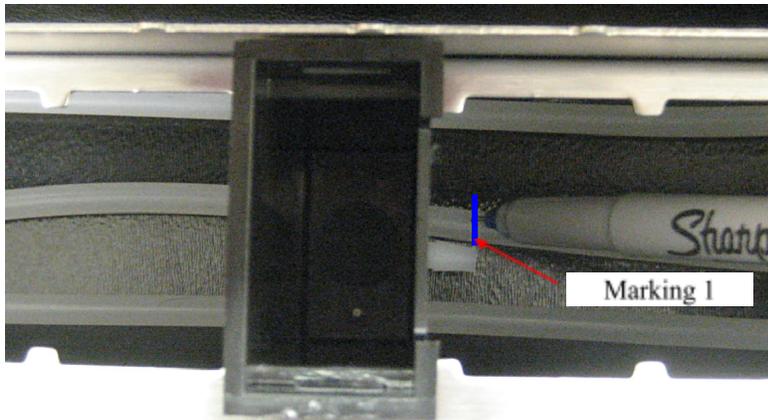
Route hoses in the Stainer in accordance with the figure to the left.

If the unit is always operated without water, no further steps are necessary – simply do not connect a water supply line to the Stainer.



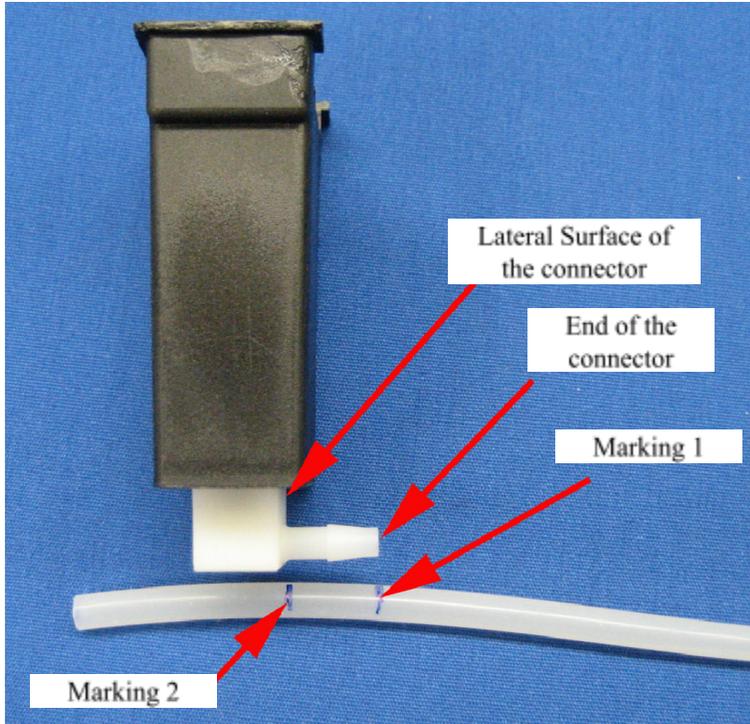
Place the rinsing water containers (Item 6) in the desired position on the platform. The rinse container fitting (Item 5) pointed to the exit tank.

Start with the station closest to the Exit Tank.



The hose should run level along the bottom of the Stainer.

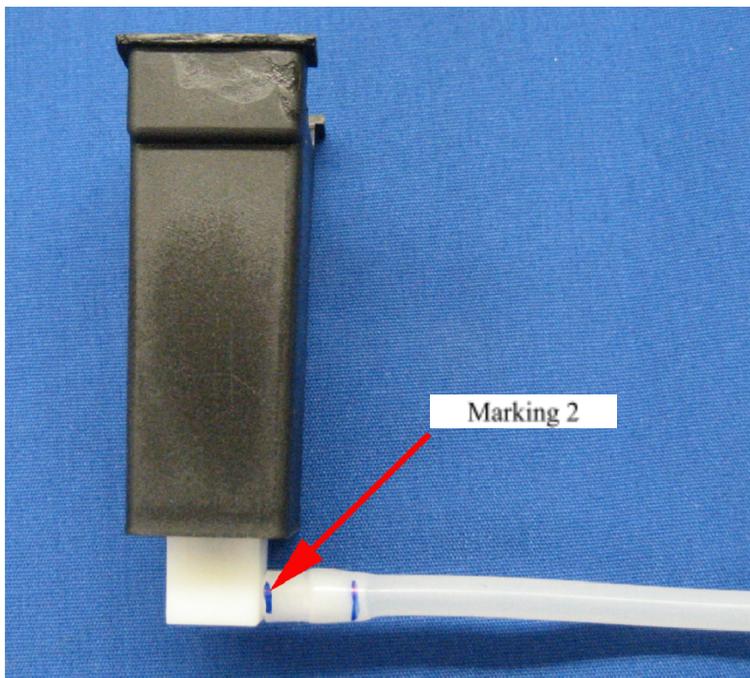
Mark the end of the hose that will connect to the rinsing water container. This is "Marking 1"



Now take the rinsing water container and the hose out of the stainer.

Align “Marking 1” on the end of the connector and make a second marking (“Marking 2”) to indicate the lateral surface of the connector.

Cut the hose off at “Marking 2.”



Then, push the hose fully onto the connector by twisting until the end of the hose is flush against the lateral surface of the connector.

If the hose is not pushed completely onto the connector, it may become detached as soon as the water supply is turned on.



Do not stretch tubing to fit on the fitting.

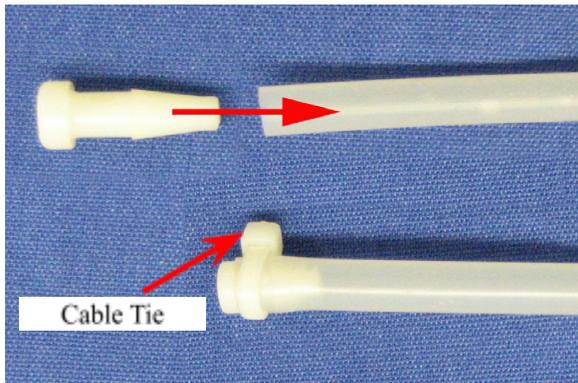
Place the rinsing water container back in the desired position on the platform. Check that the rinsing water container is positioned horizontally on the platform.

If the hose is too long, the rinsing water container will tilt to the right; if it is too short, it will tilt to the left.



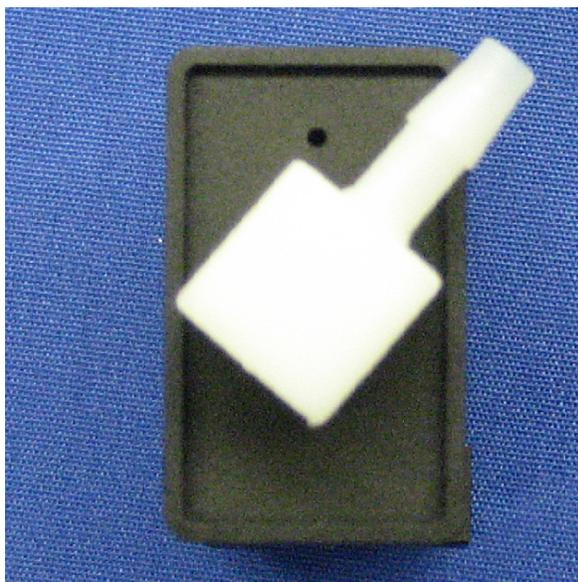
If the Rinse Container is not positioned horizontally on the platform, the Stainer may not move the slides carriers from one station to the next station properly.

Repeat the steps described above for the other rinsing stations.



If only one or two rinsing stations are required, the hoses that are not used must be sealed with a plug.

- To do this, twist and push the plug fully into the end of the hose, and then secure it with a cable tie.



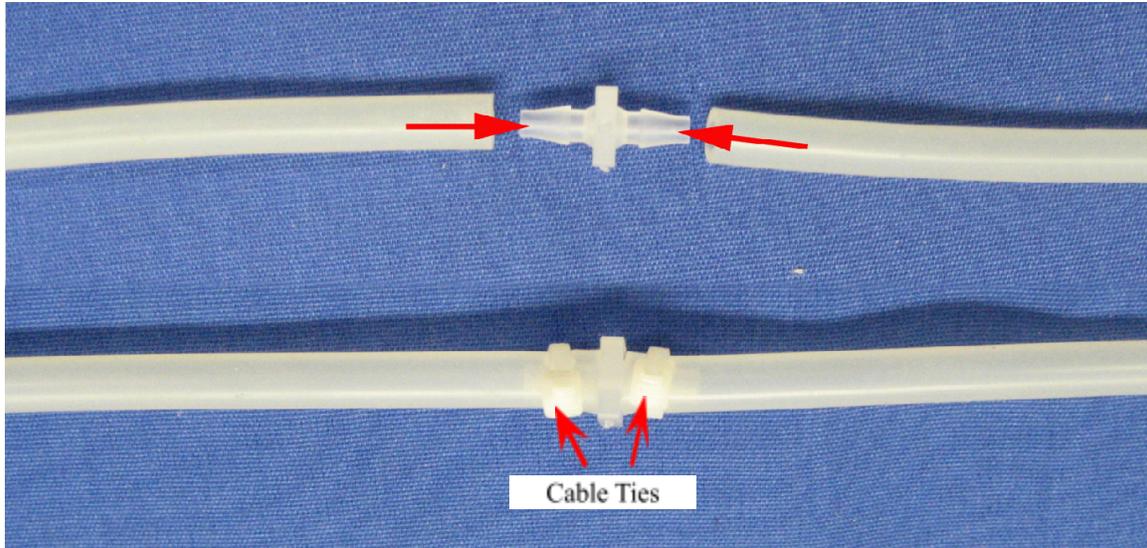
If two rinsing stations are to be located immediately beside one another, the connector for the left station must be aligned as shown in the figure to the left.

2.7.5 Remedy if Hose is Cut Too Short

If the hose at one of the rinse stations should be too short, or if a hose has been cut too short by mistake, the following remedy may help:

- Cut the hose roughly in the middle between the Y-connector and the rinsing station.
- Use the extension connector included with the package to attach an additional hose section of the required length.

- Push both ends of the hose as far as they will go onto the extension connector, and then secure each hose with a cable tie.
- Finally, check again that the rinsing water container is positioned horizontally on the platform.



2.7.6 Switching on the Stainer



The Stainer **MUST** be connected to a grounded power socket.

Only the power cord provided may be used, which is intended for the local power supply (socket). The protective effect must not be eliminated by an extension cable without a protective grounding conductor.

The AC socket used for power supply must be close to the Stainer and easily accessible.

- Before plugging the Stainer into the A/C mains, make sure that the main switch on the rear of the Stainer is in the OFF (“O”) position.
- Plug the power cable into the A/C mains power supply socket and connect it to the power socket on the wall. If applicable, switch on the switch for the power socket.
- Then switch on the main switch on the Stainer



- Before plugging the Stainer into the mains, make sure that the main switch on the rear of the Stainer is in the OFF (“O”) position.
- Plug the power cable into mains power supply socket and connect it to the power socket on the wall. If applicable, switch on the switch for the power socket.
- Then, switch the main switch on the Stainer, (ON = “I”).

2.7.7 Control Panel Functions

The control panel consists of a membrane keypad with six keys, and a screen consisting of a two-line display, each line being 16 characters long.

This is used for controlling the functions of the Stainer and for programming the software. The current state of the stainer and ongoing operations are displayed while a staining task is being processed.



- The Stainer will take a few seconds to initialize. During this time, the installed version of the software will be displayed on the monitor.
- Then, the lift bar performed a circular motion to ensure that the bar is in the correct position at the start of staining.

The message FINDING HOME... is displayed on the screen.

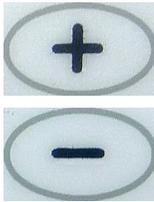
There are six push-buttons on the control panel, and these are used to adjust the operating parameters and control the Stainer.

The keys have been assigned the following functions:

The operating parameters can be displayed and checked with the MENU key.



Each time the MENU key is pressed, another one of the six operational parameters will be displayed.



Whenever a new setting is made, it will take effect immediately. Furthermore, since all settings are saved in memory, it will automatically be used the next time the system is powered up. The operating parameter that is currently being displayed can be raised or lowered by pressing the PLUS (“+”, increases the displayed value) and MINUS (“-”, reduces the displayed value) keys respectively.



Pressing the PAUSE/STOP key allows the operator to exit the setup menu without changing the parameter currently being displayed.

While running:

Pressing PAUSE/STOP once interrupts the current staining operation so that another slide carrier can be placed in the lift bar.



Pressing PAUSE/STOP twice (in quick succession) terminates the current program, and the system returns to idle mode.

If the ENTER key is pressed, the selected parameter is stored in the system.



The system returns to its idle mode whenever a new setting is entered, or whenever the user exits the setup menu by pressing the PAUSE/STOP key.

Pressing the RUN key starts a staining operation on the basis of the values shown on the display. At the same time, the flushing valve is activated, the display changes, and the timer appears, counting down to show the remaining processing time.

2.7.8 System Set Up

The operator is given the ability to adjust a number of operational parameters with the keypad. In addition, several mechanical adjustments can be made. These are described in sections 4.2.8.1 through 4.2.9.

The process of adjusting the operational parameters is simple and direct. When the system is "ON" and is in the IDLE mode (that is, neither RUNNING nor in any other SETUP mode), the operator may examine the setup parameters by pressing the MENU key. Each time the MENU key is pressed, another one of the five operational parameters will be displayed.

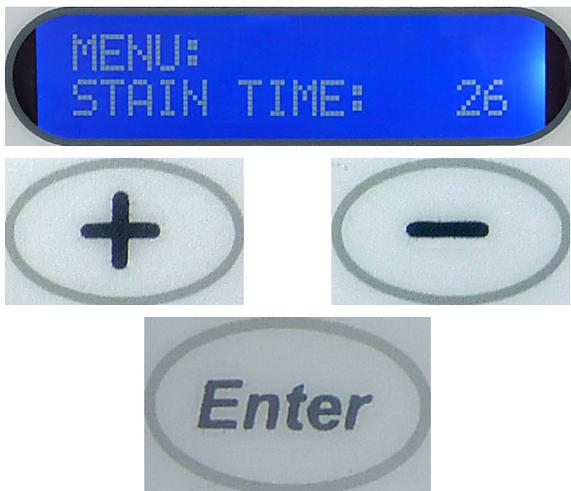
Each may be altered while it is being displayed by the use of the INCREMENT (+) and DECREMENT (-) keys. Pressing the ENTER key selects the value currently being

displayed and saves it in non-volatile memory. Pressing the STOP key allows the operator to EXIT the setup menu without changing the parameter currently being displayed.

Whenever a new setting is selected, it will take effect immediately. Furthermore, since all settings are saved in non-volatile memory, it will automatically be used the next time the system is powered up.

The system returns to its IDLE mode whenever a new setting is entered, or whenever the user exits the setup menu by pressing the STOP key,

2.7.8.1 Processing Time



The amount of time that the slides are immersed at each station can be varied from 2 to 300 seconds.

Pressing the INCREMENT (+) or DECREMENT (-) keys will change the stain time by one second in the range of 2 to 30 seconds, by five seconds in the range of 30 to 60 seconds, and by ten seconds in the range of 60 to 300 seconds.

To set the new processing time and save it for future use, press the ENTER Key.

2.7.8.2 Display Contrast

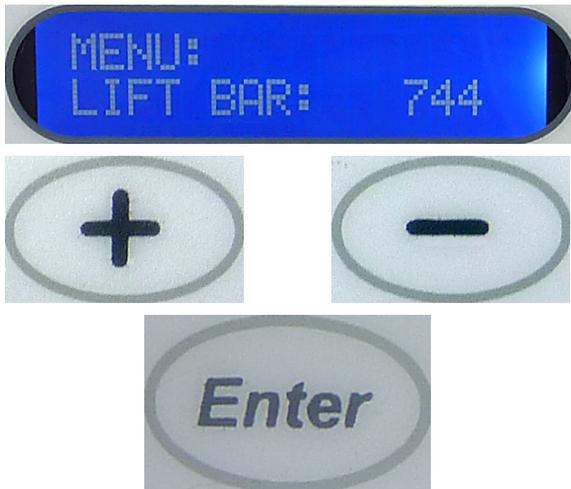


The contrast on the Liquid Crystal Display (LCD) may be adjusted to the preference of individual operators by pressing the INCREMENT (+) or DECREMENT (-) keys, followed by the ENTER key.

Factory Setting = 06



2.7.8.3 Transfer Mechanism Calibration

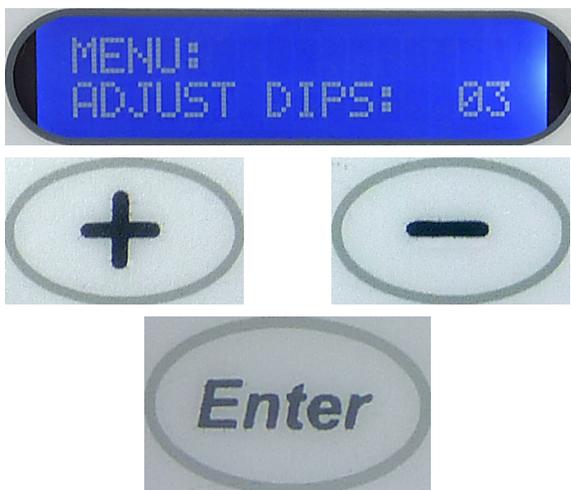


The position at which the mechanism stops for processing may be adjusted by pressing the INCREMENT (+) or DECREMENT (-) keys, followed by the ENTER key. The number of steps taken by the stepper motor changes by 8 each time the + or - key is pressed. The minimum acceptable value is 704, and the maximum is 1000. The typical setting is 936 to 960. **This parameter is set at the factory and should not be changed.**

Factory Setting = 936

When ENTER key is pressed, the number of steps is saved in non-volatile memory. Also, the mechanism advances to the next station, stopping when the selected number of steps has been taken after the sensor is actuated.

2.7.8.4 Agitation



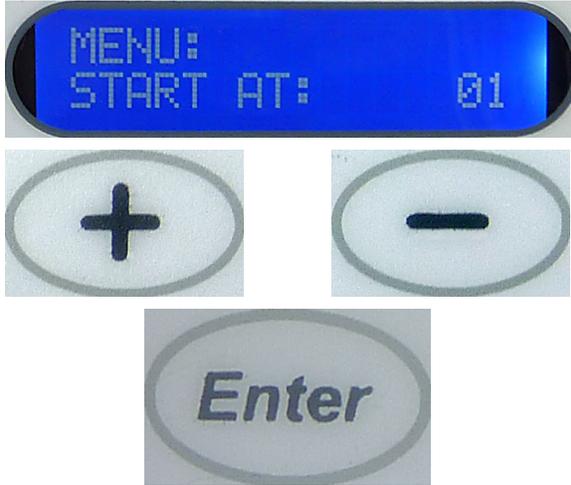
The number of dips used for agitation may be adjusted from 0 to 3 by pressing the INCREMENT (+) or DECREMENT (-) keys, followed by the ENTER key. When enter is pressed, the number of dips is saved in non-volatile memory.

Factory Setting = 03

If a value of 1, 2 or 3 has been selected, the system will raise and lower the slides the appropriate number of times when they first enter a station, and at intervals of 5 seconds thereafter, provided that the processing time is at least 4 seconds. If the processing time is

less than 4 seconds, then no dips will occur, regardless of the agitation setting.

2.7.8.5 Start Position



It is anticipated that some users may have special staining protocols that do not require the use of all fourteen staining positions. In order to make the processed slides available to the user at the exit tank in the least amount of time possible, a programmable start position feature has been added.

Factory Setting = 01

The user can specify which station is being used for the start position. For example, a protocol that requires only ten stations could use stations 5 through 14 rather than beginning at the first station. This puts the slides into the exit tank as soon as they leave the last process station. By specifying the start position as position 5, the user allows the system to issue its "reminder beep" at the correct time. This beep informs the operator that slides are available for retrieval.

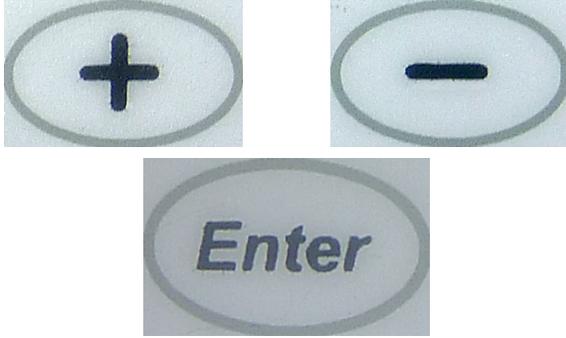
The starting position may be adjusted from 1 to 14 by pressing the INCREMENT (+) or DECREMENT (-) keys, followed by the ENTER key. When enter is pressed, the starting position is saved in non-volatile memory.

2.7.8.6 Run Forever



There are two settings, and these can be set using the INCREMENT (+) or DECREMENT (-) keys.

- With a setting of "00", the stainer runs for as long as slide carriers are loaded into it and are undergoing the staining process.

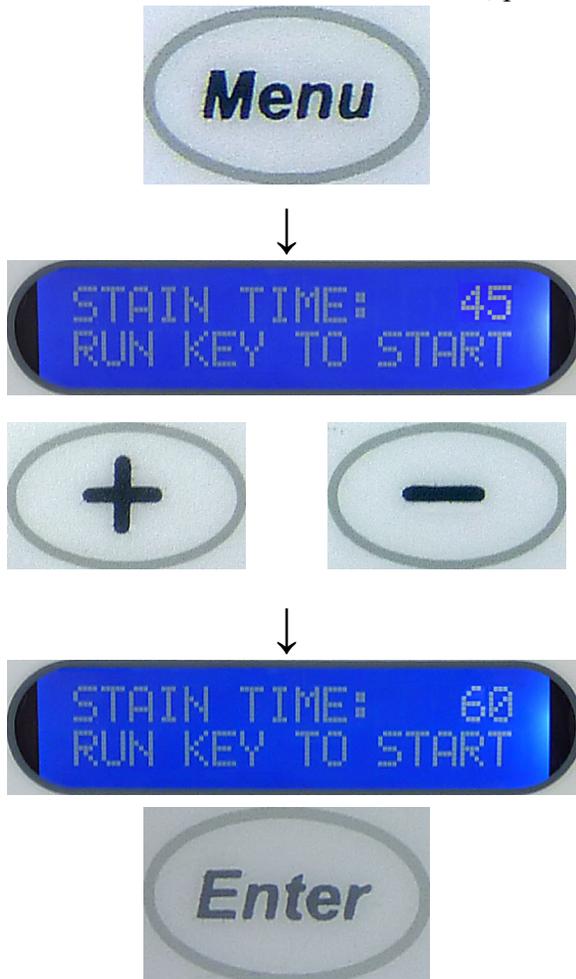


- A beep sounds every time a slide carrier is ready. When 3 racks have reached the exit tank, a signal sounds 5 times.
- With the “01” setting, the stainer runs continuously whether it is loaded or not. A beep sounds every time a slide carrier is ready.
- After ENTER is pressed, the Run Forever mode is stored.

Factory Setting = 00

2.7.9 Setting the Rinse Water Flow Rate

To set the flow rate for the rinse water, proceed as follows.



First, set a staining time of 60 seconds. To do this, press MENU once, and then press the INCREMENT (+) or DECREMENT (-) key repeatedly until a processing time of 60 seconds is displayed.

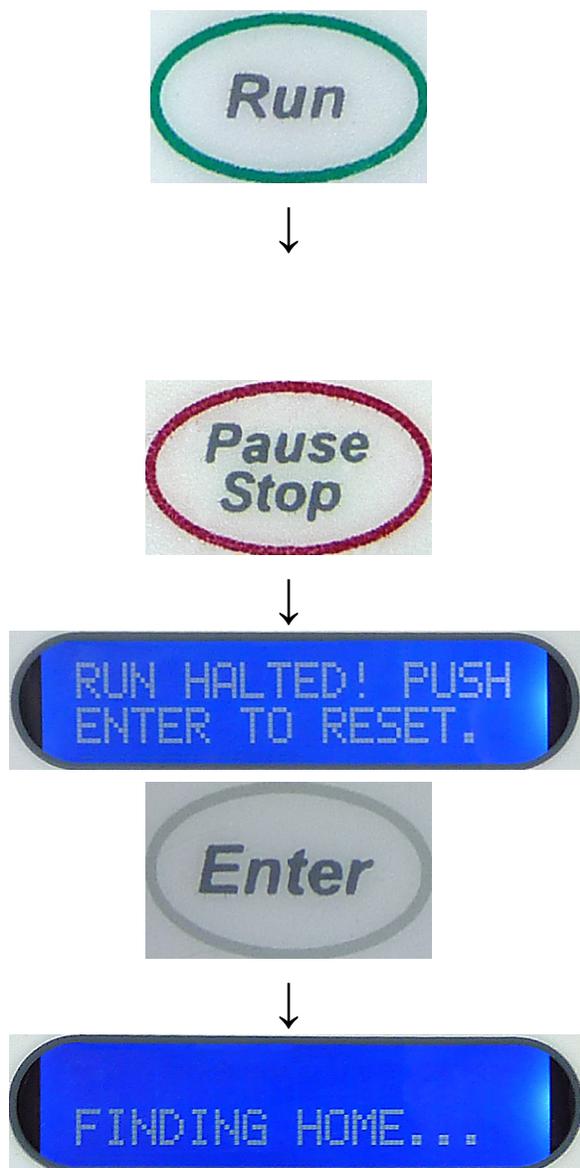
Then press the ENTER key to confirm this processing time.

Now press RUN. The countdown of station time will be displayed while the rinse water valve inside the unit activates.

Now, slowly turn on the tap to which the supply hose is connected, and adjust the flow rate so that water flows into the rinsing water container at a sufficient rate and the rinsing water can drain without obstruction.

Note: DO NOT adjust the flow rate too high. This can cause spills on the platform to the next stain station or can overflow the drain area of the stainer.

Once the flow rate is adjusted properly, press the PAUSE/STOP key twice.



Then press the ENTER key to reinitialize the mechanism when prompted by the Stainer.

3 Processing Slides

This section provides information on processing slides after the stainer's setup parameters have been reviewed and possibly adjusted. It covers loading slides onto the stainer, starting a run, and removing processed slides. In addition, it provides instruction on how to pause and then resume processing, how to stop processing in the middle of a run, and how to respond to system alarms.

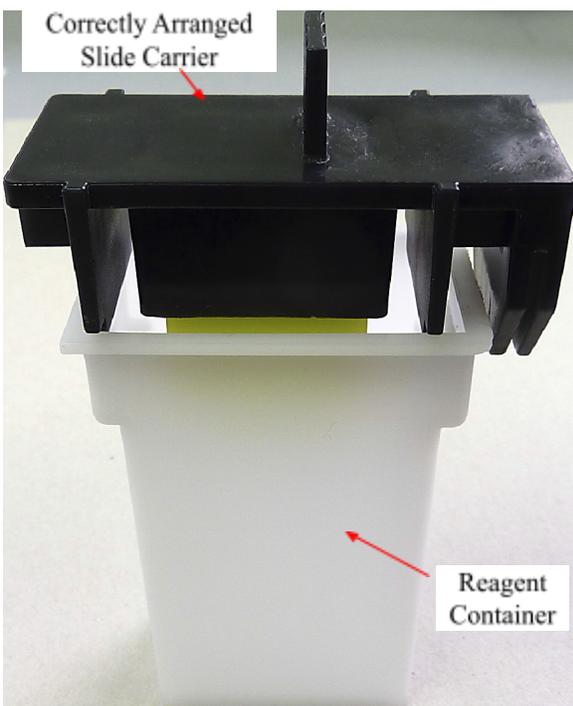
The stainer is a relatively simple and trouble-free system. The user must inform the system (through the keypad) whenever slides are added to or removed from the Stainer. Directions

as to how this is done appear in the following sections. Slides must be loaded and unloaded in the prescribed fashion.



Important!

Failure to follow these directions may result in improper or incomplete processing of slides.



- The slide carrier must be prepared carefully, because if it is positioned incorrectly, the slides may not be properly transported by the lift bar.

There are two occasions that slides may be loaded onto the start position:

- Before the start of processing, and
- After the start of processing.

In both cases, the slides will be immersed in the start position's reagent.

The user should be prepared to start or resume the staining run as soon as the slide carrier is in position, so that extra staining time may be kept to a minimum.

3.1 Loading Slides

Loading slides involve placing the slide carrier to which the slides have been added, on top of the start position reagent container in such a way that it can be engaged by the Lift Bar. This is not difficult, but should be done with care, since incorrect placement means that the Lift Bar might not transport the slides correctly. Please refer to Section 2.3 for pictorial advice as to how to position the slide carrier correctly.

There are two occasions that slides may be loaded onto the start position: before processing has started, and after processing has started. In both cases, the slides will be immersed in the start position's reagent. The user should be prepared to start or resume the run as soon as the slide carrier is in position, so that extra staining time may be kept to a minimum.

See Section 5.2, “Starting a Run,” for more information on loading slides before processing has started. See Section 5.3 “Adding more slide carriers during a staining run” for more information on loading slides after processing has started.

3.2 Starting a Run

Before slides are placed in the starting position and the RUN key is pressed, verify that each of the setup parameters (station time, number of steps, number of dips, etc.).

While verifying setup parameters, do not load slides: when the number of steps is changed, the “transfer mechanism calibration” will cause the transfer mechanism to advance to the next position.

All parameters should be verified before loading the first set of slides.

A staining run cannot be started unless the stainer is in standby-mode.

In this mode, the system displays the process time and instructions to press the RUN to start.



To start a run, the stainer must be in its IDLE mode. In this condition, the system displays the process time and instructions to press RUN to start.

When the RUN key is pressed, the rinse valve is turned on, the display changes and the system immediately begins to count down the process time.

Note that the first station's process time begins as soon as the RUN key is pressed. This means that the slides must be loaded in the start position immediately prior to the RUN key being pressed.

Note that starting a RUN informs the system that slides are present at the starting position. The stainer will continue running until these slides are transferred from station 14 to the exit tank. At this point, the system will stop processing and will return to its IDLE state unless additional slides have been loaded in the prescribed manner.

3.3 Adding more slide carriers during a staining run

The PAUSE/STOP function can be used to allow additional slide carriers to be placed in the Stainer after processing has begun. ONLY ONE SLIDE CARRIER CAN BE ADDED AT ONE TIME. Follow the same procedure multiple times to add more slide carriers.



Please wait, and do not add any further slides!

This message is displayed until the slide carriers have been removed from a position by the lift bar and transferred to the next station.



If a staining run is already underway and more slide carriers are to be inserted, press the PAUSE/STOP key **Only ONCE**.



If PAUSE/STOP key is pressed twice, the entire staining run will be aborted.

When:

LOAD SLIDES...

PRESS RUN

appears on the display, the new slide carrier must be inserted at the start position immediately, and the RUN key pressed.

As soon as the RUN key is pressed, the system resumes processing, and continues counting down the process time.

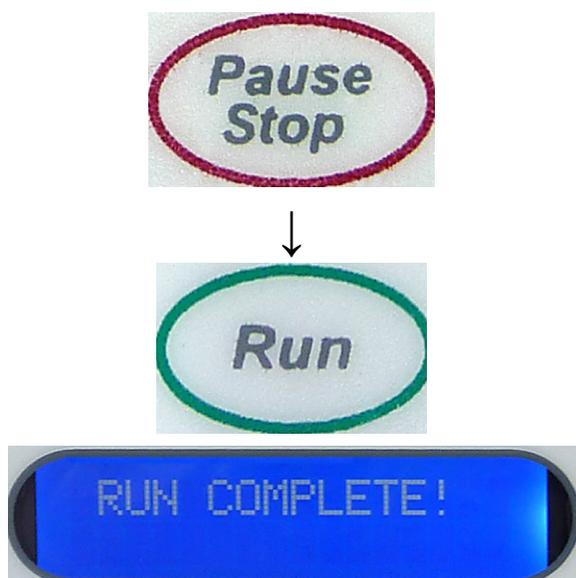
It should also be noted that the entire operation is interrupted until the RUN key is pressed again. Therefore, the operator should be prepared to load the new slides as quickly as possible and should then press the RUN key quickly to avoid having all slides already in the system spend extra time immersed.



This procedure applies for inserting slide carriers after processing has begun, and must be followed under all circumstances.

Attempting to add slide carriers without pressing the PAUSE and RUN keys will result in the carriers not being transported to all of the stations, since the stainer will not know that additional slide carriers have been added!

3.4 Temporarily pausing a staining run



If the PAUSE/STOP and RUN keys are pressed in this order, the Stainer receives the information that more slide carriers have been inserted at the start position.

The stainer continues operating until these slide carriers are transferred from station 14 to the exit tank.

If no other slides have been added in the meantime, it emits an audible signal to alert the operator that the staining run has been completed. A corresponding message appears on the display.



This procedure applies for inserting slide carriers after processing has begun, and must be followed under all circumstances.

Attempting to add slide carriers without pressing the PAUSE and RUN keys will result in the carriers not being transported to all of the stations, since the stainer will not know that additional slide carriers have been added!

Occasionally, it may be necessary to stop the system when it is processing slides. This too can be accomplished with PAUSE/STOP key.

Staining can be interrupted,

- To allow access to the Stainer if anomalies requiring such arise during staining.
- So that reagents can be checked, and changed if necessary.

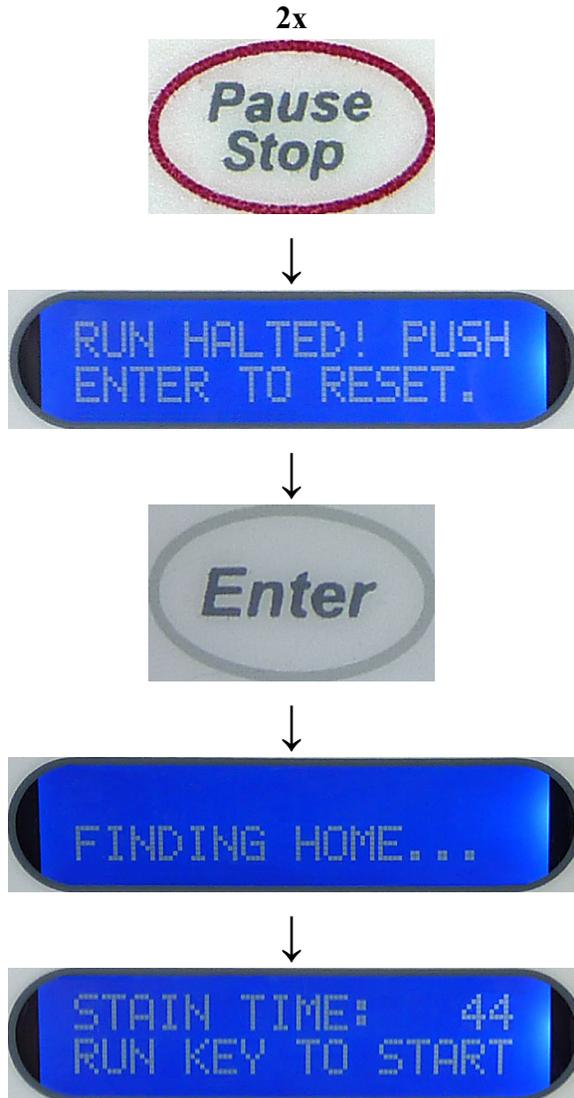


The mechanism will complete the current cycle, and will move the slide carriers to the next station. Do not attempt to attend the Stainer until "LOAD SLIDES... PRESS RUN" message appears on the display

3.5 Ending a staining run prematurely

The role of the PAUSE/STOP key in loading additional slides was described in the previous section.

However, this key has a second function, that of terminating a staining run that has already been started.



By pressing PAUSE/STOP key twice during a run, a run can be terminated at any time. The system will display the following message

RUN HALTED! PUSH
ENTER TO RESET

User must remove all the slide carriers before pressing ENTER. When the ENTER key is pressed, the stainer reinitializes the mechanism and gets ready for a new processing run.

4 Maintenance Instructions

4.1 General Information

DO practice good housekeeping and maintain the Stainer in a clean condition

DO remove the power supply from the wall outlet when the stainer is not in use.

DO NOT use excessive amounts of solvent for cleaning

DO NOT use metal scrapper to scrape off any residue on different surfaces

DO NOT use the Stainer for purposes other than its designed function

DO practice good housekeeping and maintain the Stainer in a clean condition

DO remove the power supply from the wall outlet when the stainer is not in use.

4.2 Cleaning Procedures

- Use only minimal quantities of cleaning solvent on an absorbent cloth. Xylene and Xylene substitute as well as other decolorizing agents will 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 10% diluted bleach solution to minimize any growth of fungus.

5 Routine Maintenance

- No routine maintenance is necessary for the stainer.
- Keep the unit clean of any liquids in the path of the moving parts.
- In the event of a spillage of the liquids inside the unit, allow the qualified service technician inspect and clean the stainer to ensure safe operation and long operational life of the Stainer.

6 Troubleshooting Guide

The HistoPro® 414 is equipped with a simple fault detection system, and can identify certain movement errors automatically.

- If an operation error is detected, the transfer mechanism will first stop moving.
- It will then back up a short distance, stop again, and then move forward in a second attempt to reach the desired position.
- If this error recovery attempt is successful, processing continues normally.

6.1 Alarms



The Stainer will detect certain motion failures. When an operation error is detected, the mechanism will first stop moving. It will then back up a short distance, stop again, and then move forward in a second attempt to reach the desired position.

If the error recovery attempt is successful, processing continues normally.

If the recovery attempt fails, the system beeps continuously in a distinctive pattern and an error is displayed on the keypad.

When the operator presses the STOP key, the system tries to find its home position and returns to IDLE mode.

6.2 Fault Detection and Correction List

No	Symptom:	Probable Causes:	Suggested
1	<ul style="list-style-type: none"> • Unit does not power up 	<ul style="list-style-type: none"> • The Power cord is not plugged into wall outlet properly. 	<ul style="list-style-type: none"> • Check the power both ends. Replace necessary.

		<ul style="list-style-type: none"> • Power cord is not plugged into the Stainer properly. • Fuse is blown. • The power supply in the Stainer is faulty. 	<ul style="list-style-type: none"> • Replace the fuse with the same rating. Investigate why the fuse is blown in the first place before plugging it back in again. • Contact authorized service technician for repairs.
2	<ul style="list-style-type: none"> • Display appears to be blue, however, cannot see any text on the display. 	<ul style="list-style-type: none"> • Contrast adjustment may be necessary • Defective Control PCB. 	<ul style="list-style-type: none"> • Adjust the contrast as described in paragraph 1. • Contact authorized service technician for repairs.
3	<ul style="list-style-type: none"> • Keypad does not respond to key presses 	<ul style="list-style-type: none"> • Defective keypad or a defective Control PCB. 	<ul style="list-style-type: none"> • Contact authorized service technician for repairs.
4	<ul style="list-style-type: none"> • Unit powers up, but the mechanism does not initialize. 	<ul style="list-style-type: none"> • Main Mechanism jammed. • The motor seems to turn, however, the Lift bar is not moving due to a worn/broken belt or a loose set screw on the motor. • The motor is not turning due to a defective motor or a defective Control PCB • Defective Sensor PCB 	<ul style="list-style-type: none"> • Check for obvious obstructions and remove the obstructions. • Contact authorized service technician for repairs. • Contact authorized service technician for repairs.
5	<ul style="list-style-type: none"> • Water does not flow. 	<ul style="list-style-type: none"> • Water hose is not connected. • Faucet is not opened. • Defective Valve that does not open or a defective Control PCB. 	<ul style="list-style-type: none"> • Connect the water hose to the stainer. • Open the faucet. • Contact authorized service technician for repairs.
6	<ul style="list-style-type: none"> • Water overflows at the rinse stations. 	<ul style="list-style-type: none"> • Faucet opened too far • Clogged drain hose • Improperly placed drain hose 	<ul style="list-style-type: none"> • Adjust the faucet handle. • Remove kinks from the drain hose to clear the drain hose. • Place the drain hose in a position that does not have to rest on the fitting level.

7	<ul style="list-style-type: none"> • The motor does not turn. 	<ul style="list-style-type: none"> • Defective Motor or defective Control PCB. 	<ul style="list-style-type: none"> • Contact authorized for repairs.
8	<ul style="list-style-type: none"> • Water flowing on the table 	<ul style="list-style-type: none"> • Drain hose not placed properly or has a kink • The fitting of the water inlet hose is not secured properly. 	<ul style="list-style-type: none"> • Lay the drain hose with no kinks and the length is less than the Stainer. • Contact authorized for repairs. • Secure the water inlet hose properly. • Contact authorized for repairs.
9	<ul style="list-style-type: none"> • Slide carriers do not transfer to the next station properly 	<ul style="list-style-type: none"> • Slide carrier placement on the Lift Bar not correct • Slides are not properly inserted in the slide carrier • Rinse containers or other reagent containers are not sitting flush on the platform 	<ul style="list-style-type: none"> • Check the placement of slide carriers (see Section 4.1) • Check the slide insertion in the carriers (see Section 4.1) • Adjust the rinse tube height • Ensure that the reagent and rinse containers are sitting flush on the platform

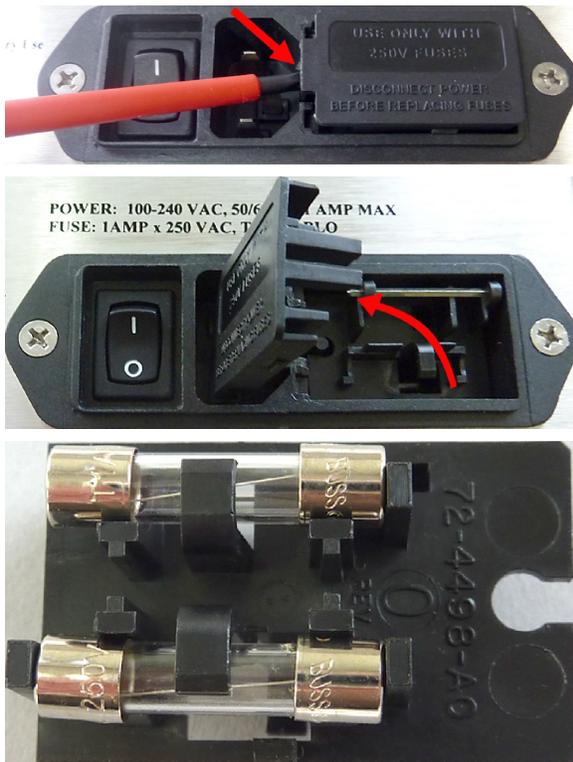
Operator Manual for HistoPro® 414 Slide Stainer

6.3 Power Failure

- Check whether there is a general power failure (no power)
- Check whether the power cord is inserted correctly into the power socket and whether the power socket is switched on, if applicable.
- Check whether the power cable is plugged into the socket on the Stainer properly.
- Check whether the power switch is switched on correctly.
- Some Stainer malfunctions/failures are caused by defective fuses. Check whether one or both secondary fuse(s) is/are faulty.



Before replacing a fuse, always switch the Stainer off and unplug from power supply. Defective fuses may be replaced only with the replacement fuses supplied together with the Stainer.



To replace a fuse, proceed as follows:

- With a screwdriver, carefully push out the Hood of the fuse insert at rear of Stainer and open it upwards.
- Remove the fuse insert – it contains two fuses on its rear.
- Check that the thin wire in the glass capillary of a fuse is intact. If not the fuse must be replaced.



Before plugging the power cable back in and switching on the Stainer, you must have identified and corrected the cause of the faulty fuse.

- Insert the fuse insert with the two fuses and start up the Stainer again.

Operator Manual for HistoPro® 414 Slide Stainer

7 Ordering Supplies, Optional Accessories and Parts

Supplies and Accessories	Part No
Operator Manual	13070
Reagent Containers (6 in a pack)	13072
Slide Carriers (4 in a pack)	13073
Rinse Station (with rinse nozzle, fitting and tubing)	13074
Rinse Tubing (48" long)	13081
Tubing and Fitting Kit	13098
Water Inlet Hose with in-line filter	13077
Water Inlet Hose without in-line filter	B11894-2
Water Faucet Adaptor Kit	13474
Drain Hose	13078
Exit Tank	13228
Support Bracket	13362
Stabilizer Bar	13364
Reagent Container Cover	13348
Power Supply	Y100065

SERVICE ITEMS	
Service Manual	13071
Keypad	13067
Control PCB with Software	13079
Software	13080
Drive Motor (wired and without pulley)	13063
Drive Belt	P680055
Solenoid Valve (wired and with fittings)	13082
Sensor PCB	B12597-4B

8 Service Information:

If you are in need of technical customer service or spare parts, please contact our Technical Service Department at 215-491-0081 or the dealer where you purchased the unit.

Please provide the following information:

- Model name and serial number of the Stainer.
- Location of the Stainer and name of the person to contact.
- Reason for the service call.
- Delivery date.

9 Decommissioning and Disposal:

The unit or parts of the unit must be disposed of according to existing local applicable regulations.