



Automated Glass Coverslipper

Operating Manual

Model Numbers:

- Model 6400 115 VAC (North America)
- Model 6409 115 VAC (Asia)
- Model 6410 220/230/240 VAC (Asia/Pacific)

IMPORTANT NOTICE

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

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Manufactured for:

Sakura Finetek USA, Inc., Torrance, CA 90501 U.S.A.
Sakura Finetek Japan Co., Ltd., Tokyo, 103-0023, Japan

Made in U.S.A.

TABLE OF CONTENTS

<i>Section</i>		<i>Page</i>
1	INTRODUCTION	
	General Description.....	1.1
	Physical Characteristics.....	1.2
	Safety Features.....	1.10
	Specifications.....	1.11
2	INSTALLATION	
	General Information.....	2.1
	Environmental Factors.....	2.1
	Unpacking.....	2.1
	Description of Accessories.....	2.3
	Priming the Instrument.....	2.7
	Slide Preparation and Handling.....	2.11
3	OPERATING INSTRUCTIONS	
	Operating Instructions.....	3.1
	Loading of Slides.....	3.1
	Routine Operations.....	3.2
	Operating Precautions.....	3.9
	Using the Emergency Stop key.....	3.9
4	SETUP PROCEDURES	
	Modifying the Setup Menu.....	4.1
	Description of Setup Menu options.....	4.1
	1. Prime Dispenser.....	4.1
	2. Dispense Volume.....	4.3
	3. Coverslip Type.....	4.7
	4. Software Version.....	4.7
	5. UPS Connection.....	4.8
	6. Setting the Fan.....	4.11
	7. Fan Timer.....	4.12
	8. Slide Pick-Up Rate.....	4.13
	9. Tuneup Prime.....	4.13
5	CARE OF INSTRUMENT	
	General Maintenance.....	5.1
	Daily Maintenance.....	5.1
	Weekly Maintenance.....	5.3
	Every Six Months.....	5.4
	Yearly Maintenance.....	5.6

TABLE OF CONTENTS

<i>Section</i>		<i>Page</i>
6	TROUBLESHOOTING	
	General Information	6.1
	Troubleshooting Chart	6.2
	Messages.....	6.4
	Error Codes and Corrective Measures	6.5
	Instrument Control Error Codes	6.7

INTRODUCTION

General Description

The Tissue-Tek® Glas™ Automated Coverslipper (Fig 1-A) is designed for coverslipping biological specimens that are mounted on standard 25 x 75 mm (1 x 3 in.) microscope slides. Histological and cytological specimens are prepared and loaded into the instrument in preparation for coverslipping with glass coverslips designed for automated instruments (specifically Superslips® brand coverglass or Richard Allan Signature Series™). Standard sizes for coverslips are 24 x 40, 24 x 50, 24 x 55, and 24 x 60. The Tissue-Tek Glas coverslipper is compatible with slide baskets accommodating the Tissue-Tek® DRS™ automated staining instruments. A maximum of 60 slides can be processed in a single batch, with the maximum hourly throughput reaching 400. A microcomputer controls all mechanical movements and an LCD offers a visual display of selectable options and current status. All operating functions are controlled through the control panel. Adjustments to the software, such as mounting medium volume and coverslipping speed, can be modified easily by using the function keys or control knobs on the display panel.

All slides ready for coverslipping are placed into the Tissue-Tek DRS compatible basket and loaded into the instrument via the loading drawer. The loading drawer should contain a compatible solvent, (xylene or aliphatic-based hydrocarbons or d-limonene-based solvents) in order to protect specimens from drying out prior to coverslipping. The loading drawer can house 3 baskets (60 slides) at one time. Robotics are responsible for efficiently moving slides from the loading area to the coverslipping stage for the application of coverglass. The slide arm removes one slide at a time from the slide basket, carefully positioning it down on the coverslipping stage. This coverslipping stage is responsible for moving slides through all coverslipping steps and into the receiving racks located on the left side of the instrument. A fan, located in the lower left corner, aides in drying coverslipped slides. Once all receiving baskets are full, they may be removed from the instrument for final microscopic evaluation.

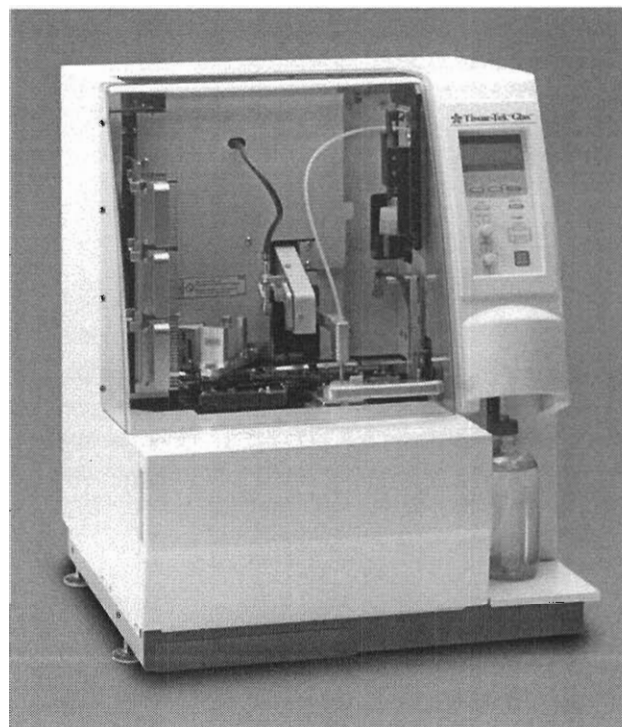


Figure 1-A

INTRODUCTION

Physical Characteristics

Loading area (Fig 1-B)

Access to the loading area can be obtained by opening the front door, located at the lower portion of the instrument. The loading drawer can be accessed by gently sliding the drawer out, exposing three compartments available for loading slide baskets ①, ②, ③. This drawer can be filled with xylene or aliphatic-hydrocarbon based or d-limonene-based solvent, which keeps slides from drying out prior to coverslipping.

CAUTION: Do not use Toluene.

A maximum of three baskets of 20 slides each can be loaded into the drawer.

The Tissue-Tek Glas Coverslipper accommodates slide baskets compatible with the Tissue-Tek® DRS™ 601 and 2000 Automated Stainers.

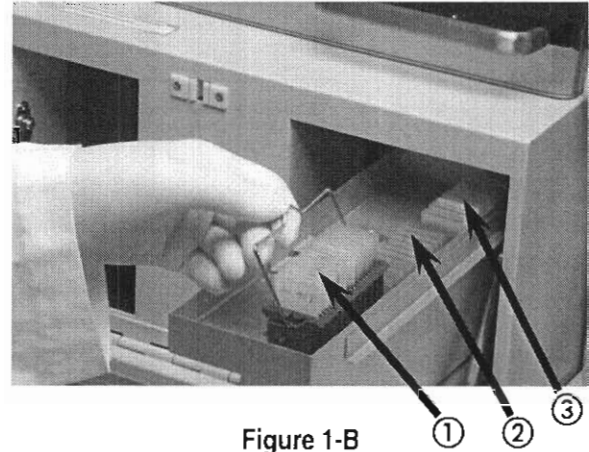


Figure 1-B

Slide Glass Arm (Fig 1-C)

The robotic slide glass arm ④ is responsible for removing slides from the loaded slide baskets, one at a time, and positioning them on the coverslipping stage. The slide is removed via a vacuum system, which secures the slide while lifting. When the slide is positioned properly on the coverslipping stage, the vacuum is released and the slide can then move to the next position.

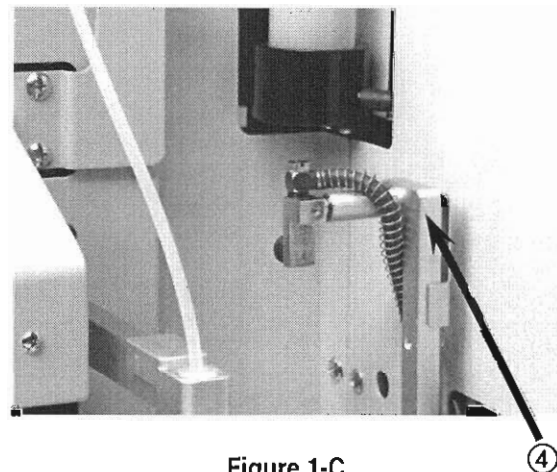


Figure 1-C

Coverslipping Stage (Fig 1-D)

The coverslipping stage, comprised of four stations, moves each slide through the instrument. Area one ① positions the slide, area two ② dispenses mounting medium, area three ③ applies the coverglass, and area four ④ prepares the slide for placement in the receiving rack.

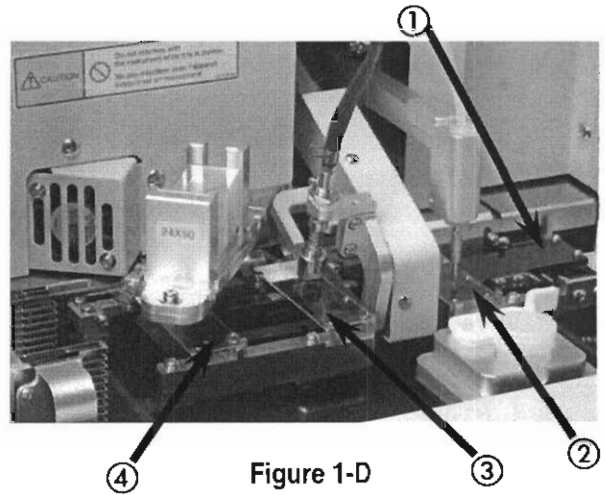


Figure 1-D

Mounting Medium Dispensing Nozzle (Fig 1-E, Fig 1-F)

The mounting medium nozzle ⑤ dispenses a line of mounting medium onto the slide at a preset volume and length. The volume of mounting medium can be increased or decreased through the instrument software. In addition, the mounting medium control knob ⑥, labeled **VOLUME** on the control panel, can be used to fine-tune the mounting medium volume in 5, 10, or 15 microliter increments.

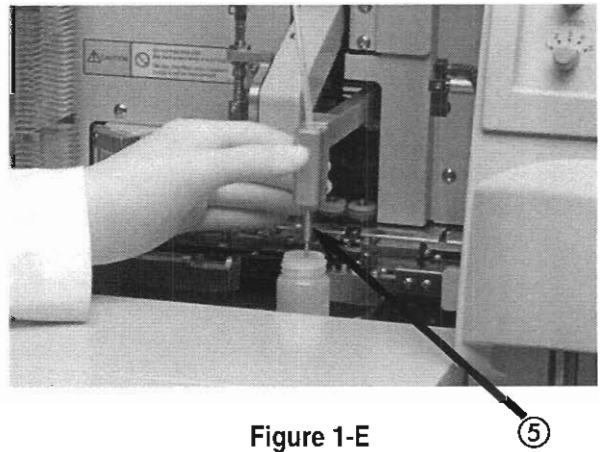


Figure 1-E



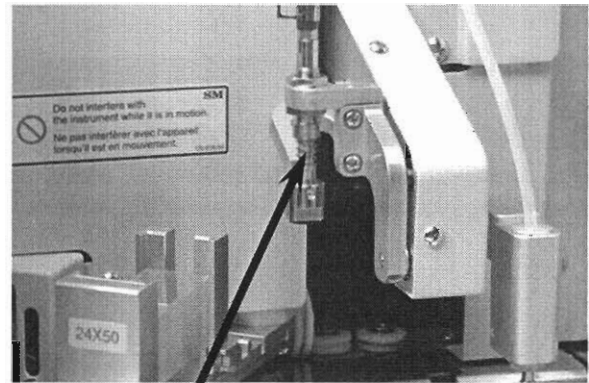
Figure 1-F

INTRODUCTION

Coverglass Arm (Fig 1-G, Fig 1-H)

The coverglass arm ① is responsible for the application of coverglass onto the slide. One piece of coverglass is picked up via a vacuum system and carefully applied to the slide using gentle pressure. The arm carefully places the coverglass so that all air can escape before complete coverage.

The control knob ②, labeled **SPEED**, controls the speed at which the coverglass is applied to the slide. This may be necessary when thick or uneven specimens are processed. The coverglass speed can be adjusted from a range of 1-5. Position 5 is the fastest speed, processing 400 slides per hour.



① Figure 1-G

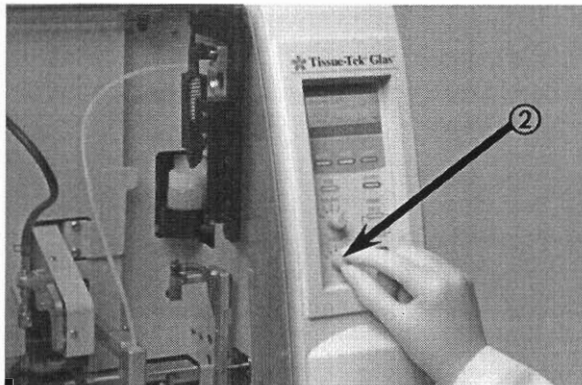


Figure 1-H

Coverglass Holder (Fig 1-I)

The coverglass stage ① is located to the left of the coverglass arm where the coverglass holder is positioned. The coverglass holder ② can be easily accessed by lifting the holder from the stage. Four sizes of coverglass are available for use, 40 mm, 50 mm, 55 mm, and 60 mm.

NOTE: It is recommended that coverglass specifically designed for automated glass coverslippers be used on this instrument to prevent potential removal problems.

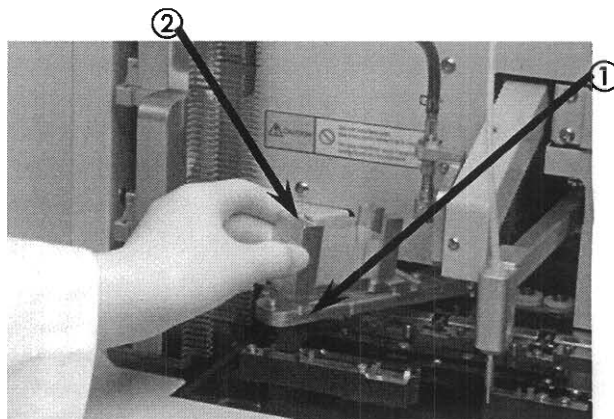


Figure 1-I

Unloading Area/Receiving Rack (Fig 1-J)

The unloading area of the coverslipper can accommodate 60 slides at a time. Three removable racks ③, accommodating 20 slides each, are positioned in the receiving area. These racks house the slides after coverslipping. These baskets are easy to load and remove using the convenient handle.

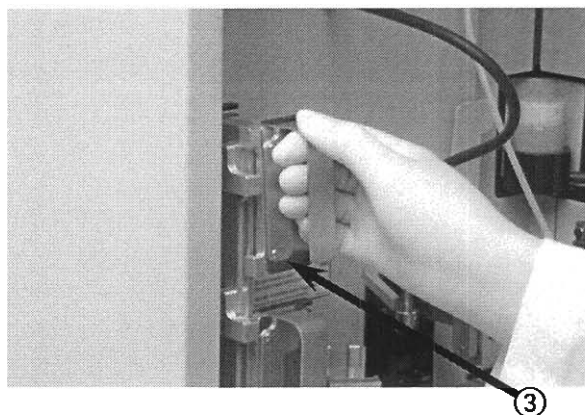
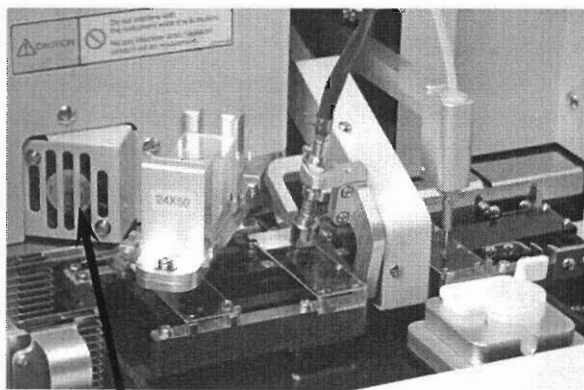


Figure 1-J

INTRODUCTION

Fan (Fig 1-K)

A fan, which aides in drying coverslipped slides, ① is located at the back, left, inside corner of the instrument. The fan is a low-pressure blower, which uses room temperature air to dry residual solvent and help facilitate drying of the mounting medium. For added flexibility, the drying time can be programmed from 2 to 10 minutes.



①

Figure 1-K

Power Switch (Fig 1-L)

The instrument power is turned ON and OFF by pressing the power switch ② on the upper right side of the instrument.

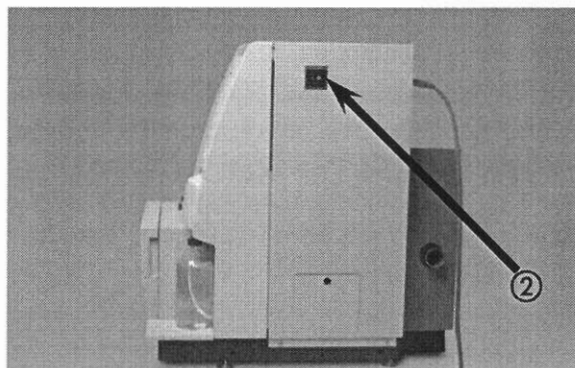


Figure 1-L

Rear of the instrument (Fig 1-M)

The power cord can be installed on the rear of the instrument in ① the upper, left hand corner. The other end of the power cord attaches into an appropriate grounded AC electrical outlet.

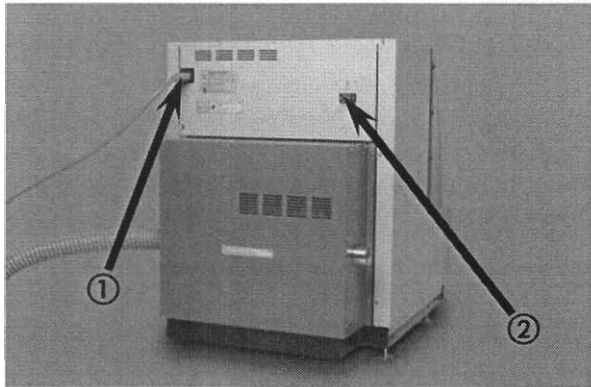


Figure 1-M

A UPS connection ② is located on the upper right side of the instrument and can be used if desired. Please refer to Section 4, page 4.8, for more details about installing the UPS connection.

Exhaust Port (Fig 1-N)

There are two exhaust ports located at the back of the instrument, which allow for effective venting of fumes. An exhaust hose is provided with the instrument accessories and can be placed on either the right or left exhaust port ③ and vented to an external venting system or through a fume hood. The fumes are expelled by forced ventilation. The exhaust port not being used should be secured with the fume plug included with the accessories.

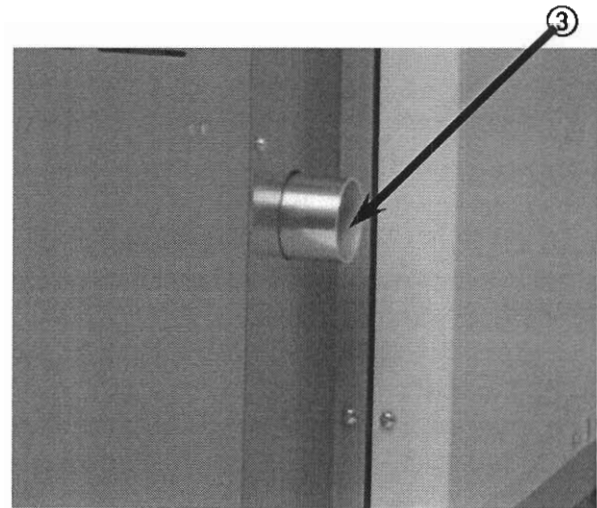


Figure 1-N

INTRODUCTION

Control Panel (Fig 1-0)

All operating functions are controlled through the control panel. There are eight keypad switches and two rotary switches interfacing with the instrument software. A four line LCD offers the user information such as, current status, setup menu options, error codes, and messages.



Figure 1-0

Description of Control Panel

Once the power is turned on, the instrument will initialize and perform a series of system checks as it prepares for operation.

After the initialization process is complete, the instrument goes into standby mode and is ready for operation. From this standby screen, a series of operations can be selected.

Directly under the LCD display are three function keys labeled: **[STOP]**, **[TEST]**, and **[START]**.

When the instrument is in operation, the **[STOP]** key is used to discontinue operation already in progress. The instrument will, however, continue current operation but will not proceed with removing additional slides from the loading drawer. This ensures that all slides on the coverslipping stage are coverslipped, preventing any unnecessary drying of the specimens on the coverslipping stage.

The **[TEST]** key can be used when the operator desires to run a test slide for the purpose of verifying proper operation of the instrument, correct mounting medium volume, or proper coverglass placement. In the TEST mode, one slide will be coverslipped and processing will halt until the slide has been removed from the coverslipping stage. A test run is usually performed as a quality control procedure at the beginning of operation to ensure all parameters are set properly.

The coverslipper will begin routine operation when the **[START]** key is pressed, allowing for continued operation.

Directly under these three keys are the **[SIZE]** and **[VERIFY]** keys.

The correct size of coverglass can be chosen by pressing the **[SIZE]** key. There are four coverglass sizes available for use, 40, 50, 55, and 60 mm; however, three are provided in the instrument accessories (40, 50, and 60 mm). Size 55 mm is an optional accessory. Each time the **[SIZE]** key is pressed, the instrument will toggle between 40, 50, 55, and 60 mm.

The **[VERIFY]** key is used when the operator needs to confirm or save entered data. Essentially it acts as an "ENTER" key. The instrument display messages prompt the user to press **[VERIFY]** when necessary.

The two keys associated with priming the instrument are the **[SINGLE]** and **[CONTINUOUS]** keys. These keys are used to prime the mounting medium line prior to setup or when changing to a different type of mounting medium. The **[SINGLE]** key can be used when the operator wishes to prime the instrument by performing only one dispersal of mounting medium. When **[CONTINUOUS]** is pressed, the instrument will continue dispensing mounting medium until the **[STOP]** key is pressed or mounting medium has been dispensed 10 times. (Refer to Section 2, page 2.7, for detailed priming instructions).

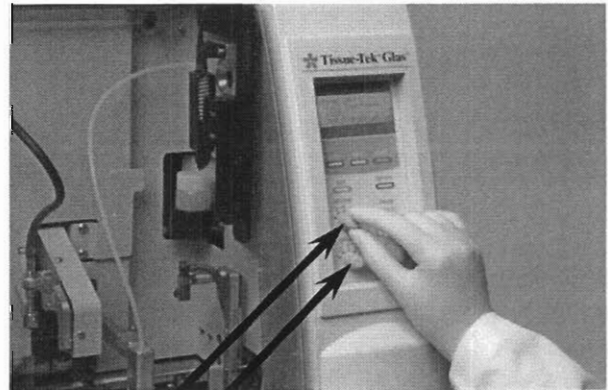
In the setup menu, which is accessed by pressing the **[EMER. STOP]** key from the initial display, the **[SINGLE]** and **[CONTINUOUS]** keys act as arrow keys. Pressing **[SINGLE]** will move the cursor up and pressing **[CONTINUOUS]** will move the cursor down.

The **[EMER. STOP]**, key located in the lower right corner of the control panel, will immediately bring the instrument to a halt and should be used only when the operator notices routine operation has been disturbed in some way. The **[EMER. STOP]** key is also used to access the setup menu from the <STAND BY> screen. Once the instrument has stopped, it is possible to abort the run or resume processing if desired.

Two control knobs located on the left side of the control panel (Fig 1-P), **[VOLUME]** and **[SPEED]**, can be used to adjust specific operations even while the instrument is operating. The **[VOLUME]** knob ① gives the user the flexibility of fine-tuning the mounting medium volume. Fine-tuning of the mounting medium can be set at 5, 10, and 15 microliter increments ranging from 1-5. Position 5 disperses the highest volume of mounting medium.

The **[SPEED]** knob ② can be used when the user chooses to slow the operation of the instrument. The instrument will adjust the speed at which it applies a coverglass to the glass slide. Sometimes this is used when a particular specimen is thick and uneven. A slower speed may allow for less bubble formation in this case. The speed knob ranges from 1-5. Position 5 is the fastest speed.

More details about the control panel will be given later in the operating manual.



① ② Figure 1-P

INTRODUCTION

Safety Features

The Tissue-Tek Glas Coverslipper is equipped with several safety features, which help keep the operator and the instrument safe from harm.

- An alarm sounds when any of the following conditions occur:
 - The cover is not properly closed during operation.
 - The loading door is open during operation.
 - Low volume of coverglass is detected.
 - The instrument is unable to pick up a coverglass or slide.
 - When normal operation has been suspended due to instrument failure.
- If the instrument does not detect a slide on the coverslipping stage, mounting medium will not be dispensed.
- If the instrument does not detect a slide on the coverslipping stage, coverglass will not be applied.
- Receiving racks must be removed and empty baskets must be positioned in the unloading area at the end of a run in order to continue operation.
- If a slide jam occurs, all mechanical movement stops and an alarm sounds.

Regardless of the various safety features, prompt attention to a potential problem can prevent damage to specimens and/or slides if corrected immediately.

Specifications

Power Supply Requirements

Model 6400 & 6409

Rated Voltage and Current:

AC 115V \pm 10%, (50/60Hz), 1.7 Amps

Grounding System: Class D or higher in rating

Model 6410

Rated Voltage and Current:

AC 220/230/240V \pm 10%, (50/60Hz), 0.85 Amps

Circuit Breaker Rating

Model 6400: 5.0 Amps

Safety Standards

Tested and listed by Intertek Testing Services (ITS)

Complies with: (UL-61010-A), CSA 22-2,

No. 1010.1-92

Dimensions

Centimeters: 51(W) x 63(D) x 64(H)

Inches: 20(W) x 25(D) x 25(H)

Instrument Weight

69 kg (152 lbs)

Operating Conditions

Operational Temperature: 10°C to 40°C (50°F to 104°F)

Relative Humidity: 30-85% (non-condensing)

Atmospheric Pressure: 80kPa – 106kPa

Protect from direct sunlight

Processing Speed

Maximum throughput: 400 slides/hour

60 slides/batch

Acceptable Dimensions for Slides

Dimensions: 25 mm (W) x 75 mm (L) (1 x 3 inches)

Thickness: 0.95 – 1.05 mm

Acceptable Dimensions for Coverglass

Dimensions: 24 x 40, 24 x 50, 24 x 55, 24 x 60

Thickness: 0.13 – 0.17 mm

Compatible Solvent

Xylene

D-Limonene-based substitutes

Aliphatic-Hydrocarbon-based substitutes

Compatible Mounting Medium

Xylene-based mounting medium

D-Limonene-based mounting medium

Aliphatic-Hydrocarbon-based mounting medium

CAUTION: Do not use toluene or toluene-based chemicals, as these chemicals will damage the instrument.



INSTALLATION

General Information

This section provides detailed installation and setup instructions for the Tissue-Tek® Glas™ Automated Coverslipper. The installation steps must be followed correctly to ensure proper operation and service. Read this Operating Manual carefully before attempting to operate the instrument. Follow all instructions carefully.

The Tissue-Tek Glas Coverslipper is a precision instrument and must be handled accordingly. Rough handling or dropping the instrument will disturb or damage internal components. Always handle the instrument with care.

Select a place where sufficient clearance can be provided around the instrument. A clearance of at least 10 cm is required for the top and left side of the instrument. To the right of the instrument, at least 30 cm should be provided.

Environmental Factors

As with all sensitive electronic instruments, prolonged exposure to excessive humidity and temperature should be avoided. Temperature and humidity should be held relatively constant. The ambient temperature range for operating the instrument is 10°C to 40°C (50°F to 104°F). The ambient operating humidity range is 30-85% relative humidity.

Locate the instrument in a well-ventilated area, avoiding exposure to corrosive vapors and extreme variations in temperature or humidity. The area should be clean and dust-free and have a firm, level surface capable of holding at least 69 kg (152 lbs.) of weight. Be sure it is near a power source that meets the electrical requirements specified on the rating label located on the rear of this instrument. The power receptacle must be grounded and should be a dedicated line. Avoid proximity to direct sunlight, open windows, sinks, ovens, hot plates, open burners, or radiators.

Unpacking

Removing the Outer Shipper

1. The Tissue-Tek Glas Coverslipper is packaged in a sturdy cardboard shipping carton attached to a metal pallet. Inspect the carton and make sure there are no visible signs of damage. If visible signs of damage are evident, immediately file a complaint with the carrier and notify Sakura Finetek USA Technical Support Department.
2. If no visible signs of damage are evident, remove the protective tie wraps securing the outer shipper box to the pallet. Next, remove the shipping tape securing the top of the box. Open the box and remove the accessory box.
3. The outer cardboard box may now be lifted up away from the instrument.

The instrument is protected by a plastic cover and Styrofoam packing material. If the Styrofoam has not already been removed with the outer shipper, remove it from the corners of the unit. Remove the protective wrapping exposing the instrument and carefully lift the coverslipper from the pallet and place it on a sturdy, level surface capable of supporting at least 69 kg (152 lbs).

CAUTION: The instrument is very heavy and large; therefore, it is strongly recommended that it always be lifted and transported by at least two people, one positioned on each side.

INSTALLATION

Positioning the instrument (Fig. 2-A)

4. Proper leveling of the instrument is essential. There are four leveling feet located at the base of the unit ①. Carefully lift each side of the instrument, one at a time, to adjust the level of the feet. Rotating the feet clockwise will raise the level and rotating counter-clockwise will lower the level. Be sure that all four feet have been adjusted equally for proper height. To check that the instrument is level, place a small leveling tool on the flat area ② located in front of the mounting medium dispensing nozzle. Verify proper adjustment both side-to-side, and front-to-back. The instrument must be level for consistent, routine operation.

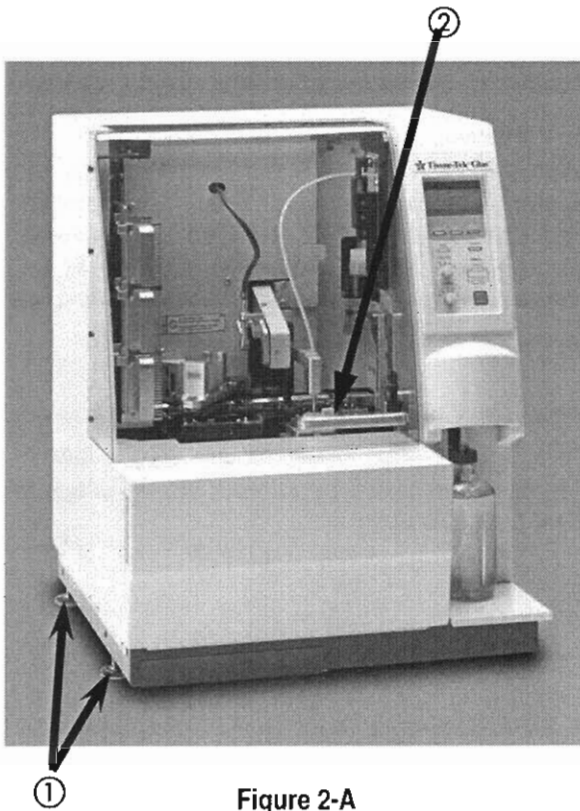


Figure 2-A

Unpacking the Accessories

5. When opening the accessory box, confirm that all accessories have been included with the instrument:
 - Operating Manual (1)
 - Warranty card (1) (inside the Operating Manual)
 - Slide baskets (3)
 - Basket hooks (3)
 - Receiving racks (6)
 - Coverglass Holders
 - Size 40 mm (1)
 - Size 50 mm (1)
 - Size 60 mm (1)
 - Exhaust hose (1)
 - Hose clamp (1)
 - Exhaust cover (1)
 - Loading drawer (1)
 - Cover for loading drawer (1)
 - Power cord (1)
 - Priming bottle (1)
 - Metal tray (1)
 - Plastic waste tray (1)
 - Nozzle reservoir (1)
 - Waste bottle with lid (1)
 - Maintenance tool (for strainer) (1)

Description of Accessories

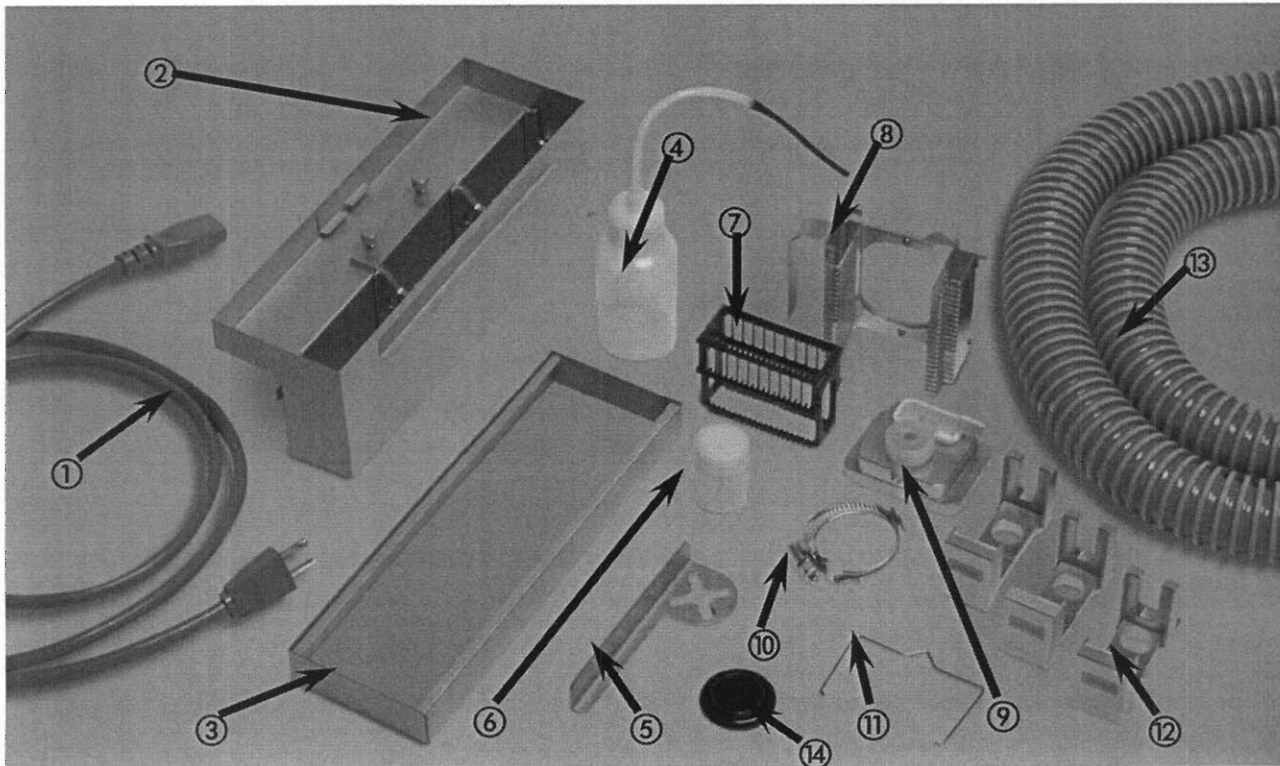


Figure 2-B

Power Cord ① — Supplies power to the instrument.

Loading Drawer ② — Accommodates up to 3 slide baskets (60 slides) at one time.

Loading Drawer Cover ③ — Cover for loading drawer to prevent evaporation of solvent.

Priming Bottle ④ — Used for instrument priming, prior to operation.

Maintenance Tool ⑤ — A tool used to remove the instrument strainer for cleaning.

Waste Bottle ⑥ — Accommodates waste generated from the priming process.

Slide Basket ⑦ — Slide basket used for loading microscope slides.

Receiving Rack ⑧ — Rack used for receiving coverslipped slides.

Metal tray with Nozzle reservoir and Plastic waste tray ⑨ — Nozzle reservoir houses the mounting medium nozzle when the instrument is in standby or not in use. The plastic waste tray is used for collecting mounting medium waste generated during routine operation.

Hose Clamp ⑩ — Used to secure the exhaust hose to the exhaust port.

Basket Hook ⑪ — Aids in loading slide baskets into the loading drawer.

Coverglass Holders ⑫ — Holds coverglass, available in sizes 40, 50, and 60mm (coverglass size 55 mm is optional).

Exhaust Hose ⑬ — Used for effective venting of fumes.

Exhaust Cover ⑭ — Used to secure the exhaust port not in use.

Debris Tray (Not pictured) — Used to collect debris, generated from coverslipping process.

INSTALLATION

Removing the packing materials

Once the instrument has been secured on a counter, remove the adhesive tape from the cover and door of the instrument. Packing material inside the instrument must be removed prior to operation.

6. After removing the tape securing the door, open the door and remove the small Styrofoam wedge under the base of the guide rails. These guide rails accommodate the loading drawer. Next, remove the tape securing the slide arm to the side panel of the instrument and the tape positioned over the guide rails.
7. After removing the tape securing the cover, open the cover and carefully remove all adhesive tape securing the components. All Styrofoam wedges and foam need to be removed prior to operation. Remove the Styrofoam above the coverglass arm and above the mounting medium arm. In addition, foam secures the coverglass stage; therefore, raise the coverglass arm and carefully remove the foam around the stage. Lastly, raise the coverslipping stage and remove the foam from under this area. Do not dispose of these items until proper operation has been verified.

NOTE: Be certain that all tape and foam is removed from the instrument before operation.

Connecting the Exhaust Hose (Fig. 2-C)

To connect the exhaust ① hose, run the hose clamp over one end of the exhaust hose and attach it to the exhaust port on the backside of the instrument, either the left or right side. Tighten the clamp using a Phillips screwdriver, securing the exhaust hose to the port. There are two ports on either side of the instrument; the unused port should be closed with the exhaust cover included with the accessories. Connect the other end of the hose to a fume hood or venting system. (Fig 2-C)

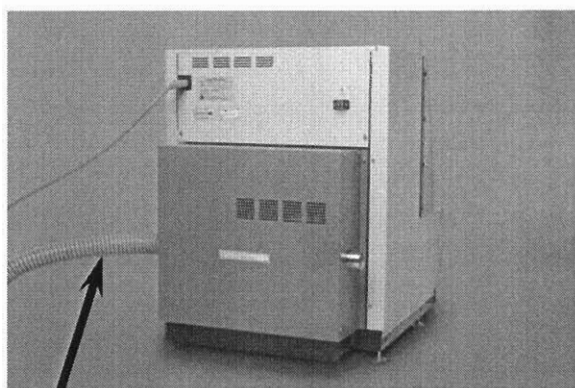


Figure 2-C

Connecting the power cord

To connect the power cord, make sure the "O" side of the POWER switch is depressed. Remove the power cord from the accessory box and plug it into the power inlet located on the back side of the instrument. Plug the other end of the power cord into an appropriate AC electrical outlet.

NOTE: The outlet should be a dedicated line and must be grounded.

NOTE: Be sure the outlet supplies the proper voltage and frequency (Hertz) for the instrument. Refer to the rating label located on the rear of the instrument to determine the proper voltage rating.

Positioning the Accessories

The remaining accessory items may be removed from the box and positioned on the instrument.

1. The loading drawer (Fig. 2-D) can be positioned in the lower, right section of the coverslipper. Open the door to expose the loading area. Position the drawer securely along the guide rails by engaging the locating pin on the loading drawer with the slots on the guide rails. Make sure the drawer can move forward and back smoothly. This area is used for loading slide baskets prior to coverslipping. The loading drawer also keeps the slides from drying prior to coverslipping.

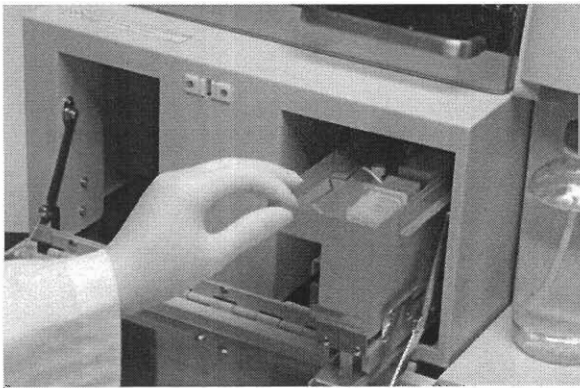


Figure 2-D

2. The debris tray can be positioned under the base of the door, on the lower left portion of the instrument, by sliding it between the rails. Its purpose is to catch excess debris generated during routine operation.
3. Three receiving racks ① can be placed on the left side of the instrument in the unloading area (Fig. 2-E). Each aluminum rack holds slides in a horizontal position to help speed drying and maintain proper coverglass placement. Each rack holds 20 slides.

NOTE: All three racks must be in place before operation can begin.

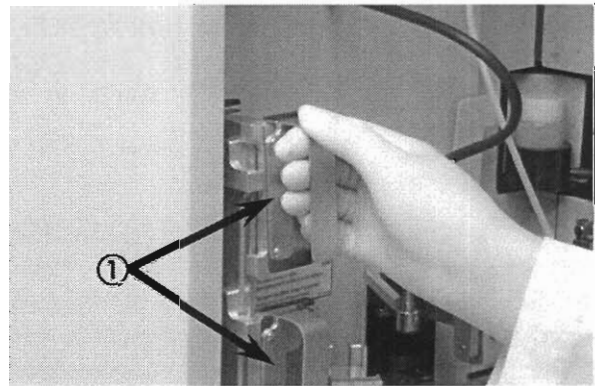


Figure 2-E

4. A coverglass holder ② (Fig. 2-F) can be positioned on the coverglass stage. Sizes 40, 50, and 60 mm are available for use. Size 55 mm is an optional accessory. Place the desired size on the coverglass stage by angling the holder toward the instrument slightly and engaging it onto the rails of the stage. The size key can be pressed to select the desired coverglass size.

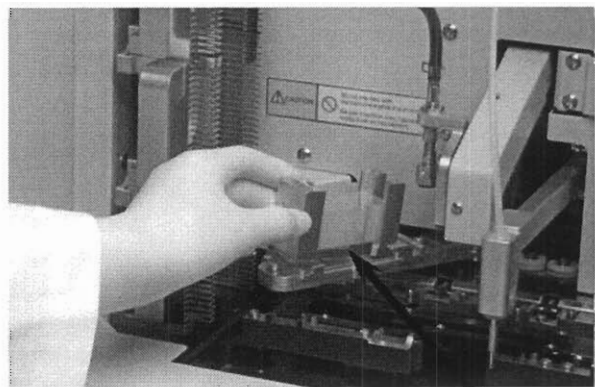


Figure 2-F

②

INSTALLATION

5. Inside the instrument, located on the upper right side, is a small container seated in a metal housing ② (Fig. 2-G). Fill this container with xylene or a compatible solvent.

CAUTION: Do not use Toluene.

Using the priming bottle or a dropper, fill the container with solvent until it reaches a visible level just above the metal housing. The solvent should be replaced every 2 months. This container is attached to the instrument and cannot be removed. A tube located at the base of the container slowly releases solvent into the mounting medium line. This solvent aides in lubricating the line and maintaining a consistent mounting medium flow.

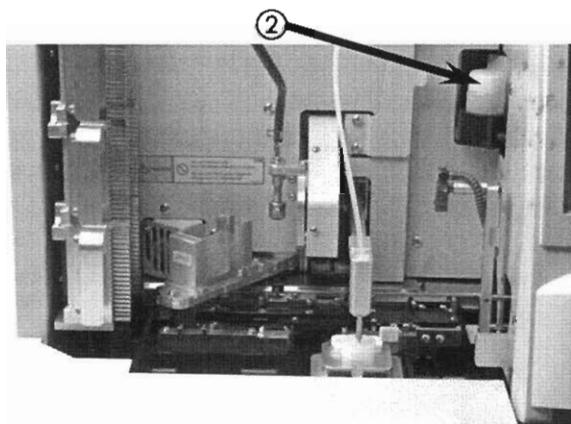
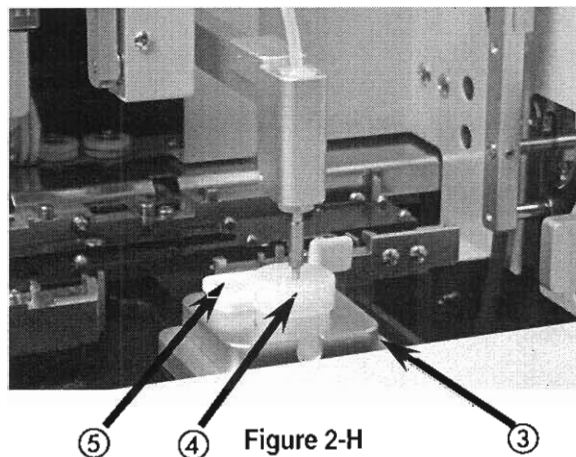


Figure 2-G

(Fig. 2-H) The metal tray ③, housing the nozzle reservoir ④ and plastic waste tray ⑤, can be positioned on the platform directly in front of the mounting medium dispensing nozzle. To place the metal tray, line up the holes located underneath the tray with the small pins located on the platform. The tray should be positioned so that the nozzle reservoir housing is closest to the front of the instrument. The plastic waste tray should be set so that the small handle on the tray is to the right of the instrument.

Next, manually move the dispensing nozzle forward and position it inside the nozzle reservoir.



NOTE: The mounting medium dispenses nozzle should be positioned inside the nozzle reservoir at all times to prevent the tip from drying out. The level of solvent should be filled so that the nozzle tip is not immersed completely in the solvent. The Tissue-Tek Glas Coverslipper automatically performs this function during operation. This reservoir should be checked weekly and solvent should be replaced or added accordingly.

Priming the Instrument

The priming procedure prepares the Tissue-Tek Glas Coverslipper to accept mounting medium.

1. Before operating the instrument, it is critical that all air in the mounting medium line be removed. To remove the air, force xylene or a compatible solvent through the line using the priming bottle. The solvent helps to remove bubbles from the line in preparation for mounting medium.
2. Follow this previous procedure when changing the brand of mounting medium in the Tissue-Tek Glas Instrument.

NOTE: It is critical that the priming process be completed properly before operating.

To prime the instrument for operation:

1. Fill the priming bottle, half-full (approximately 50 μ l) with xylene or a compatible solvent.
2. Place the black tubing, extending from the nozzle tip of the priming bottle, onto the suction tube extending from the mounting medium bottle position. Make sure the connection is secure to prevent any solvent from leaking. Place the priming bottle on the mounting medium stage until all other setup procedures have been completed.
3. Open the cover and gently raise the mounting medium dispenser to remove the metal tray, nozzle reservoir, and plastic waste tray. Place the waste bottle, provided in the accessories, underneath the mounting medium nozzle ① (Fig. 2-1). This bottle is used to collect solvent, which will be forced through the line during priming. The solvent waste should be discarded after completion of the priming process or when it nears the rim of the waste bottle to prevent overflow.

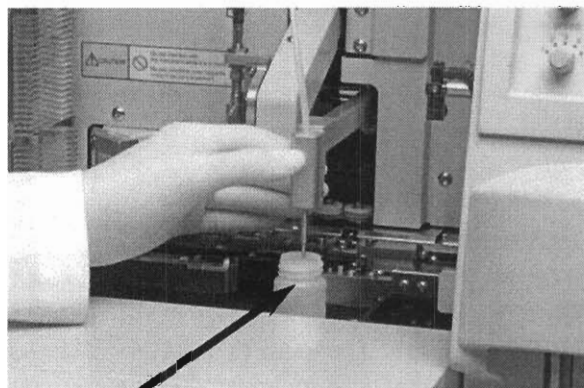


Figure 2-1

4. After the waste bottle has been placed underneath the nozzle, the priming bottle may now be used to initiate the flow of solvent through the line. Squeeze the priming bottle, forcing the solvent into the dispensing line. Continue pressing the bottle, until the solvent in the bottle is low but not completely empty, as air will again be introduced into the line. Solvent will begin filling the line as air is forced out. This process should take only a few minutes. Visually inspect the line to check that no air bubbles are evident. If bubbles are evident in the line, add more solvent to the priming bottle and repeat the procedure until all air is removed.

NOTE: If the waste bottle under the mounting medium nozzle is almost full, discard the waste from the bottle and replace the empty bottle under the nozzle.

INSTALLATION

5. When this manual procedure is complete, remove the black tubing on the priming bottle from the suction tube that extends from the mounting medium tube.
6. The mounting medium bottle may now be placed in position, directly under the control panel. Open the cap and place the tube inside the bottle. Secure the cap by turning it clockwise (Fig. 2-J).
7. Since the mounting medium line is now filled with solvent, it will be necessary to remove it and replace it with mounting medium in order to begin operation. To replace the solvent with mounting medium, use the instrument software to automatically force out the solvent and introduce mounting medium.

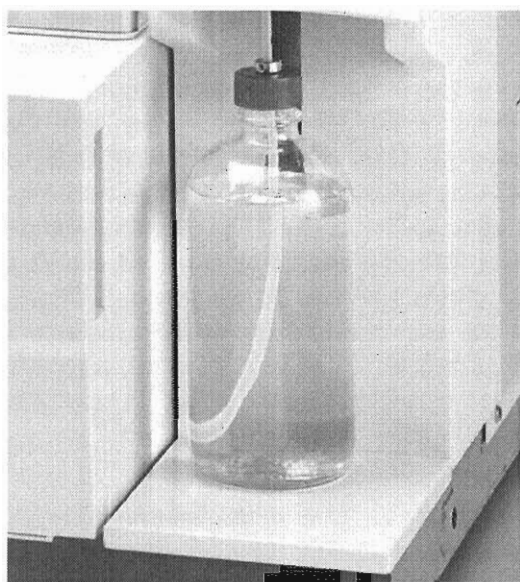


Figure 2-J

Priming the Instrument using the Software

After the manual procedures have been completed, the instrument software can be used to replace the solvent with mounting medium.

NOTE: Make sure that the waste bottle is again positioned under the mounting medium nozzle to collect the solvent waste when priming begins.

8. Press the "I" side of the power switch to turn ON the instrument. The following message will be displayed:

```
<Power On>  
Check Instrument  
[VERIFY]  
[EMER. STOP] to setup
```

9. Press the [EMER. STOP] key, then to access the Setup menu.

```
-Setup Menu-  
1. Prime Dispenser  
2. Dispense Volume  
3. Coverslip Type
```


10. The cursor will be positioned on the first parameter, Prime Dispenser. Press the [VERIFY] key on the control panel to access the "Prime Dispenser" menu. The display will read:

```
<Prime Dispenser>
[START] to prime
[EMER. STOP] to exit
```

11. From the "Prime Dispenser" display, press the [START] key to begin operation.

```
<Prime Dispenser>

[START] to prime.
[EMER. STOP] to exit.
```

The display message will read:

```
<Prime Dispenser>
Setup completed?
[START]
```

12. Press the [START] key to begin the priming procedure. The pump will begin operating, *pumping* solvent through the mounting medium line. It will take approximately 7 minutes to complete the priming process. During priming, the following message will be displayed:

```
<Prime Dispenser>
In process
[STOP] to suspend.
[EMER. STOP] to exit.
```

NOTE: It will again be necessary to check the waste bottle under the nozzle and empty it when it nears the rim of the bottle.

It is important that priming be allowed to complete so that all solvent has been removed from the line and replaced with mounting medium. Visually inspect the mounting medium line to be sure that there are no bubbles evident. If there are bubbles visible in the line, it is recommended to complete the priming procedure a second time.

INSTALLATION

NOTE: Be careful not to shake the bottle when handling. If the mounting medium has been agitated, air bubbles may be created that will need to be forced from the mounting medium line.

If visible air bubbles are trapped in the line, follow one of the procedures below to remove the bubbles.

- Replace the mounting medium with a new bottle that does not contain any bubbles.
- Allow the mounting medium to settle for a short time in order for the bubbles in the bottle to dissipate.
- Use the PRIME DISPENSER function to force the mounting medium through the line until no bubbles are evident.

13. Upon completion of the priming operation, the display menu will return to the user Setup Menu.

```
-Setup Menu-
1. Prime Dispenser
2. Dispense Volume
3. Coverslip Type
```

14. Remove the waste bottle by gently raising the mounting medium dispenser and empty the bottle into a container designated for solvent waste. It is now necessary to place the metal tray ① (Fig. 2-K) accommodating the nozzle reservoir and plastic waste tray, as these items are necessary for operation.

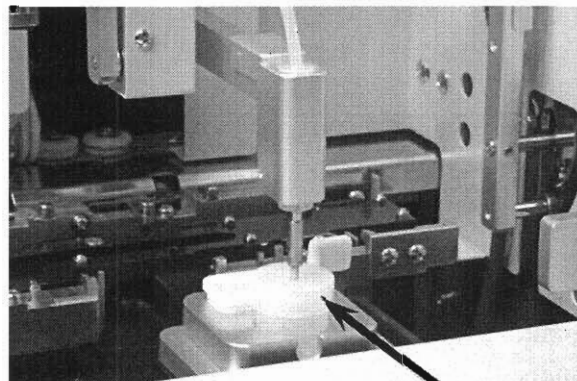


Figure 2-K

15. Close the cover and press the [EMER. STOP] key. The instrument will be restarted and the following message will be displayed:

```
<Initialization>
Please wait.
```

If no air bubbles are visible in the line, priming has been successfully completed.

The instrument is now ready for routine operation.

Changing Mounting Medium Brands

Since mounting mediums vary in viscosity and formulation, it will be necessary to follow the same priming procedure when changing to a different brand of mounting medium.

Follow the procedures under "Priming the Instrument" beginning on page 2.7 for detailed instructions.

Slide Preparation and Handling

Precautions on Slide Selection

Beveled slides, or slides which are angled on the edges, should not be used on the Tissue-Tek Glas Coverslipper. It is possible that these slides may lose contact with the guide rails on the coverslipping stage causing the slide to misalign, preventing proper coverglass placement.

Narrow slides, such as the V/C/E slides occasionally used for cytology, fit very loosely in the slide baskets. They may misalign while being removed and positioned on the coverslipping stage.

Only stains calling for solvent-based mounting medium should be used to stain slides that will be coverslipped on the Tissue-Tek Glas instrument.

Xylene or a compatible solvent should be placed in the loading drawer to keep the specimen slides from drying out. Slides should be free of paraffin, foreign debris and staining residue. When the solvent appears cloudy or becomes contaminated with debris, replace the solvent with fresh reagent.

CAUTION: Toluene and toluene-based mounting medium should never be used in the instrument as instrument parts and components are not compatible with this solvent.

Handling of Coverslipped Slides

Slides coverslipped with coverglass require time to dry completely. Although the instrument is equipped with a fan, which is activated when slides enter the receiving rack, the slides may not dry completely. Care should be taken when the slides are removed from the receiving racks as the coverglass may have a tendency to move freely or "float" on the slide.

Slides removed from the instrument can be allowed to air dry and then be placed in slide trays for further drying. As with all glass coverslipped slides, slides should not be filed until the mounting medium has had time to dry sufficiently.

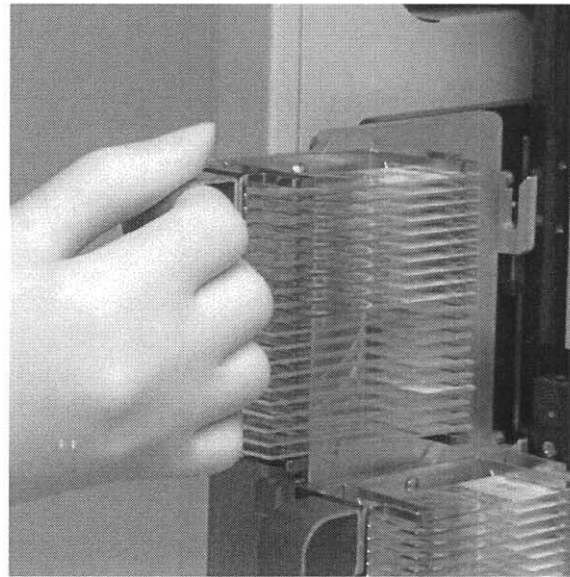


Figure 2-L

Removal of Coverslipped Slides

On occasion, it may be necessary to remove a coverglass from a slide, either to restrain the specimen or because an air bubble is obscuring the field of view. The most commonly used method for removing a glass coverglass from a specimen slide is to fill a coplin jar with xylene and immerse the slide. The length of time necessary in xylene is dependant on how long the coverglass has been attached to the slide. The shorter the length of time, the shorter the immersion time. The xylene will attack the mounting medium, making it viscous and easy to remove.

Once the coverglass has been removed, the uncoverslipped slide should be placed in a coplin jar filled with fresh xylene and agitated, if necessary, to remove all residual traces of mounting medium.

1

2

3

OPERATING INSTRUCTIONS

Operating Instructions

The Tissue-Tek® Glas™ Automated Coverslipper is capable of performing continuous, rapid coverslipping by simple operating steps. Described in this chapter are basic and routine operations.

Loading of Slides (Fig. 3-A)

The Tissue-Tek Glas Coverslipper is compatible with slide baskets used on the Tissue-Tek® DRS™ 601 and Tissue-Tek® DRS™ 2000 Automated Slide Stainers only.

Slides must be correctly inserted into the slide baskets for proper slide retrieval.

- The specimen side of the slide must be facing toward the side of the basket labeled "UPSIDE."
- The label end of the slide must be visible from the outside (top) of the basket.
- Each slide must be positioned properly in the parallel grooves of the basket.

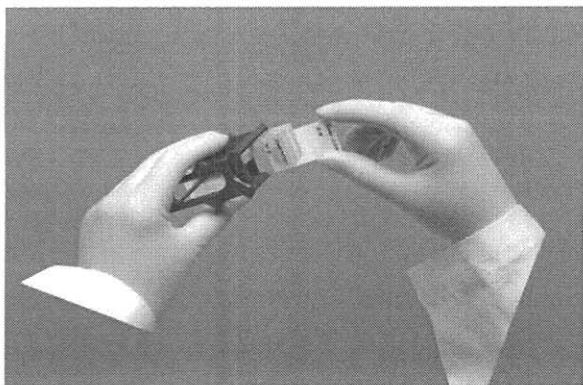


Figure 3-A

Each basket can hold up to twenty (20) slides. To prevent damage to the specimens, keep the slides totally immersed in xylene or a recommended solvent when positioned in the loading drawer of the instrument (Fig. 3-B).

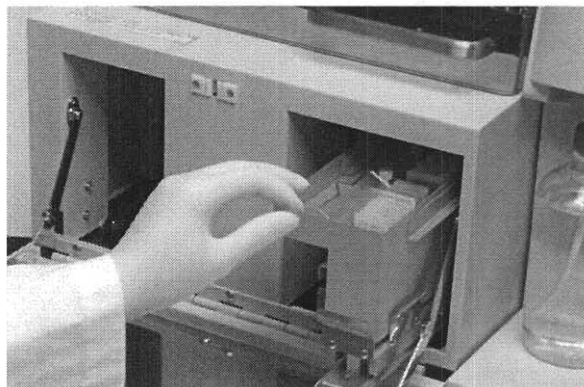


Figure 3-B

OPERATING INSTRUCTIONS

Routine Operations

1. Turn the instrument on by firmly pressing the power switch to the "1" position ① (Fig. 3-C). The power switch is located on the upper right side of the instrument.

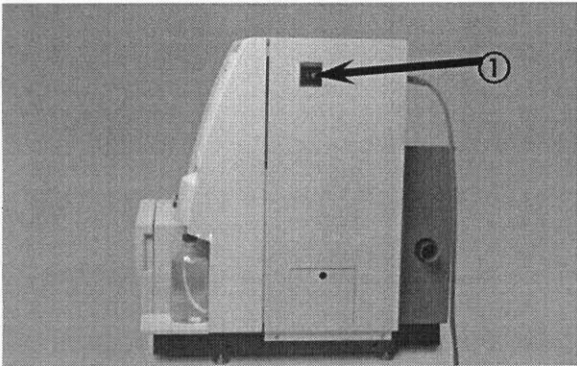


Figure 3-C

An audible beep will sound briefly, and the following message will appear:

```
<Power ON>
Check instrument.
[VERIFY]
[EMER.STOP]to setup
```

2. If the mounting medium bottle ② (Fig. 3-D) has not already been positioned following the priming process, it should be positioned to the right of the instrument in its designated area, directly under the control panel. Verify that there are no kinks in the tubing, which may prevent dispensing. Make sure that the level of mounting medium is at least 2 cm or higher from the bottom of the bottle. If the level is below 2 cm, air may be introduced into the line, as the tubing does not extend completely into the base of the bottle. In this case, add more mounting medium to the bottle or replace it with a new bottle of mounting medium.

NOTE: It is not necessary to perform priming procedures each time the instrument power is turned off.

NOTE: If the mounting medium bottle is completely empty, it is possible that air may have been introduced into the mounting medium line. If there are air bubbles in the line, remove the mounting medium bottle and perform the priming procedure detailed in Section 2, "Priming the Instrument", page 2.7.

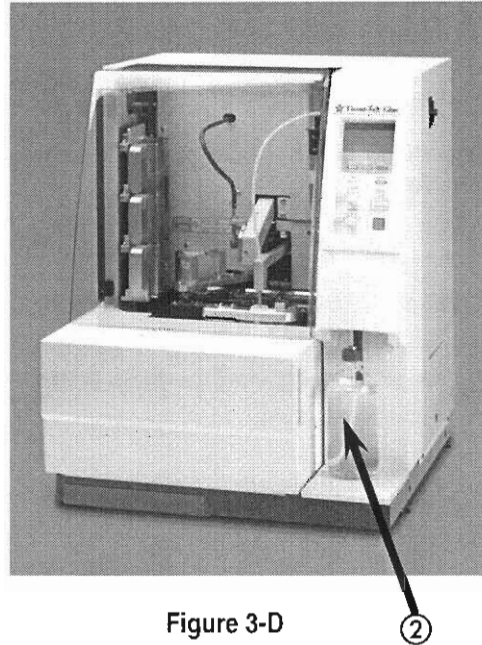
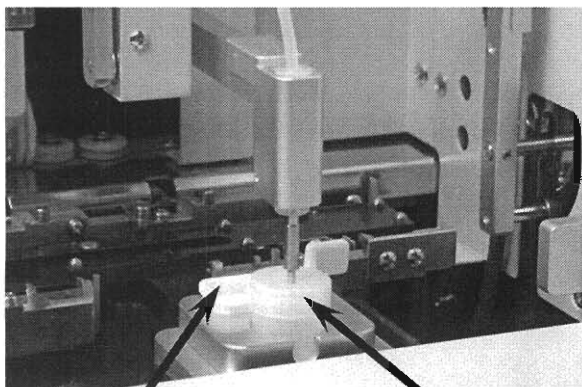


Figure 3-D

- Open the cover and check that the metal tray, housing the nozzle reservoir and plastic waste tray, is positioned correctly. The nozzle reservoir should be set on the tray and filled approximately three-quarters full with a recommended solvent, just enough for the mounting medium nozzle to rest above the solvent level ① (Fig. 3-E). When the instrument is in the standby position, or not in use, the nozzle will be positioned here to keep the tip from drying out. The solvent in the nozzle reservoir should be replaced weekly. The plastic waste tray should be positioned in the metal tray as seen below ②. This waste tray is needed for removing mounting medium waste, which may be disposed of at various times during routine operation.



② Figure 3-E ①

- Prior to operation, clean the part of the coverslipping arm vacuum cup ③ (Fig. 3-F), which comes in contact with the slide. Use a cloth soaked in alcohol and gently wipe the vacuum cup to remove any debris or dirt, which could restrict airflow. This will also help degrease the vacuum cup and allow for consistent performance. The vacuum cup should then be allowed to air dry.



③ Figure 3-F

- Choose the appropriate size of coverglass holder, 40, 50, or 60 mm. Remove the holder and carefully place the coverglass into the holder. Hold the coverglass at an angle to ease loading (Fig. 3-G). Each coverslip holder will hold 200 sheets of coverglass.

NOTE: When the coverglass level falls below 60 sheets, the instrument will alarm to alert the operator to add additional coverglass.

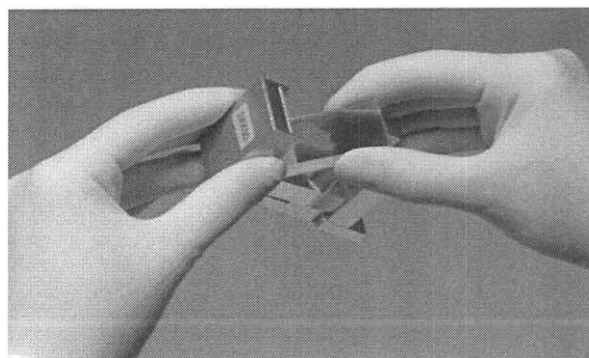


Figure 3-G

OPERATING INSTRUCTIONS

6. Place the coverglass holder on the coverglass stage (Fig. 3-H), positioning the guides into the grooves on the stage. The holder can be slightly angled down toward the instrument as shown below. The holder must be positioned properly and secured.

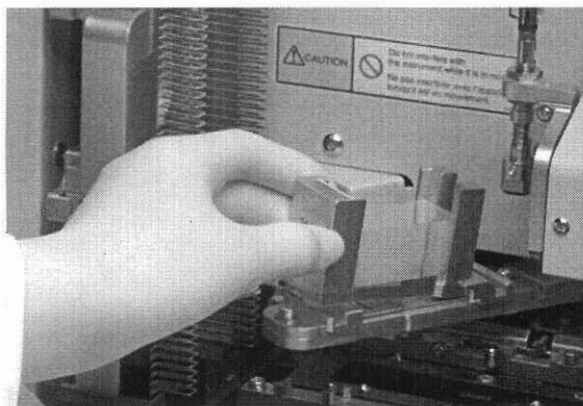


Figure 3-H

7. Place all (3) (Fig. 3-I) receiving racks onto the receiving rack guide rails if not already positioned.

NOTE: All three racks must be positioned in place or the instrument will not operate.

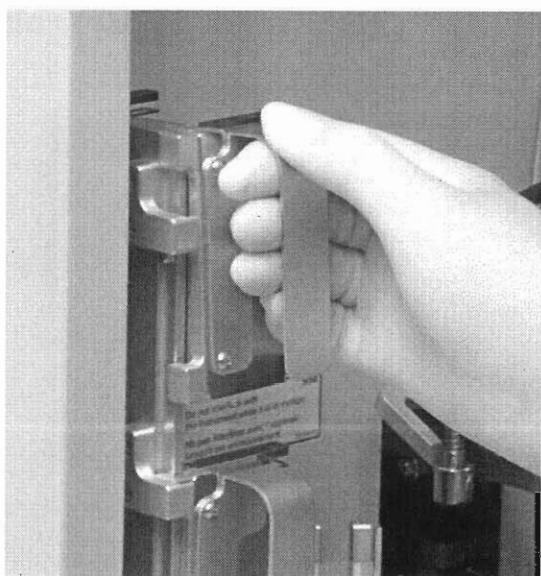


Figure 3-I

8. If the loading drawer has not already been positioned during installation, it may now be positioned in the loading area. To secure the loading drawer, follow the procedure below.

To position the loading drawer:

1. Open the door to access the loading drawer guide rails. Engage the locating pins on the base of the drawer with the appropriate grooves on the guide rails. Make sure the loading drawer is securely set on these guide rails; failure to do so will result in misalignment.
2. The loading drawer should be filled with a recommended solvent in order to keep specimens from drying out prior to operation. This solvent should be topped off or replaced when it appears to be dirty or contains a significant amount of debris. Two levels are visible on the left edge of the loading drawer ①; the solvent should be filled so that it is at least at the lower level but not higher than the higher level. This will ensure that the volume of solvent is adequate to cover all specimens when processing between 1-60 slides at a time.

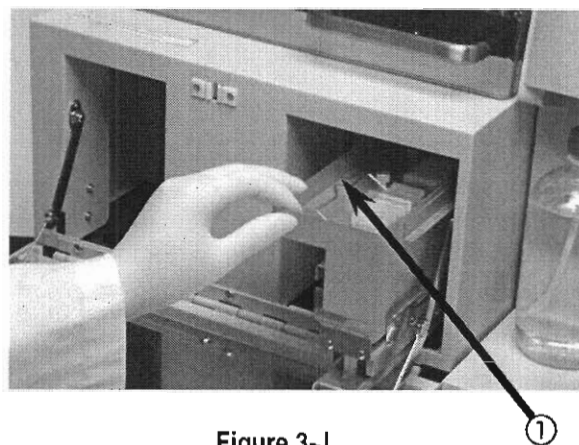


Figure 3-J

CAUTION: Do not use toluene or toluene-based chemicals, as these chemicals will damage the instrument.

- To position slide baskets in the loading drawer, set the basket into the drawer with the "UPSIDE" marking on the slide basket directed toward the front of the instrument (Fig. 3-K). The loading drawer is partitioned and can accommodate three baskets at one time. The basket hook can be used to carefully guide the basket into the loading drawer, however the hook must be moved to the left in order to remain out of the path of the slide glass arm when retrieving slides.

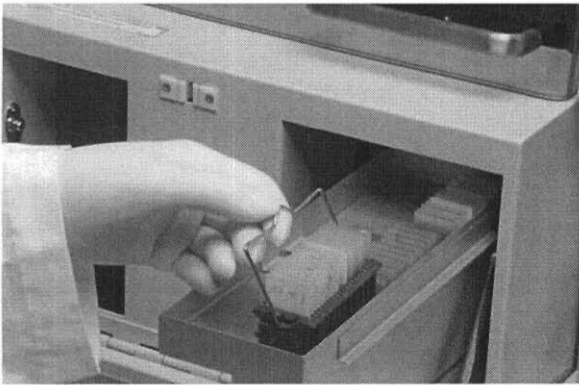


Figure 3-K

NOTE: The Tissue-Tek DRS slide baskets are the only slide baskets that are compatible with this instrument.

- When all slide baskets are loaded into the loading drawer (Fig. 3-L), the drawer may be pushed into the loading area enough so that it will not interfere with the door upon closing. It is not necessary to push the drawer all the way to the back of the unit as the instrument will automatically align itself during initialization.

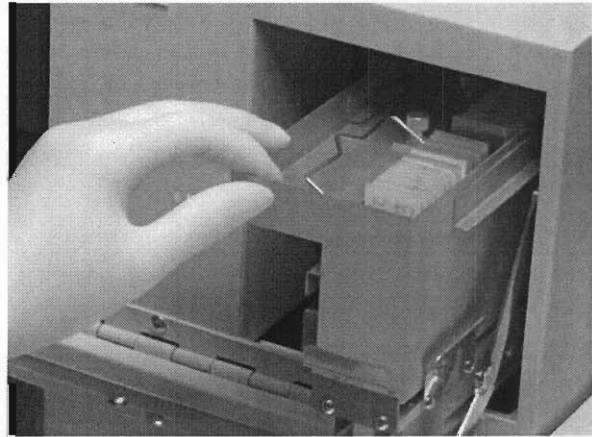


Figure 3-L

- The initial Standby screen is displayed after the power is turned on:

```
<Standby>    50
Prime dispenser?
[START] [TEST]
[SIZE] [PRIME]
```

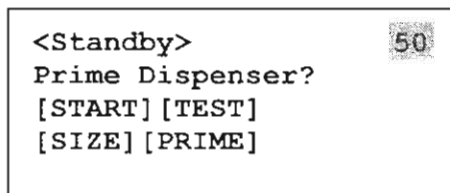
NOTE: The message "Prime Dispenser?" prompts the operator to perform a visual check to see that the mounting medium is dispensing properly from the nozzle. To bypass this action, press [START] to begin operation.

OPERATING INSTRUCTIONS

6. To visually inspect whether the mounting medium nozzle is dispensing properly, press [SINGLE] under the "PRIME" area of the display panel. When pressing [SINGLE], the pump will dispense mounting medium from the nozzle into the plastic waste tray one time.
7. To further test the mounting medium pump or dispensing, press the [CONTINUOUS] key; the pump will run continuously, dispensing mounting medium into the plastic waste tray. Stop the operation by pressing the [STOP] key on the control panel. The dispense nozzle will return to the nozzle reservoir to prevent the nozzle tip from drying out. The nozzle tip is positioned in the reservoir when the instrument is in standby mode or not in operation.

NOTE: If the instrument has been OFF for an extended period of time, it may be necessary to manually set the nozzle tip in the reservoir.

8. Verify that the size of coverglass selected is the same size identified in the upper right portion of the display screen.



If the correct size is not displayed, press the [SIZE] key to scroll through the options, which are 40 mm, 50 mm, 55 mm, and 60 mm.

NOTE: The size identified on the display must be the same size as the coverglass which will be used.

9. From the Standby mode, the operator has the choice of running a test run to verify proper coverglass placement or correct mounting medium volume. A "test" will be performed on one slide, which means the instrument will coverslip one slide and stop operation until the slide is retrieved.
10. The coverslipped slide will remain on the coverslipping stage and will not proceed into the receiving rack. It must be removed from the stage for review. The operator can perform the test procedure as many times as necessary.
11. Place the slides prepared for coverslipping into the loading area of the instrument (Page 3.7, Fig. 3-M). To do so, open the lower door and carefully slide the loading drawer toward you. To access all three areas of the loading drawer, insert the first basket in the closest area. Using the hook will help guide the basket into the loading area easily. Be careful to move the hook toward the left of the instrument so that it avoids contact with the slide glass arm as slides are retrieved from the loading drawer. It is not necessary to load 3 baskets at one time. The instrument will operate with a minimum of 1 slide loaded and a maximum of 60 slides. The loading drawer can accommodate up to 3 baskets at one time.

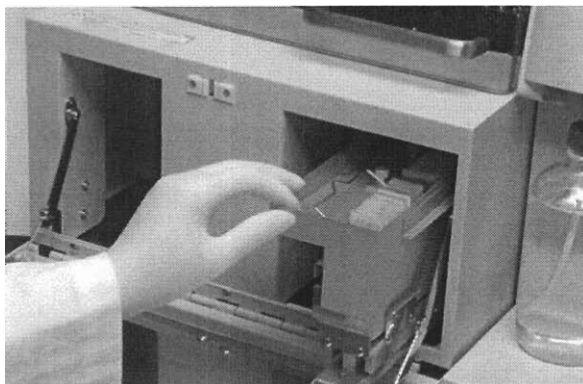


Figure 3-M

12. Slide the loading drawer back into the instrument, enough so that it does not come in contact with the door and gently close the door.

NOTE: The door and the cover must be closed in order for operation to begin.

13. From the Standby mode, press [START] to begin operation.

```

<Standby>           50
Prime dispenser?
[START] [TEST]
[SIZE] [PRIME]
  
```

As operation begins, the slide arm moves downward, into the loading drawer to retrieve a slide ① (Fig. 3-N). The loading drawer advances until a slide, from one of the three baskets, is identified by the slide arm. When it has identified a slide, the vacuum cup seals a vacuum and gently lifts it onto the coverslipping stage.

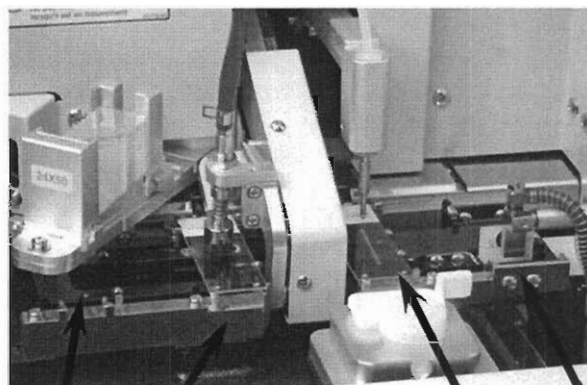


Figure 3-N

The coverslipping stage advances and moves to the second station where mounting medium is dispensed ②.

Once mounting medium has been dispensed onto the slide, the coverslipping stage moves to the next position where a coverglass is applied ③ or (Fig. 3-O).

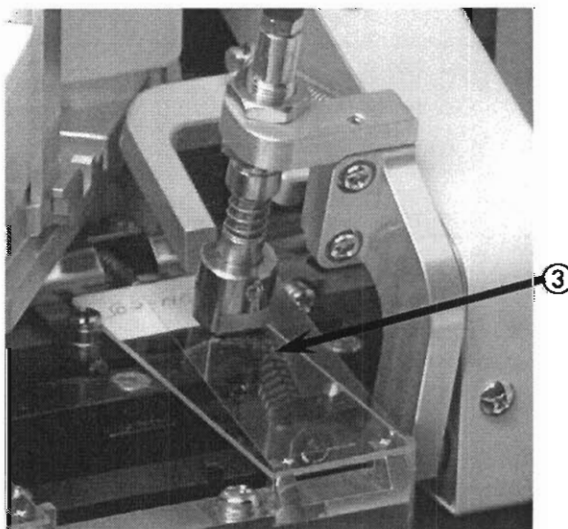


Figure 3-O

The fourth station essentially acts as a holding area ④ (Fig. 3-N) until the stage advances again and places the slide into the receiving rack. The complete coverslipping operation acts as a conveyor system, each process is isolated as it simultaneously operates for enhanced throughput.

OPERATING INSTRUCTIONS

NOTE: If it is necessary to stop the instrument for any reason, press the [STOP] key and the instrument will go into a "Hold" position. From the "Hold" position, press the [STOP] key to abort the run or press [VERIFY] to exit the display and resume coverslipping.

NOTE: If normal operation has been suspended due to an instrument failure, press the [EMER.STOP] key and the instrument will stop immediately.

CAUTION: If the [EMER. STOP] key has been pressed, it will be necessary to follow the display messages and remove all slides on the coverslipping stage. Any coverglass from the coverglass arm must be removed and all receiving racks must be emptied of slides and placed back onto the guide rails before coverslipping can resume.

14. After all slides have entered the receiving racks, the racks will move to the unloading position and the following message will be displayed:

```
<END OF RUN>
Still in motion.
Please wait.
```

15. If the fan is set to the ON position, the following message will be displayed:

```
<RUN COMPLETED>
Drying Slides. 1 min.
[VERIFY]
To go to Stand by.
```

NOTE: To stop the fan, press the [VERIFY] key, the fan will stop and the display will prompt the user to remove the racks.

16. Open the cover and carefully remove the receiving racks from the instrument. Slightly angle the racks toward the left to prevent any slides from accidentally sliding out of the rack.

17. The instrument will return to the Standby mode and is again ready to begin operation.

Operating Precautions

There may be occasions when the instrument needs to be stopped in order to attend to a minor problem during operation. There may also be occasions when it is necessary to remove a slide or slides from the unloading area of the coverslipper which are needed for immediate review. In such cases there are two ways to stop the instrument, each are described below.

Using the Emergency Stop key

If a malfunction occurs that necessitates stopping the normal operation of the instrument, press the [EMER. STOP] key to stop all operations immediately.

CAUTION: If the instrument has caused an error, an audible alarm will sound alerting the user. In addition, a display message and/or error code will appear on the display. If the error has caused coverglass to break, it is important to attend to the instrument immediately and remove all broken glass particles from inside the instrument.

1. To remove any broken glass from inside the instrument, be sure all mechanical operations have ceased. There may be small glass particles surrounding or under the coverslipping stage which should be removed. Use a small brush to sweep away the debris. The debris tray located under the left side of the instrument may then be checked and any glass particles may be discarded.

Whenever the [EMER. STOP] key is pressed, the instrument will automatically stop all operations and prompt the operator with the following message:

```
<Emergency Stop>      32
[STOP] to next.
```

2. Pressing the [STOP] key will allow the operator access to the inside of the instrument so that removal of slides and coverglass is possible.
3. After the [STOP] key is pressed, the following message is displayed:

```
<Emergency Stop>      32
Remove Slides
[VERIFY] to next
[TEST] coverslip only
```

4. The message, "Remove Slides" refers to any slides which may be positioned on the coverslipping stage. If, however, the instrument has stopped while in the process of retrieving a slide, it must first be removed before resuming operation. In order to release a slide from the slide glass arm, press the [VERIFY] key, while gently holding on to the slide. The following screen is displayed:

```
<Emergency Stop>      32
[VERIFY]
to release the slide.
```

NOTE: It is important to hold on to the slide while pressing the [VERIFY] key to prevent the slide from dropping down into the loading drawer.

OPERATING INSTRUCTIONS

- If the instrument has stopped while retrieving a coverglass, it must be removed from the coverglass arm (Fig. 3-P). To remove the coverglass, press the [VERIFY] key from the following display while gently holding the coverglass. This prevents it from dropping from the coverglass arm.

```
<Emergency Stop>      32
[VERIFY]
to release coverslip.
```

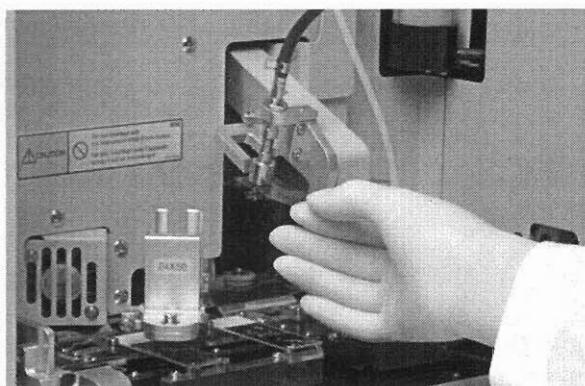


Figure 3-P

- After the slide and coverglass have been removed, the instrument next prompts the operator to remove any slides that are positioned on the coverslipping stage. The following message will be displayed:

```
<Completed>          32
Remove the slides.
[VERIFY] to next.
[TEST] coverslip only.
```

- Remove all slides from the coverslipping stage before resuming operation.
- Press the [VERIFY] key when all slides have been removed.

CAUTION: Be certain to remove the slide on the slide glass arm, the coverglass from the coverglass arm, and all slides on the coverslipping stage before resuming operation.

- The message next prompts the operator to resume operation by displaying the following screen:

```
<Emergency Stop>      32
Resume Operation?
[START] to resume
[STOP] to abort
```

Pressing the [START] key will resume operation of the instrument without delay.

- If it is necessary to abort operation, press the [STOP] key. The following message will be displayed:

```
<Emergency Stop>      32
Check Instrument.
[VERIFY] to drain
the solvent.
```

- Since the instrument was abruptly interrupted when pressing the [EMER. STOP] key, it is possible that the slide glass arm may have acquired solvent through the vacuum cup, which must be removed. The message, "drain the solvent" refers to an operation where the instrument automatically drains this solvent into a holding container within the instrument for a brief time.

12. Press the [VERIFY] key to drain the solvent from the vacuum cup into the holding area of the instrument.
13. Once the [VERIFY] key is pressed, the instrument will initialize and prompt the operator with the following message:

```
<Operator Action>
Return the solvent.
Place the container.
[VERIFY]
```

The message "Return the solvent" refers to the process of returning the solvent, which has collected in the holding container, back into the loading drawer. The message "Place the container" refers to an operator action that requires the loading drawer to be positioned appropriately in the loading area. The instrument then forces the small volume of solvent into the loading drawer via a small port above the loading drawer.

14. Press the [VERIFY] key to return the solvent into the loading drawer. The following message is displayed:

```
<Drain Solvent>
In process.
Please wait.
```

Once the solvent has drained back into the loading drawer, the instrument display returns to the standby mode.

Using the Stop key

There may be occasions when the operator wishes to stop the instrument in order to retrieve slides from the receiving racks needed for immediate review, or to add slide baskets to the loading drawer.

CAUTION: Never open the instrument while operating.

Unlike the [EMER. STOP] key, pressing the [STOP] key will stop the instrument; however, all current coverslipping operations will continue until all slides on the coverslipping stage are coverslipped.

1. To stop the instrument, press the [STOP] key from the control panel while the instrument is in operation. The instrument will complete all coverslipping currently in progress. All slides, which are positioned on the coverslipping stage, will be coverslipped and placed in the receiving rack for removal. This is important since slides remaining on the coverslipping stage may dry out if not attended to promptly.
2. After all slides on the coverslipping stage have been placed in the receiving rack, the racks may be removed and slides needed for immediate review can be accessed. The following message will be displayed:

```
<Hold>
Abort the run?
[VERIFY] to exit.
[STOP] to abort.
```

NOTE: Empty receiving racks must be placed in the unloading area of the instrument before resuming operation.

3. The instrument will then go into a "Hold" mode where the run can be aborted or operation can be resumed.
4. To resume operation, press [VERIFY] from the "Hold" display. Operation will resume immediately.
5. To abort the run, press the [STOP] key from the "Hold" display. The run will be aborted and operation can resume at a later time.

—

—

—

SETUP PROCEDURES

Modifying the Setup Menu

Through the instrument software, the operator has access to a setup menu, which allows for programming various functions. These functions enable the user to set specific values for optimal performance. It may be necessary to modify a parameter setting to meet the diverse needs of each lab.

In the setup menu, the [SINGLE] and [CONTINUOUS] keys perform as arrow keys. The [SINGLE] key moves the cursor up and the [CONTINUOUS] key moves the cursor down.

There are nine options available under the Setup Menu:

1. Prime Dispenser
2. Dispense volume
3. Coverslip Type
4. Software Version
5. UPS Connection
6. Dry-Fan
7. Dry-Fan Timer
8. Slide Pick-up rate
9. Tuneup Prime

To access the Setup Menu:

1. From the POWER ON display, press the [EMER. STOP] key. The following message will be displayed:

```

- Setup Menu -
1. Prime Dispenser
2. Dispense Volume
3. Coverglass Type
```

Each of these parameters will be described in detail in the following material.

The cursor will be blinking on the number of the first option, "1. Prime Dispenser". To choose this option, press the [VERIFY] key. To select another option, use the [CONTINUOUS] key to scroll down, and press the [VERIFY] key to choose the desired selection.

Description of Setup Menu options

1. Prime Dispenser

Priming the instrument

The priming procedure is critical when the instrument is being installed for the first time. Priming refers to preparing the instrument to accept mounting medium. It is necessary to run xylene or a recommended solvent through the mounting medium dispensing line in order to remove any trapped air. In addition, it is also necessary to follow this procedure when changing to a different brand of mounting medium.

The priming process involves using the priming bottle, included with the standard accessories, to force solvent through the dispensing line. When all air or bubbles visible in the line have been removed, mounting medium can then be introduced.

CAUTION: Do not use toluene or toluene-based chemicals as these chemicals will damage the instrument.

Please refer to Section 2, page 2.7, "Priming the Instrument" which gives a detailed explanation of the priming procedure.

SETUP PROCEDURES

Priming procedures when changing mounting medium brands

To change the brand of mounting medium currently in use, follow the procedures below:

1. Switch the instrument power to the "O" position to turn the power OFF.
2. Detach the mounting medium bottle from the bottle cap, connected to the dispensing line.
3. Using a solvent soaked cloth, gently wipe the inner side of the mounting medium bottle cap, removing any dried mounting medium.
4. Follow the priming procedures described in section 2, page 2.7, Priming Procedures, it is important to manually force the current brand of mounting medium out of the line by using a compatible solvent.

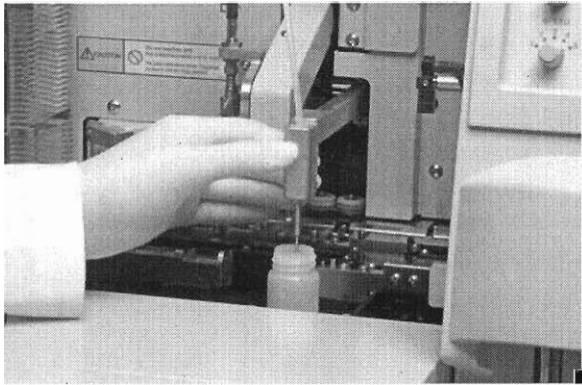


Figure 4-A

5. Switch the instrument power to the "I" position to turn the instrument ON. The following screen will be displayed:

```
<Power on>  
Check instrument.  
[VERIFY]  
[EMER. STOP] to setup.
```

6. Close the cover and door, and press the [EMER. STOP] key to access the Setup Menu. The following screen will be displayed:

```
Setup Menu          50  
1. Prime dispenser  
2. Dispense Volume  
3. Coverslip Type.
```

7. The cursor will be blinking on "1. Prime Dispenser". Press the [VERIFY] key to access the following screen:

```
<Prime Dispenser>  
[START] to prime.  
[EMER. STOP] to exit.
```

Press the start key twice and the instrument will begin forcing out the residual mounting medium, introducing solvent.

NOTE: Check the waste bottle tray to be certain that the mounting medium is not overflowing. If the bottle is close to being full, remove it and discard the mounting medium and replace the empty bottle under the nozzle.

The instrument will continue dispensing mounting medium until the [STOP] key is pressed. Continue this process until all of the old mounting medium has been dispensed and the solvent introduced. It will take approximately 7 minutes to complete this procedure. Once this procedure has been completed, place the new bottle of mounting medium on the mounting medium stage and secure the cap. Priming, as described above, must be performed one last time in order to introduce the new brand of mounting medium.

While the instrument is priming, the following screen will be displayed:

```
<Prime Dispenser>
In Operation
[STOP] to suspend.
[EMER. STOP] to exit.
```

When the new mounting medium has been introduced, the priming procedure is complete.

2. Dispense Volume

The second parameter under the Setup Menu, "2. Dispense Volume", refers to the volume of mounting medium which will be dispensed on each slide. This function offers the user a wide range of flexibility in order to select the ideal volume of mounting medium for each type of specimen and/or size of coverglass.

Modification of the dispense volume is also important since each brand of mounting medium varies in viscosity; adjustments can be made accordingly.

To access the "Dispense Volume" Menu:

1. Press the [EMER. STOP] key from the POWER ON display.
2. Press the [CONTINUOUS] key to move the cursor down to **2. Dispense Volume**. The following message will be displayed:

```
- Setup Menu -
1. Prime Dispenser
2. Dispense Volume
3. Coverslip Type
```

3. Next, press the [VERIFY] key to access the dispense volume Setup Menu. The display will read:

```
<Dispense Vol.>    50mm
VolumeSW1: 50µl    (+5)
[SINGLE] to increase.
[CONTINUOUS] to decrease.
```

SETUP PROCEDURES

Setting the Base Volume

The Dispense Volume menu allows the user to adjust the dispense volume by adjusting the base volume, in this case, 50 microliters

In most cases the default value set in the instrument software will accommodate most specimens; however, due to the variety of mounting mediums available and varying viscosities, it may be necessary to increase or decrease the volume of mounting medium dispensed. The type of specimen also affects the performance of coverslipping.

```
<Dispense Vol.>    50mm
VolumeSW1: 50µl    (+5)
[SINGLE] to increase
[CONTINUOUS] to decrease
```

4. To increase or decrease the base volume, press the [SINGLE] key to increase or the [CONTINUOUS] key to decrease the volume. The base volume will adjust by 10 microliters each time the [SINGLE] or [CONTINUOUS] key is pressed.
5. Before modifying the base volume, it is first necessary to select the size of coverglass which will be used for operation. The coverglass size is located in the upper right corner of the display. To change coverglass size, press the [SIZE] key on the control panel. The size in the right corner of the display will toggle between 40, 50, 55, and 60 mm.

NOTE: There are upper and lower base volume limits for each coverglass size. Refer to page 4.6 for a more detailed explanation.

NOTE: The Tissue-Tek® Glas™ Mounting Medium, with a viscosity of 500 cps, is the brand recommended for use on the Tissue-Tek® Glas™ Automated Glass Coverslipper.

Setting the Fine-Tuning Dispense Volume

In addition to the base volume, the user can set a value used for fine-tuning the dispense volume. The **fine-tuning volume** is identified in the following display:

```
<Dispense Vol.>    50mm
VolumeSW1: 50µl    (+5)
[SINGLE] to increase
[CONTINUOUS] to decrease
```

In this case, (+5) refers to 5 microliters. Each time the [SINGLE] key is pressed, the base volume will increase by 10 microliters and the fine-tuning volume will stay at the +5 value.

Once the base volume reaches its upper limit, at 130 microliters, the base volume will return to 50 microliters and the fine-tuning value will increase to +10. The +10 fine-tuning value will remain the same until the base volume again reaches its upper limit at 110 microliters. The base volume will change to 60 microliters and the fine-tune adjustment will change to +15.

These fine-tuning values refer to the values associated with the VOLUME knob on the control panel (Fig. 4-B).



Figure 4-B

With each turn of the VOLUME knob, the fine-tuning value will increase by either +5, +10, or +15 microliters, depending on the value set in the Dispense Volume menu.

That is, if the base volume for 50 mm coverglass size is set at 50 microliters (+5), each turn of the [VOLUME] knob will increase the base volume by +5 microliters.

The VOLUME knob range is from 1 to 5. Setting 5 will dispense the highest volume of mounting medium.

Using the VOLUME knob for fine-tuning offers flexibility when processing various types of specimens, each potentially requiring a different volume of mounting medium.

Each coverglass size provides specific base volume values. The base value ranges vary by coverglass size. The tables, detailed on the following page, explain base volume and fine-tuning options for each coverglass size.

NOTE: Mounting mediums with a medium viscosity are best suited for use with the Tissue-Tek Glas Coverslipper.

CAUTION: Do not use toluene-based mounting medium on the Tissue-Tek Glas Coverslipper, as it will damage the components.

3. Coverslip Type

The third parameter, coverslip type, refers to the angle at which the coverglass will be retrieved. The coverglass arm tilts at a specific angle for the purpose of picking up the coverglass one at a time. If the improper angle is selected, the coverglass will break during the retrieval, or two or more coverglass may be picked up simultaneously. To avoid this situation, the instrument is provided with a function for adjusting the angle at which the coverglass is retrieved. There are three different settings that may be selected; however, if the recommended coverglass is used, TYPE 3 (the default value) must always be selected.

4. Software Version

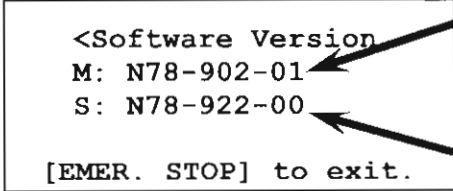
The fourth parameter under the Setup Menu, "4. Software Version", allows the user access to the current software version in the instrument.

From the POWER ON display, press the [EMER. STOP] key to access the Setup Menu.

From the Setup Menu:

1. Press the [CONTINUOUS] key and scroll down to "4. Software Version".
2. Press the [VERIFY] key. Reference to the current software version will be displayed.

The software version currently installed in the Tissue-Tek Glas Coverslipper reads:



```
<Software Version  
M: N78-902-01  
S: N78-922-00  
[EMER. STOP] to exit.
```

The screenshot shows a monospaced text display. The text is as follows: "<Software Version", "M: N78-902-01", "S: N78-922-00", and "[EMER. STOP] to exit.". Two arrows originate from the right side of the image. One arrow points to the "M: N78-902-01" line and is labeled "master". The other arrow points to the "S: N78-922-00" line and is labeled "slave".

SETUP PROCEDURES

5. UPS Connection

Connecting a UPS (Uninterrupted Power Supply)

Should the power fail at any time during instrument operation, it may affect the coverslipping process. To protect against a power failure, a UPS may be installed. A UPS is a battery-powered standby power supply that can provide power to the instrument in the case of a failure.

Requirements for the UPS are as follows:

- Back up voltage: same voltage as the instrument
- Output capacity: at least 200 VA

To Connect a UPS:

Connect the commercial power–failure detection–signal input terminals of the instrument ① and the commercial power–failure detection–signal output terminals of the UPS, using a 2-conductor cable (approx. 3m long, 20 AWG).

- Power failure detection signal output terminal: Normal open contact (to be closed in case of power failure); contact rating; 30mA max.

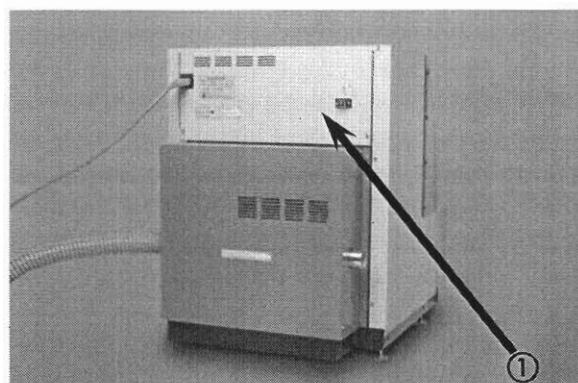


Figure 4-C

NOTE: AWG is an abbreviation for American wire gauge, a unit of cable conductor size.

1. Plug the power cord of the instrument into the UPS outlet.
2. Press the "I" side of the power switch to turn ON the instrument.
3. Press the [EMER. STOP] key to access the Setup Menu and scroll down, using the [CONTINUOUS] key, to "5. UPS connection".
4. Press the [VERIFY] key to access the UPS connection display:

```
<UPS CONNECTION>
UPS connected.
[SINGLE] to change.
[STOP] to save and exit.
```

5. Each time the [SINGLE] key is pressed, the UPS connection status on the display will toggle as follows: [Connected] → [Not Connected] → [Connected]
6. Press the [STOP] key to save the desired setting.

NOTE: If the [EMER. STOP] key is pressed without pressing the [STOP] key, the display will return to the Setup Menu without saving the selection.

7. When the setting is saved, press the [EMER. STOP] key to return to the Setup Menu.
8. Press the [EMER. STOP] key from the Setup Menu and the instrument will be rebooted. The initial screen will be displayed:

```
<Power On>
Check Instrument
[VERIFY]
[EMER. STOP] to setup
```

Procedures to Correct a Power Outage

In the event that a power outage occurs during operation, it is necessary to follow the steps described below.

This section describes how to correct a power outage when a UPS is connected and when a UPS is not connected to the instrument.

When a UPS is not connected

The procedure described below explains how to correct a power outage when a UPS is not connected to the instrument.

CAUTION: If the instrument is not connected to a UPS, the instrument will stop immediately. It will be necessary to check the instrument and remove any specimens which may be waiting on the coverslipping stage. These precautions are necessary to avoid any problems that may occur if specimens have been exposed to air.

If the power to the instrument has been interrupted:

1. Press the "O" side of the POWER switch to turn the power supply OFF.
2. Open the cover and remove the slides from the coverslipping stage to prevent the slides from drying.
3. Close the cover and wait until the power supply is again operational before turning the instrument on.
4. Once the power has been restored, press the "I" side of the POWER switch to turn ON the instrument.
5. The following message will be displayed:

```
<Checkup>
Release the slides.
[VERIFY] to release.
```

6. It will be necessary to remove the slide from the slide glass arm. While holding on to the slide, press the [VERIFY] key to release the slide.
7. Check the coverslipping stage and remove any coverglass that may have become dislodged after the power failure.
8. Unload the baskets which are in the loading drawer and remove the receiving racks from the receiving area.
9. Replace the empty receiving racks back into the unloading area.
10. Prepare to resume operation.

SETUP PROCEDURES

When a UPS is connected

This procedure describes how to recover from a power outage when a UPS is connected to the instrument.

Upon receiving the power outage signal from the UPS, the instrument will automatically take recovery actions.

The recovery actions and screen displays vary depending on the status of the instrument at the time of the occurrence.

The following information details two cases:

Power Outage during the Standby Mode or Hold position

If the instrument is in the Standby or in a Hold position at the time of a power outage, the current message will remain displayed.

NOTE: If any key relating to operation is pressed, the following message will be displayed:

```
<Checkup>
Power Outage.
Please Wait.
[VERIFY] to exit.
```

If the [VERIFY] key is pressed, the display will return to the previous message.

Once the instrument power has recovered, it will automatically resume operation.

Power Outage during Operation

When power is interrupted during operation and the instrument is connected to a UPS, all slides currently on the coverslipping stage will be coverslipped and placed into the receiving racks. Once the slides on the stage have been coverslipped, an alarm will sound and the instrument will be brought to a "Hold" position.

When the instrument is in a hold position, the message reads:

```
<Power Outage>
[START] [TEST]
[PRIME]
[STOP] to abort.
```

NOTE: If any key is pressed during the power outage, the following screen will be displayed. If the [VERIFY] key is pressed, the display will return to the previous screen.

```
<Checkup>
Power Outage.
Please Wait.
[VERIFY] to exit.
```

To restart operation after the power has been restored:

1. Press the [START] key. The instrument will resume operation.

To abort operation after the power has been restored:

1. Press the [STOP] key. The following screen will be displayed:

```
<Power Outage>
Abort the run.
[VERIFY] to exit.
[STOP] to abort.
```

2. Press the [STOP] key to abort the operation. Press the [VERIFY] key to exit from the abort process.
3. Remove the receiving racks and empty the coverslipped slides. Replace the empty racks back onto the guide rails of the receiving area.
4. Resume processing when instrument is again prepared for operation.

6. Setting the Fan

The fan is located in the lower, left corner of the instrument near the base of the unloading area. The fan is responsible for accelerating the drying of cover-slipped slides using room temperature air. The fan can be selected ON or OFF. If the fan is set ON, it is possible to set a drying time, which will continue after coverslipping has ceased.

To set the fan ON or OFF:

1. From the POWER ON display, press the [EMER. STOP] key to access the Setup Menu.
2. From the Setup Menu, use the [CONTINUOUS] key to scroll down to option "6. Dry-Fan".
3. Press the [VERIFY] key to access the fan option.
4. Press the [SINGLE] key to change the fan from the ON position to the OFF position.
5. Each time the [SINGLE] key is pressed, the ON/OFF function will change as follows: [ON] → [OFF] → [ON]
6. Choose the desired setting, ON or OFF, for the fan.
7. To save the setting, press the [STOP] key. The fan setting will be saved.

NOTE: If the [EMER. STOP] key is pressed without pressing the [STOP] key, the display will return to the Setup Menu without saving the setting.

8. Press the [EMER. STOP] key to exit the Setup Menu and the instrument will reboot with the original screen displayed:

```
<Power On>
Check Instrument
[VERIFY]
[EMER. STOP] to setup
```

SETUP PROCEDURES

7. Fan Timer

The fan can be programmed to continue after coverslipping is completed and coverslipped slides remain in the receiving racks.

To the set a delayed time for drying:

1. Press the [EMER. STOP] key from the POWER ON screen to access the Setup Menu.
2. When the Setup Menu is displayed, use the [CONTINUOUS] key to move the cursor down to option "7. Dry-Fan Timer".
3. Press the [VERIFY] key to access the Fan Timer.

```
<DRY-FAN TIMER>
2 min. 00 sec.
[SINGLE] to increase.
[CONTINUOUS] to decrease.
```

4. The default value displays 2:00 minutes. To increase the time, press the [SINGLE] key. The time will increase by 30 seconds.
5. The selectable range of time can be programmed from 2 to 10 minutes in 30 second increments.
6. Press the [STOP] key to save the setting.

NOTE: If the [EMER. STOP] key is pressed without pressing the [STOP] key, the display will return to the Setup Menu without saving the setting.

7. Press the [EMER. STOP] key to exit the Setup Menu and the instrument will reboot with the original screen displayed:

```
<Power On>
Check Instrument
[VERIFY]
[EMER. STOP] to setup
```

NOTE: The fan will operate during routine coverslipping when the fan is set to the ON position. The timer allows the fan to continually operate after coverslipping has been completed.

8. Slide Pick-Up Rate

The slide pick-up rate refers to the speed at which the slide glass arm retrieves a slide and moves it out of the loading drawer. It may be necessary when using xylene substitutes in the loading drawer, to slow down the retrieval rate.

Because xylene substitutes, by nature, are more oily than xylene, more solvent will remain on the slide after it has been retrieved from the loading drawer. This residual solvent, when mixed with mounting medium, may be in excess; therefore, causing excess mounting medium to be forced out over the edge of the slide. To prevent this occurrence. The slide pick-up rate or retrieval rate can be reduced, enabling more solvent to drain off the slide while lifting.

The values for the slide pick-up rate are from 1-5, 5 is the fastest speed. It may be necessary to reduce the speed of slide retrieval to ensure coverslipping results are ideal.

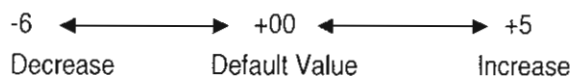
9. Tuneup Prime

The Tuneup Prime parameter refers to an adjustment which can be made to the volume of mounting medium first dispensed on a slide. When the mounting medium nozzle first disperses mounting medium on a slide, it does so at the base of the slide in a circular area. The default value set for the volume dispensed in this circular area is 20 microliters.

It may be necessary to modify this parameter if the following conditions apply:

- After coverslipping, if mounting medium is being forced out at the bottom edge of the slide, it may be necessary to decrease the tuneup prime value lower than 20 microliters.
- If bubbles are visible near the bottom edge of the coverglass, it may be necessary to increase the tuneup prime value higher than 20 microliters.

The default value is set at +00. The value +00 refers to 20 microliters. The selectable range of values is as follows:



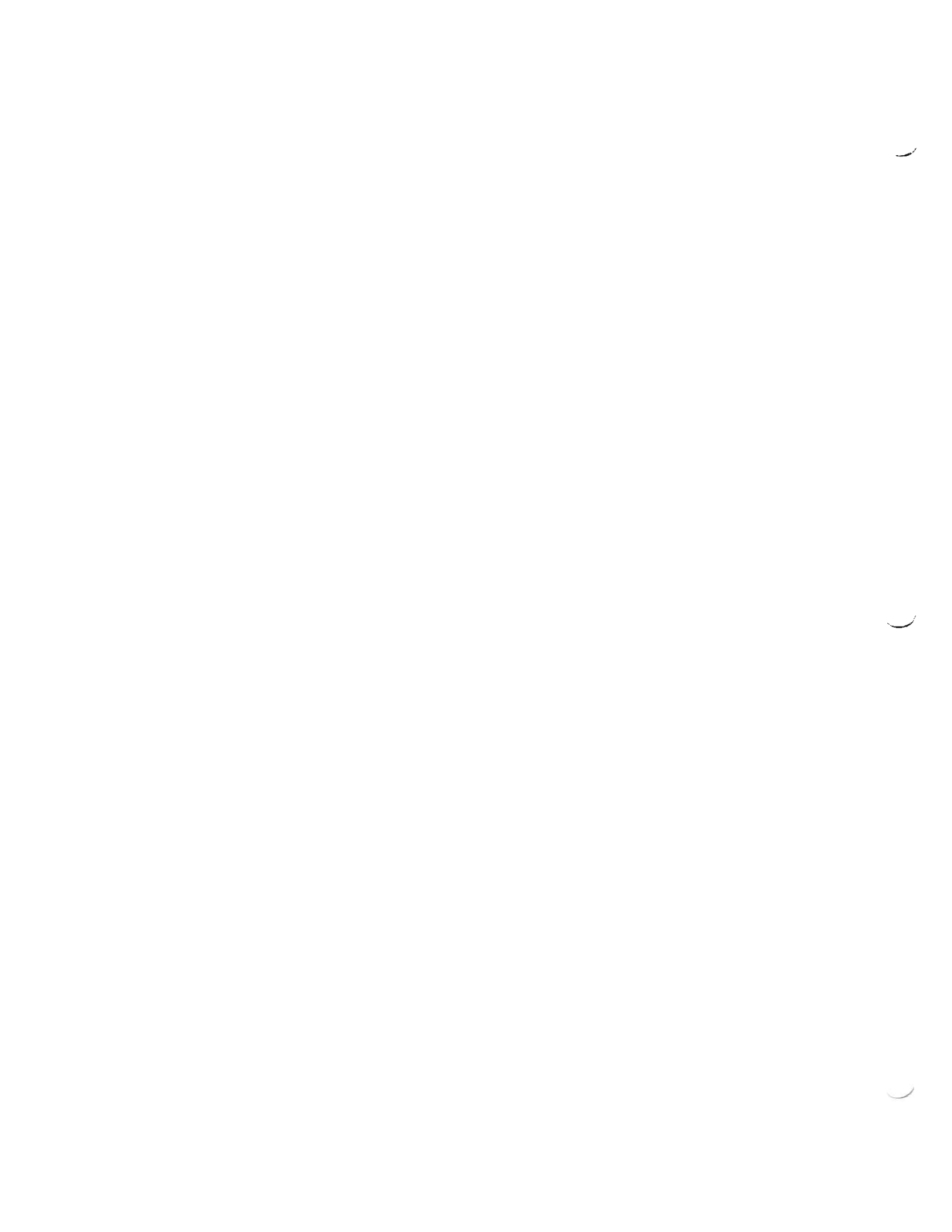
The [SINGLE] key can be used to increase the volume and the [CONTINUOUS] key can be used to decrease the initial volume.

Each time the [SINGLE] or [CONTINUOUS] key is pressed, the value will change by 1 increment.

1 increment = 2 microliters of mounting medium.

I.E.) If the tuneup prime value is decreased by 1, the value setting will display -1. The volume of mounting medium initially dispensed will reflect 18 microliters. Each time the value is decreased, the initial dispense volume will be reduced by 2 microliters.

NOTE: The tuneup prime parameter should only be adjusted if necessary.



CARE OF THE INSTRUMENT

General Maintenance

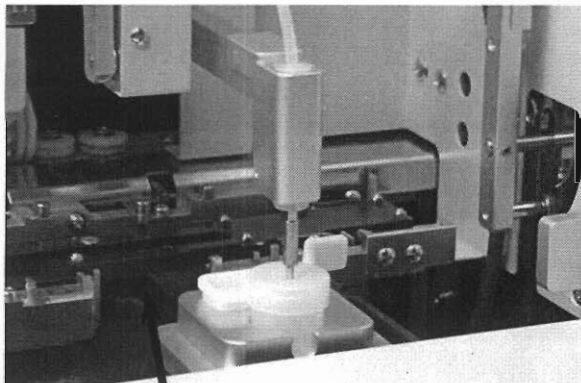
Keep the exterior of the instrument free of dust at all times. If needed, the exterior may be cleaned using a damp cloth and a mild detergent; do not use solvents of any kind on the painted exterior parts. The plastic cover may be cleaned with a glass cleaner and soft cloth.

Daily Maintenance

Each day the internal components should be inspected and cleaned as needed. When cleaning or removing debris, turn the instrument power to the OFF position.

Station Assembly (Fig. 5-A)

The station assembly ① refers to the fixed area under the coverslipping stage, which catches debris or glass particles during routine operation.



① Figure 5-A

1. Using a small brush or damp cloth, sweep the entire station assembly to collect dust and debris, moving it to one side. If the particles are too fine or it is too difficult to collect the debris, use a piece of adhesive tape to collect the fine particles.

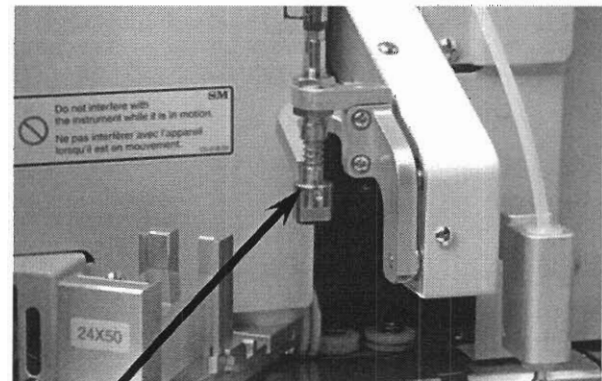
NOTE: Glass particles or dust will not affect routine operation of the instrument; however, it is a good practice to regularly inspect this area.

2. Mounting medium may have been deposited and dried on areas of the station assembly during operation. Forceps can easily remove any residual dried mounting medium or a solvent soaked cloth, which will soften the mounting medium, may be used.

Vacuum Cup (Coverslipping Arm) (Fig. 5-B)

Once daily, the part of the vacuum cup ② on the coverslipping arm which comes in contact with the coverglass should be wiped clean.

3. Using an alcohol soaked cloth, carefully wipe the vacuum cup and allow it to air dry. The vacuum cup may have a tendency to become dirty with routine operation. The alcohol will quickly evaporate from the vacuum cup.



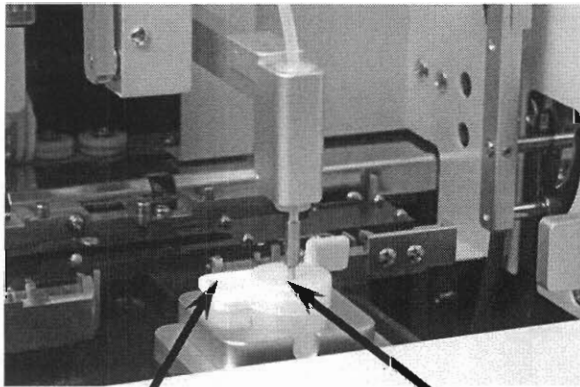
② Figure 5-B

Weekly Maintenance

Replacement of Solvent (Fig. 5-E)

Replace the solvent in the nozzle reservoir at least once a week or sooner if it appears to become viscous due to excess mounting medium.

1. Lift the mounting medium nozzle up out of the reservoir and remove the nozzle reservoir ① from the metal tray. Empty the old solvent and replace it with fresh xylene or a recommended solvent. Be sure to fill the bottle to the area just below the cap to be certain the nozzle, in its resting position, will be immersed directly in the solvent. Secure the cap and place the reservoir back into the metal tray in its original position. If the instrument will not be in use, manually place the mounting medium nozzle inside the reservoir to prevent the tip from drying out.



② Figure 5-E ①

Plastic Waste Tray

2. Remove the plastic waste tray ② from its housing and replace it with a new one if the tray has become completely filled with dried mounting medium.
3. The mounting medium in the plastic waste tray can also be removed if desired. Place the waste tray into enough solvent so that it is completely covered. It will take about 24 hours to dissolve the mounting medium inside the tray completely. After all residual mounting medium has been dissolved, reposition the plastic tray in the metal housing.
4. Inspect the plastic blade on the waste tray. If the blade is deformed or damaged in any way, replace it with a new one.

NOTE: The plastic blade is used to sever the thread of mounting medium from the dispense nozzle during mounting medium application. If the blade tip is not sharp, the performance of the nozzle may be affected.

CARE OF THE INSTRUMENT

Every Six Months

Instrument Strainer (Fig. 5-F and 5-G)

At least every six months clean the instrument strainer ① of debris generated from the mounting medium line. The strainer is located on the lower, right side of the instrument.

1. Turn the instrument to the OFF position.
2. Remove the access cover located on the lower, right side of the instrument. The access cover is attached to the main body of the instrument by a magnet.
3. The strainer maintenance tool can be used to remove the cap of the strainer. Secure the part of the tool showing and "X" indentation over the cap and turn it counterclockwise until it is loose enough to remove by hand.

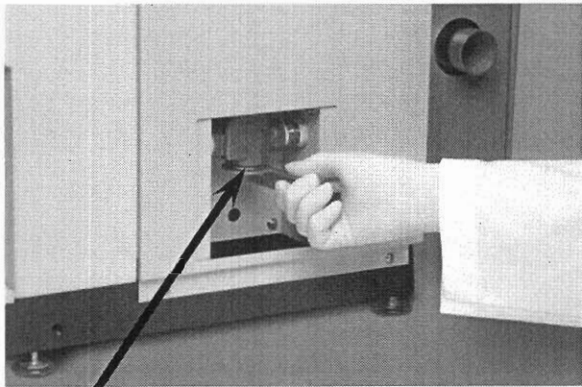


Figure 5-F

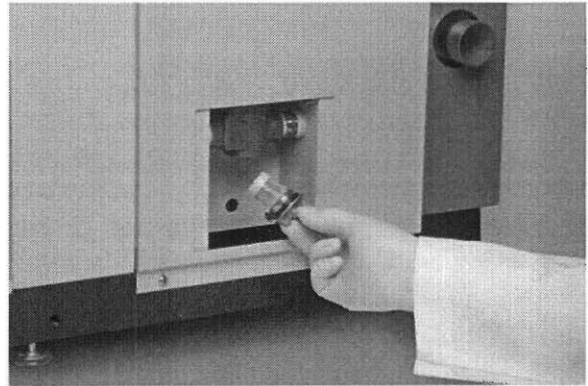


Figure 5-G

5. Once the strainer has been cleaned properly, place it back into the housing, turning it clockwise and use the maintenance tool to tighten the cap.
6. Once the strainer has been secured, replace the access cover.

4. The strainer should easily be dislodged from its housing. Using a small brush or toothbrush soaked in xylene, scrub the mesh portion of the strainer to remove any accumulated debris.

Receiving Racks (Fig. 5-H)

Every six months, or as needed, the receiving racks ① should be cleaned in order to remove any dried mounting medium which may have accumulated along the rails.

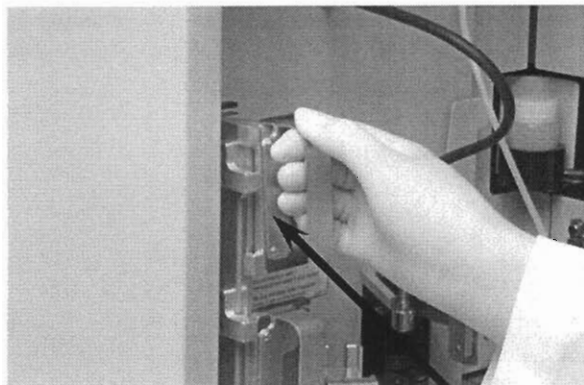


Figure 5-H

To clean the receiving racks:

1. Immerse each receiving rack into a container filled with xylene and allow the rack to soak overnight. It will take approximately 24 hours for all dried mounting medium to dissolve completely.
2. Remove the racks from the xylene and allow them to air dry.

Loading Drawer (Fig. 5-I)

Every six months, the loading drawer ② should be cleaned thoroughly. However, if it has become visibly dirty, it should be cleaned sooner.

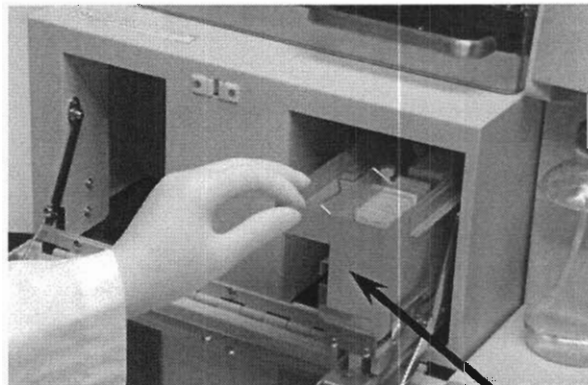


Figure 5-I

To clean the loading drawer:

1. Remove any slides or slide baskets from the drawer. Empty the solvent in the loading drawer into a proper waste container.
2. Using a small brush or toothbrush, scrub all areas of the loading drawer with xylene.

When the drawer has been sufficiently cleaned, reposition the loading drawer and fill it with solvent before routine operation.

CARE OF THE INSTRUMENT

Lubrication Bottle (Fig. 5-J)

The lubrication bottle ①, located on the inside of the instrument in the upper right corner, protects the pump and mounting medium line from mounting medium build-up. When the xylene in the bottle falls to a level below what is visible, remove and discard the old solvent and replace it with fresh solvent.

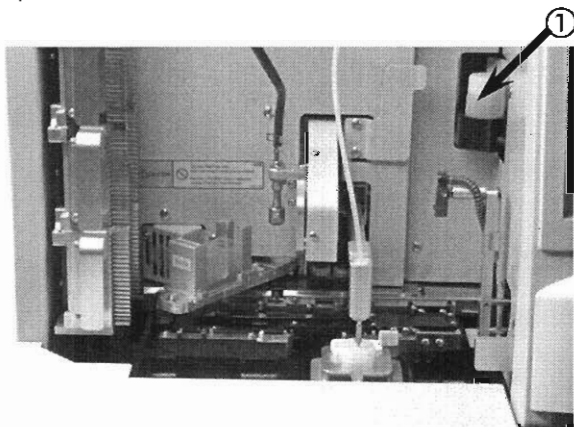


Figure 5-J

To remove and replace the solvent:

1. Open the cover and remove the cap from the solvent container. Using the priming bottle or a pipette, aspirate the solvent out of the container and dispose of it in a proper waste container.
2. Fill the container with fresh solvent using the pipette. The level of solvent should be visible above the metal housing. Fill the bottle approximately three quarters full. Be careful not to overfill the container.
3. Replace the cap of the lubrication bottle and close the cover.

Yearly Maintenance

Vacuum Cup (Slide Arm) (Fig. 5-K)

Each year, or when the vacuum cup ② of the slide glass arm has deteriorated or become damaged, remove it and replace it with a new one.

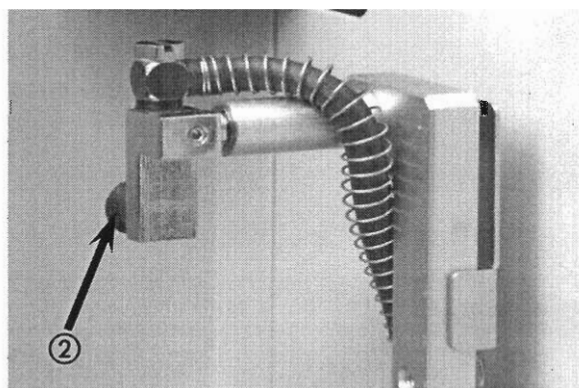


Figure 5-K

To replace the vacuum cup:

1. Turn the power to the OFF position.
2. Open the cover and raise the slide glass arm so that the vacuum cup can be easily accessed.
3. Remove the vacuum cup by gently pulling on the outer rim. If it is difficult to remove, it may be necessary to cut a portion for ease of removal.

To replace the vacuum cup, it must be oriented appropriately. The vacuum cup should be in line with the rounded part of the nozzle. If it is not correctly oriented, air leakage may occur. Place the nozzle so that is seated properly.

TROUBLESHOOTING

General Information

The following section is divided into three sections to best explain how to recover from conditions that may occur during routine operation. In the first section, a Troubleshooting Chart is provided, which identifies possible conditions related to the electrical and mechanical operations that could occur during routine operation of the Tissue-Tek® Glas™ Coverslipper. Possible causes and remedies are also included so that many isolated problems can quickly be corrected. When dealing with any problem, it is essential to determine which part of the system is the source. A systematic approach should be employed to isolate the problem.

The second section, Messages, explains specific messages that may be displayed during routine operation in detail. This section describes the message, status of the instrument, and action to be taken.

The third section gives a detailed explanation of all error codes and how to recover from them.

If additional assistance is required concerning an instrument problem, or if the problem cannot be isolated or is beyond the scope of this manual, please contact our Technical Support Department by calling (800) 725-8723, option 2.

TROUBLESHOOTING

TROUBLESHOOTING CHART

CONDITION	POSSIBLE CAUSE	REMEDY
No response from the display panel.	Power switch is OFF.	Press the "I" side of the power switch to turn the instrument power ON.
	The power cord is not attached to the instrument.	Attach the power cord to the back of the instrument and plug the other end into an appropriate grounded outlet.
	There is no power.	Check the main circuit breaker.
The display is too dim or too bright.	Brightness is not adjusted properly.	Contact the Technical Service Department at Sakura.
No mounting medium is being dispensed.	The mounting medium bottle is empty.	Replace the mounting medium bottle.
	The dispense nozzle tip is clogged with dried mounting medium.	Dissolve the dried mounting medium on the nozzle by soaking in a compatible solvent.
The instrument is not processing when it should be operating.	There may have been a power outage.	Take appropriate recovery measures. Refer to Section 4, Setup Procedures.
Coverslipped slides are not drying efficiently.	Dry-fan has been set to the OFF position.	Refer to Section 4, page 4.12, "7. Fan Timer".
Coverglass cannot be picked up or it falls off before coverslipping has been successfully completed.	The vacuum cup on the coverglass arm is torn or damaged.	Contact the Technical Service Department at Sakura for replacement procedures.
	Coverglass may not be stored in the appropriate temperature or humidity conditions.	Keep coverglass in a dry area. Coverglass stored in damp areas may have a tendency to become sticky.
Two or more pieces of coverglass are stuck together.	Coverglass may not be stored in the appropriate temperature or humidity conditions.	Keep coverglass in a dry area. Coverglass stored in damp areas may have a tendency to become sticky.
	The type of coverglass used is not appropriate.	Use only coverglass for automated coverslipping instruments. Recommended brands: SuperSlips® and Signature Series™.
The coverglass looks as if it may be broken while applying the coverglass to the slide.	The angle for retrieval may not be compatible with the coverglass type.	The coverglass type should be set at "Type 3" when using the recommended coverglass for the instrument.
The slide arm looks as if it may release a slide prior to setting on the coverslipping stage.	The vacuum cup on the slide glass arm may be torn or damaged.	Replace the slide glass arm vacuum cup. Refer to Section 5, page 5.6, for replacement procedures.
Large air bubbles visible.	Air is trapped in the mounting medium delivery line and cannot dispense the appropriate volume of mounting medium.	Stop operations and press the [CONTINUOUS] key to force the air from the mounting medium delivery line.
	The mounting medium bottle is empty.	Replace and secure a new mounting medium bottle.
	The coverglass size is not set properly through the instrument software.	Adjust the coverglass size through the software to be compatible with the coverglass holder that is currently being used.
	The solvent in the solvent container located on the inside, upper right portion of the instrument has run out.	Stop the instrument; remove the cap from the xylene container. Using a dropper, add solvent into the bottle until it is at a level above the metal housing.

TROUBLESHOOTING CHART

CONDITION	POSSIBLE CAUSE	REMEDY
Small air bubbles are visible on the coverslipped slide.	The ambient temperature is too low, and the mounting medium has not settled properly, causing small air bubbles to be trapped in the mounting medium.	Decrease the coverslipping speed using the speed adjusting knob.
	The mounting medium dispense rate or the coverslipping speed is not set properly for the type of specimen to be coverslipped.	Increase the mounting medium dispensing rate. Decrease the coverslipping speed.
	Non-standard glass slides are used.	Use standard size of glass slides.
	A build-up of dried mounting medium on the dispensing nozzle tip has prevented smooth dispensing.	Remove the dried mounting medium from the tip of the dispensing nozzle using a recommended solvent.
	The mounting medium used may have a tendency to trap bubbles unless the coverslipping speed is decreased.	Decrease the coverslipping speed.
Small bubbles entrained.	The viscosity of the mounting medium in the dispensing nozzle tip is too low because it is directly immersed in the solvent in the dispensing nozzle bottle.	Press the [SINGLE] key or [CONTINUOUS] key to force out the solvent-affected mounting medium. Avoid immersing the dispensing nozzle tip directly into the solvent of the bottle except for when the machine is not used for a long period of time.
	The viscosity of the mounting medium in the dispensing nozzle tip has increased because there is not sufficient solvent in the bottle.	Press the [SINGLE] or [CONTINUOUS] key to force out the viscous mounting medium. Fill the bottle approximately 75% full with the desired solvent.
	The xylene in the small xylene bottle inside the instrument on the upper right side is running low or has run out of solvent.	If the instrument is in operation, press [STOP] and fill the bottle until the solvent line is visible above the metal housing. Resume coverslipping by pressing the [START] key.
	The slide stations are covered with mounting medium; therefore, the glass slides are not positioned properly.	Gently remove the mounting medium with xylene or a desired solvent. If the mounting medium is dried, try to carefully remove it with forceps.
Mounting medium expelled on to the edge of the slide glass or onto the frosted area.	The coverglass size is not in agreement with the instrument setting.	Verify that the coverglass holder and the software setting are the same.
	Mounting medium dispensing rate is too high.	Decrease the mounting medium dispensing rate using the knob for fine-tuning or through the instrument software.
The coverglass is not aligned properly on the slide.	The vacuum pad on the coverslipping arm may have dried mounting medium on it.	Carefully wipe clean the vacuum cup using a cloth soaked with alcohol.
The coverglass has not properly covered the specimen on the slide.	The incorrect coverglass size is used.	Change the coverglass for the appropriate size.
	The width of the coverglass is not in agreement with the specification.	Use recommended brand of coverglass.
The coverglass and glass slide are not in alignment with each other.	The instrument is out of alignment.	The instrument needs adjustment.
	The suction pad of the coverglass may have mounting medium on it.	Carefully wipe clean the vacuum cup using a cloth soaked with alcohol.
The vacuum cup has left a mark on the coverslip.		

Messages

Various messages may be displayed if the instrument has operated erroneously or if necessary operational requirements have not been fulfilled. There are two types of messages: descriptive messages and error codes.

If the situation cannot be resolved by following the actions described below, contact the Technical Service Department at Sakura Finetek USA.

Descriptive Messages

MESSAGE	STATUS	ACTION
"Check Instrument"	The instrument is checking to see that all operational requirements have been met.	No action required.
"Close the cover"	The cover has been left open.	Close the cover and press the [VERIFY] key. The instrument will proceed to the next step.
"Close the door"	The door has been left open.	Close the door and press the [VERIFY] key. The instrument will proceed to the next step.
"Release the slide"	A slide is attached to the slide glass arm when the instrument is not operating.	Hold on to the slide and press the [VERIFY] key.
"Place the basket container"	The basket container refers to the loading drawer. The instrument started without the loading drawer set in position.	Place the loading drawer correctly in position and press the [VERIFY] key.
"Add coverslips"	The coverglass has less than 60 sheets of coverglass available for use.	Add coverglass to the holder and press the [VERIFY] key. When the instrument detects more than 60 sheets of coverglass, it will resume processing automatically.
"Place 3 racks in position"	Three receiving racks are not set in position.	Place all three receiving racks in position and press the [VERIFY] key.
"Remove the slides from the racks"	Attempted to start the instrument with slides positioned in the receiving rack(s).	Remove the slides from the receiving racks and press the [VERIFY] key.
"Power outage. Wait for recovery"	Pressed a key to command an operation during a power failure. (This message is only displayed when the instrument is connected to a UPS.)	Refer to Section 4, page 4.8, "UPS Connection."
"Return the solvent. Place the container"	When the instrument starts, the solvent in the loading drawer will be vacuumed into the overflow trap. Upon completion of operation, the solvent will be returned to the loading drawer.	If the [EMER.STOP] key was pressed, this message will be displayed. The solvent will automatically return to the loading drawer.
"Check Coverslips:"	Coverglass has run out during operation.	Open the cover and add coverglass to the holder and replace the holder. Press the [VERIFY] key.
"Fan failure"	The ventilation fan is faulty.	Operation can resume by pressing the [VERIFY] key. Contact the Sakura Technical Service Department for service.

Error Codes and Corrective Measures

If the instrument fails, an alarm will sound and an error message will be displayed on the screen.

It may be possible to simply retry the operation in order to resolve the problem or follow a series of corrective measures in order to again bring the instrument to operational mode.

Following is a list of error codes which can be recoverable by following the corrective procedures.

ERROR CODE	ERROR MESSAGE	RECOVERY PROCEDURE
01	Pump motor	Retry operation. If the same error message is displayed contact the Sakura Technical Service Department for assistance.
02	Nozzle motor	<ul style="list-style-type: none"> Remove slide, coverglass, or broken glass particles that may be inhibiting movement. Make sure that the nozzle reservoir is set in position.
03	Slide feed motor	<ul style="list-style-type: none"> Remove slide, coverglass, or broken glass particles that may be inhibiting movement. Make sure that the loading drawer is set in position.
04	Transfer motor (RH-LH)	<ul style="list-style-type: none"> Remove slide, coverglass, or broken glass particles that may be inhibiting movement. If the receiving racks contain any mounting medium, clean each rack in xylene in order to prevent slides from being misaligned prior to entry. Make sure that the receiving rack bars are not bent or warped. If so, the receiving rack must be repaired and/or replaced. Check that the receiving racks are set in position properly. Replace the slide arm vacuum cup if it is damaged. Remove any coverglass which may have dropped from the arm due to potentially retrieving 2 or more at one time. If may also be necessary to replace the remainder of the coverglass in the holder if they appear to be sticking together.
05	Transfer motor (UP-DOWN)	Remove slide, coverglass, or broken glass particles that may be inhibiting movement.
06	Rack motor	Remove slide, coverglass, or broken glass particles that may be inhibiting movement.
07	Slide pickup motor	Remove slide, coverglass, or broken glass particles that may be inhibiting movement.
08	Pump motor	Retry operation. If the same error message is displayed contact the Sakura Technical Service Department for assistance.
09	Nozzle motor	<ul style="list-style-type: none"> Remove slide, coverglass, or broken glass particles that may be inhibiting movement. Make sure that the nozzle reservoir is set in position.
10	Slide feed motor	<ul style="list-style-type: none"> Remove slide, coverglass, or broken glass particles that may be inhibiting movement. Make sure that the loading drawer is set in position..
11	Transfer motor (RH-LH)	<ul style="list-style-type: none"> Remove slide, coverglass, or broken glass particles that may be inhibiting movement. If the receiving racks contain any mounting medium, clean each rack in xylene in order to prevent slides from being misaligned prior to entry. Make sure that the receiving rack bars are not bent or warped. If so, the receiving rack must be repaired and/or replaced. Check that the receiving racks are set in position properly. Replace the slide arm vacuum cup if it is damaged. Remove any coverglass which may have dropped from the arm due to potentially retrieving 2 or more at one time. If may also be necessary to replace the remainder of the coverglass in the holder if they appear to be sticking together.

TROUBLESHOOTING

ERROR CODE	ERROR MESSAGE	RECOVERY PROCEDURE
12	Transfer motor (UP-DOWN)	Remove slide, coverglass, or broken glass particles that may be inhibiting movement.
13	Slide rack motor	Remove slide, coverglass, or broken glass particles that may be inhibiting movement.
14	Slide pickup motor	Remove slide, coverglass, or broken glass particles that may be inhibiting movement.
15	Pump motor	Retry operation. If the same error message is displayed contact the Sakura Technical Service Department for assistance.
16	Nozzle motor	<ul style="list-style-type: none"> Remove slide, coverglass, or broken glass particles that may be inhibiting movement. Make sure that the nozzle reservoir is set in position.
17	Slide feed motor	<ul style="list-style-type: none"> Remove slide, coverglass, or broken glass particles that may be inhibiting movement. Make sure that the loading drawer is set in position.
18	Transfer motor (RH-LH)	<ul style="list-style-type: none"> Remove slide, coverglass, or broken glass particles that may be inhibiting movement. If the receiving racks contain any mounting medium, clean each rack in xylene in order to prevent slides from being misaligned prior to entry. Make sure that the receiving rack bars are not bent or warped. If so, the receiving rack must be repaired and/or replaced. Check that the receiving racks are set in position properly. Replace the slide arm vacuum cup if it is damaged. Remove any coverglass which may have dropped from the arm due to potentially retrieving 2 or more at one time. If may also be necessary to replace the remainder of the coverglass in the holder if they appear to be sticking together.
19	Transfer motor (UP-DOWN)	Remove slide, coverglass, or broken glass particles that may be inhibiting movement.
20	Rack motor	Remove slide, coverglass, or broken glass particles that may be inhibiting movement.
21	Slide pickup motor	Remove slide, coverglass, or broken glass particles that may be inhibiting movement.
34	Slide vacuum line	<ul style="list-style-type: none"> Clean the strainer. Refer to Section 5, "Cleaning the Strainer." Replace the slide arm vacuum cup if found damaged. Refer to page 5.6, "Replacing the Slide arm vacuum cup."
35	Slide vacuum line	<ul style="list-style-type: none"> Clean the strainer. Refer to page 5.4, "Instrument Strainer." Replace the slide arm vacuum cup if found damaged. Refer to page 5.6, "Vacuum Cup."
36	Coverglass turning motor	Remove slides, coverglass, broken glass particles or any other debris on or around the coverglass holder.
37	Coverglass up-down motor	<ul style="list-style-type: none"> Check that the coverglass holder is properly positioned on the coverglass holder stage. Check the coverglass holder for trapped coverglass.
38	Coverglass holder motor	Remove slides, coverglass, broken glass particles or any other debris on or around the coverglass holder.
39	Coverglass turning motor	Remove slides, coverglass, broken glass particles or any other debris on or around the coverglass holder.
40	Coverglass up-down motor	<ul style="list-style-type: none"> Check that the coverglass holder is properly positioned on the coverglass holder stage. Check the coverglass holder for trapped coverglass.
41	Coverglass holder motor	Remove slides, coverglass, broken glass particles or any other debris on or around the coverglass holder.
42	Coverglass turning motor	Remove slides, coverglass, broken glass particles or any other debris on or around the coverglass holder.
43	Coverglass up-down motor	<ul style="list-style-type: none"> Check that the coverglass holder is properly positioned on the coverglass holder stage. Check the coverglass holder for trapped coverglass.
44	Coverglass holder motor	Remove slides, coverglass, broken glass particles or any other debris on or around the coverglass holder.
47	Coverglass vacuum line	<ul style="list-style-type: none"> Replace the coverglass arm vacuum cup. Contact the Sakura Technical Service Department for assistance. Use new coverglass.
48	Coverglass detection error	Add additional coverglass.
52	Slide out of position	Return those slides which were removed when the [EMER. STOP] was pressed to the slide basket. Place the slide or slides in the front of the basket, near the "UPSIDE" for convenience.

Instrument Control Error Codes

The following list of error codes are associated with the instrument control and require that the Sakura Technical Service Department be contacted.

When an error such as this occurs, the instrument will be brought to an immediate stop. A warning will be given both visually and audibly. The error code and message will be displayed on the screen.

LIST OF UNCOVERABLE ERROR MESSAGES	
<i>ERROR CODE</i>	<i>ERROR MESSAGE</i>
30	MEMORY ERROR: TURN OFF POWER
31	MEMORY ERROR: TURN OFF POWER
45	UNCONTROLLABLE: TURN OFF POWER
50	MEMORY ERROR: TURN OFF POWER
51	MEMORY ERROR: READJUSTMENT NECESSARY

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