



## **Automated Coverslipper**

### **MODEL NUMBERS**

4740 Tissue-Tek® Film® Coverslipper, 115 VAC, 60 Hz  
4741 Tissue-Tek® Film® Coverslipper, 100 VAC, 50/60 Hz  
4742 Tissue-Tek® Film® Coverslipper, 230 VAC, 50/60 Hz  
4743 Tissue-Tek® Film® Coverslipper BCR, 115 VAC, 60 Hz

**Operating  
Manual**

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# TABLE OF CONTENTS

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<i>Section</i>	<i>Page</i>
<b>1. INTRODUCTION</b>	<b>1.1</b>
Intended Use .....	1.1
Safety Instructions .....	1.1
Safety Precautions .....	1.2
General Description .....	1.1
Physical Characteristics .....	1.3
Description of Control Panel .....	1.7
Specifications .....	1.8
<b>2. INSTALLATION</b>	<b>2.1</b>
General Information .....	2.1
Environmental Factors .....	2.1
Unpacking .....	2.1
Preparation of Slides Prior to Coverslipping .....	2.10
<b>3. OPERATING INSTRUCTIONS</b>	<b>3.1</b>
Loading of Slides .....	3.1
Preparation of Film .....	3.1
Storage of Unused Film .....	3.1
Routine Operation .....	3.1
Setup Procedures .....	3.2
Coverslipping .....	3.5
Operating Precautions .....	3.6
<b>4. SLIDE HANDLING</b>	<b>4.1</b>
Handling of Coverslipped Slides .....	4.1
<b>5. ACCESSORIES</b>	<b>5.1</b>
Standard Accessories .....	5.1
Optional Accessories .....	5.1
<b>6. CARE OF THE INSTRUMENT</b>	<b>6.1</b>
General Maintenance .....	6.1
<b>7. TROUBLESHOOTING</b>	<b>7.1</b>
General Information .....	7.1
Power Failure .....	7.1
Messages .....	7.2
<b>8. SERVICE AND REPLACEMENT PARTS</b>	<b>8.1</b>
Service Information .....	8.1
Replacement Accessory Items .....	8.1
Optional Accessory Items .....	8.1
<b>Appendix A</b>	
<b>Bar Code Reader</b> .....	<b>A.1</b>



# INTRODUCTION

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## Intended Use

The Tissue-Tek® Film® Automated Coverslipper is designed for the purpose of coverslipping human and animal tissue specimens on slides.

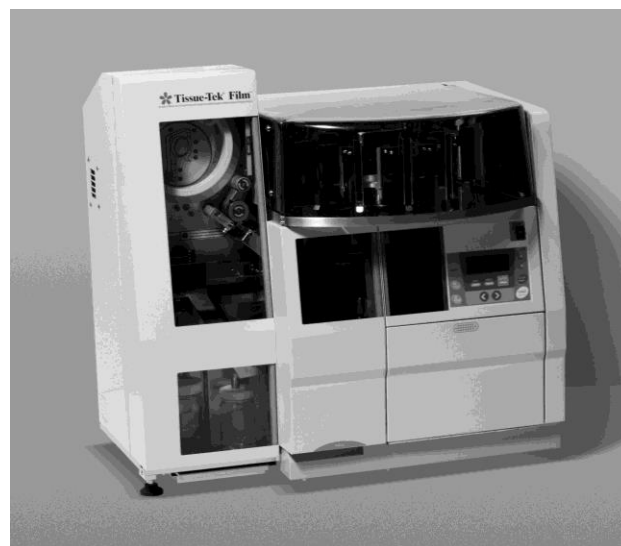
The instrument, as part of the histopathology process, is intended to facilitate the in vitro examination of human and animal tissue for morphology changes by a pathologist.

## General Description

The Tissue-Tek® Film® Automated Coverslipper designed to coverslip biological specimens that are mounted on standard 25 x 75 mm (1 x 3 inch) microscope slides (Figure 1-A). The use of a special, resin-coated, film and xylene eliminates the need for cover glass and mounting media. (Sakura can only recommend the use of Tissue-Tek® Coverslipping Film because of its proven performance). The film length is user-defined in four selectable options: 45 mm, 50 mm, 55 mm, and 60 mm. Coverslipping is performed at approximately 3 seconds per slide with continuous processing of up to 3 pre-loaded baskets. By linking the Film Coverslipper to the Tissue-Tek® Prisma® Slide Stainer, the series of slide preparation from slide staining to coverslipping is automatically performed. A microcomputer controls the mechanical movements, as well as the positioning and length of the coverslipping film. An LCD offers a visual display of selectable options and instrument status. All operating functions are controlled through a control panel. Adjustments to the software, such as xylene dispensing volume and film length can be easily modified using the function keys on the display panel.

Specimen slides ready for coverslipping are placed into compatible baskets and loaded into the basket loading station. The loading station should contain xylene in order to protect the specimens from drying out prior to coverslipping. The loading station can accommodate 3 baskets (60 slides) at one time. When the loading door is closed, sensors detect the number of baskets placed in the loading station. A robotic arm picks up one basket at a time and rises to the coverslipping area. Each slide is ejected from the basket where a pre-determined amount of xylene is dispensed onto the slide. The coverslipping film is applied to the slide and the slide is then returned to

its original position in the slide basket. When all of the slides in the basket have been coverslipped, the basket is transferred to the 12-position unloading unit. Baskets can be removed immediately or stored until 12 baskets have been placed in the unloading area. Use of an optional automatic transfer link station enables the coverslipper to receive slides directly from the Tissue-Tek® Prisma® Automated Slide Stainer.



**Figure 1-A**

The Tissue-Tek Film Automated Coverslipper with Code Reader, product code 4743, includes a bar code reader installed inside the unit. The 4740 version of the Tissue-Tek Film Automated Coverslipper arrives pre-wired for a bar code reader which may be added later with the purchase of product code 6508. This addition requires installation by a Sakura Service professional. **Please refer to Appendix A for further instructions pertaining to bar code reader functions.**

# INTRODUCTION

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## Safety Instructions

The Tissue-Tek® Film® Automated Coverslipper operating manual includes important instructions and information related to the operating safety and maintenance of the instrument. It is important to read the operating manual carefully prior to the operation of the instrument for the first time and to keep the manual with the instrument at all times.

This instrument has been built and tested with the following safety regulations on electrical measuring control, regulating and laboratory devices:

IEC 61010-1 2<sup>nd</sup> Ed.

CAN/CSA C22.2 No. 61010-1 2<sup>nd</sup> Ed.

UL 61010-1 2<sup>nd</sup> Ed.

In order to ensure safe operation, the operator must always comply with the instructions and warnings contained in the operating manual.

**CAUTION: Power Supply plug is used as mains power disconnecting device. Locate unit where power supply is easily accessible.**

**NOTE:** The protective devices installed on both the instrument and accessories may neither be removed nor modified. Only authorized and qualified persons may access and repair the internal components of the instrument.

The safety devices installed in this instrument by the manufacturer only establish the basis for accident prevention. Primary responsibility for accident-free operation lies, above all, with the institution that owns the instrument and, in addition, the designated personnel that operate, service, or repair the instrument.

## Safety Precautions

CAUTIONS and NOTES are provided throughout this manual to indicate levels of potential hazards or helpful information as defined below.

**CAUTION:** Indicates a potential hazard in which failure to follow instructions may result in damage to the Prisma and/or other property.

**NOTE:** Indicates a reminder or other helpful information.

## Safety Features

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

An alarm sounds when any of the following conditions occur:

- The loading door is open
- The film door is open
- The cover is open
- Low solvent volume is detected
- Film must be replaced
- Air bubbles are detected in the solvent tube
- When normal operation has been suspended due to instrument failure
- If a slide jam occurs, all mechanical movement stops and an alarm will sound.

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

## Physical Characteristics

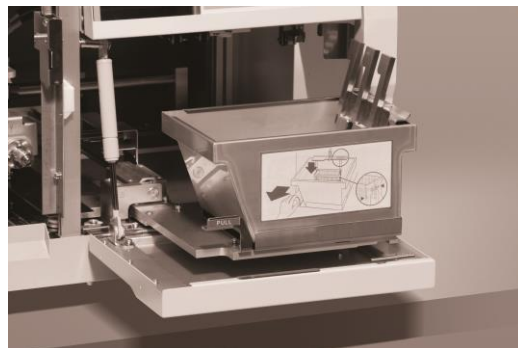
### ***Loading Area***

Access to the loading area (Figure 1-B) is obtained by opening the door located at the front, lower portion of the instrument. The loading drawer can be accessed by gently sliding the drawer out. This drawer should be filled with xylene to prevent slides from drying out prior to coverslipping. A maximum of three baskets can be loaded into the drawer.

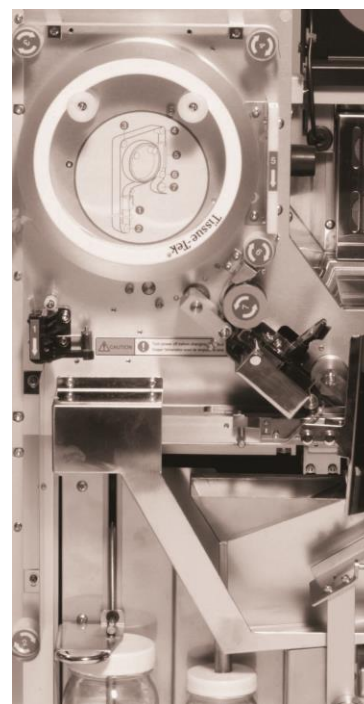
The Tissue-Tek Film Coverslipper accommodates slide baskets compatible with the Tissue-Tek® DRS™ 2000 and Prisma® Automated Slide Stainers.

### ***Film Loading Area***

Opening the film door, located on the left side of the instrument, provides access to the film loading area (Figure 1-C). Instructions for loading the coverslipping film can be found on a diagram located on the back wall of the instrument. The film is wound through positioning spools and rollers until it has reached the coverslipping area. The complex design of the film feeding system assures that even after the end of the film is detected, all of the slides held in the coverslipping position will be coverslipped. The length of the film going from the film end sensor to the cutter will coverslip 20 slides. The cutter blade used to cut the film is exchangeable and should be replaced after every 10 rolls of film (approximately 10,000 slides) or whenever the film cut is ragged or torn.



**Figure 1-B**



**Figure 1-C**

# INTRODUCTION

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## ***Dispensing Mechanism***

Xylene is pumped from the xylene bottle by a pump and then dispensed onto the slide. The xylene bottle is a glass bottle (Figure 1-D) with a capacity of 500 ml. It is located on the bottom left of the instrument and can be accessed by opening the film door. The xylene dispense volume is adjustable through the control panel with five user-selectable levels: 1 (min), 2, 3, 4, 5 (max). When the xylene bottle becomes empty, all of the slides held in the coverslipping position will be coverslipped. The tube length assures a sufficient volume of xylene to coverslip 20 slides. In order to fill the xylene bottle, it must be removed from the instrument.

The waste bottle is a glass bottle with a 200 ml capacity and is used to collect excessive xylene drained from the dispensing area. The waste bottle is located to the right of the xylene bottle. It must be removed from the instrument to be emptied.

## ***Coverslipping Stage***

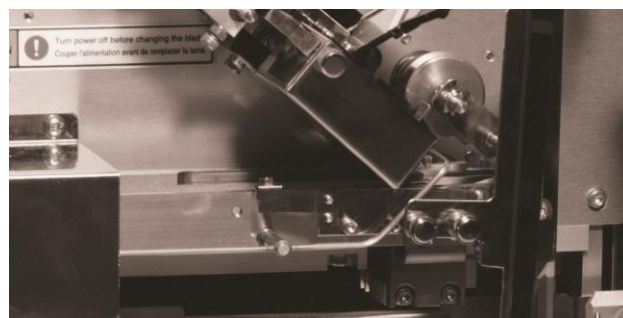
The first basket is automatically lifted from the loading drawer to the coverslipping stage (Figure 1-E). Slides are pushed one at a time from the loaded slide basket by an ejector arm onto the staging area. A pre-set volume of xylene is dispensed on the slide and then the film is cut to the appropriate length and positioned on the slide.

## ***Unloading Area***

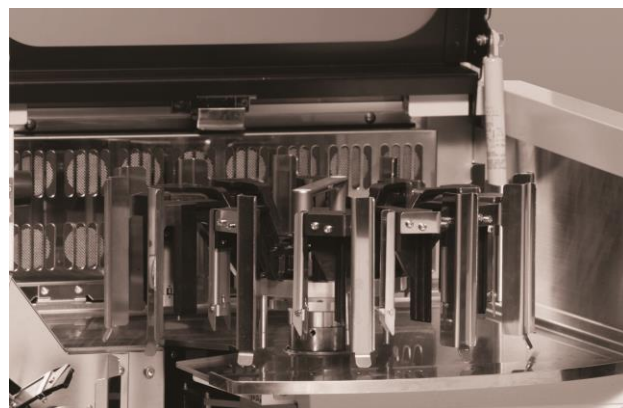
After the film is applied to the slide, it is returned to the slide basket in the same position from which it was removed. As each slide is coverslipped and returned to the basket, the basket is moved up one position until all slides have been coverslipped. The basket is then transported upward to the unloading area (Figure 1-F). The unloading area is located on the top of the instrument and is protected by a cover. It contains a carousel-like storage unit that can hold up to 12 baskets (240 coverslipped slides). The baskets can be removed individually as they are placed into the unloading area or can be held until all 12 positions are filled. The 12-position unloading unit containing baskets can be removed from the instrument.



**Figure 1-D**



**Figure 1-E**



**Figure 1-F**



## ***Fume Control***

Xylene fumes are absorbed by a carbon filtration system (Figure 1-G). The treated air is then force-vented through the exhaust outlet. The two activated carbon cartridges are located in the unloading area behind the 12-position unloading unit. An external port (OD: 38 mm or 75 mm), an optional accessory, is available so the instrument can be vented to an outside source. It is recommended that the carbon filters be replaced after two weeks of continuous use.



**Figure 1-G**

## ***Power Switch***

The instrument power is turned ON and OFF by pressing the power switch (Figure 1-H) located on the right front of the instrument on the control panel. The power switch also acts as an emergency stop switch.



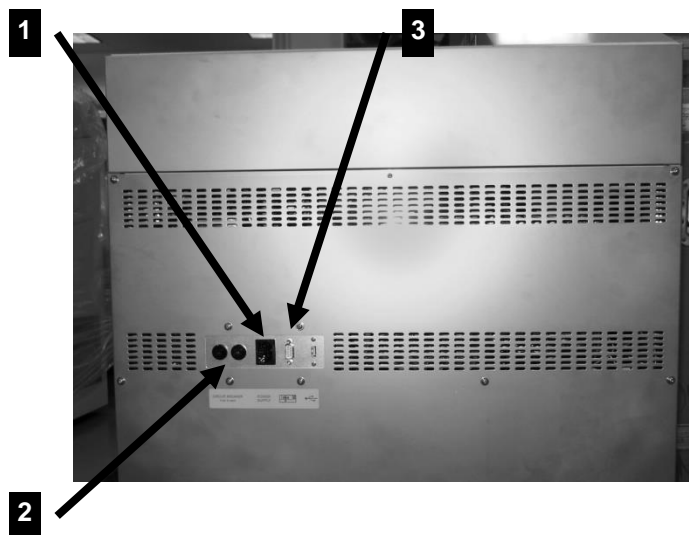
**Figure 1-H**

# INTRODUCTION

## Rear of the Instrument

The power cord can be installed on the rear of the instrument (**1**, Figure 1-I). The other end of the power cord attaches into an appropriate grounded AC electrical outlet. There are two fuses **2** located to the left of the power cord inlet.

Also located on the rear of the instrument is the connector port **3** for the link cable for the Tissue-Tek® Prisma® Automated Slide Stainer.



## Control Panel

All operating functions are controlled through the control panel (Figure 1-J). There are nine keypad switches and three LED's interfacing with the instrument software. A four-line LCD provides the user with information such as, current status, setup menu option, error codes and messages.

Rear Panel Outlets (Figure 1-I).



Figure 1-J



Figure 1-I

## 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 the standby screen, a series of operations can be selected.

Directly under the LCD display are three function keys labeled: [Enter], [Menu], and [Exit] (Figure 1-K).



**Figure 1-K**

The **[Enter]** key is used to save changed settings and to return to the previous screen. The **[Menu]** key takes the user to the menu screen. It provides access to the following functions:

- Change dispensing volume
- Change film length
- Verify dispensing action
- Reset user count
- Set key sound
- Select alarm sound
- View software version #

The **[Exit]** key is pressed to return to the previous screen without saving any changed settings.

Directly beneath these three keys are the left **[<]** and right **[>]** arrow keys. The **[<]** key, when used in the menu screen, moves the selection item upward or to the left. (Holding the key down will cause a continuous action). The **[>]** key moves the selection item downward or to the right. (Holding the key down will cause a continuous action).

On the left side of the control panel are two keys, **[Film]** and **[Prime]**. After the film is loaded up to the coverslipping staging area, pressing the **[Film]** key will capture the film and begin to feed it automatically. The **[Prime]** key is pressed to dispense the xylene using the set xylene dispensing level.

Located on the right side of the control panel are the **[Stop]** and **[Start]** keys. When the instrument is in operation, the **[Stop]** key is used to stop operation already in progress. It is also used to stop the xylene priming action. The coverslipper will begin routine operation, start of origin return action, or priming action when the **[Start]** key is pressed.

There are three LED's located on the control panel. The Cover LED, the Load LED, and the Power LED. The Cover LED lights when the cover on the top of the instrument is ready to open. The Load LED lights when the door of the loading station is ready to open. The Power LED remains lit when power is being supplied to the instrument.

# INTRODUCTION

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## Specifications

### Models

Model	Name/Description
4740	Tissue-Tek® Film® Coverslipper (115 VAC) (USA)
4741	Tissue-Tek® Film® Coverslipper (100 VAC) (Asia)
4742	Tissue-Tek® Film® Coverslipper (230 VAC) (Europe)
4743	Tissue-Tek® Film® Coverslipper BCR (115 VAC) (USA)

### Power Ratings and Requirements

Model	Voltage	Frequency	Amps
4740/4743	115 VAC $\pm$ 10% @ <15A	60 Hz	1.3A
4742	230 VAC $\pm$ 10% @ < 7A	50/60 Hz	0.8A
4741	100 VAC $\pm$ 10% @ <15A	50/60 Hz	1.5A

### Safety Standards

Tested and listed by Intertek Testing Services (ITS).

Complies with IEC 61010-1 2<sup>nd</sup> Ed., CAN/CSA C22.2 No. 61010-1 2<sup>nd</sup> Ed., UL 61010-1 2<sup>nd</sup> Ed.

CE registered in compliance with the requirements of EMC Directive, LV Directive in Europe, In Vitro Diagnostic Device Directive.

### Dimensions

Centimeters: 72(W) x 58(D) x 69(H)

Inches: 28(W) x 23(D) x 27(H)

### Instrument Weight

75 kg (165 lbs.)

### Operating Conditions

Operating temperature: 10° C to 40° C (50° F to 104° F)

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

Atmospheric pressure: 70kPa to 106kPa

Protect from direct sunlight.

### Storage Conditions

Storage temperature: -10° C to 60° C (° F to ° F)

Relative humidity: 30-95% (non-condensing)

Atmospheric pressure: 70kPa to 106kPa

### Processing Speed

Maximum throughput: 1,080 slides per hour

60 slides/batch

### Acceptable Slide Dimensions

Dimensions: 24.7 to 26.5 mm (W) x 74.7 to 76.5 mm (L)

Thickness: 0.9 to 1.2 mm thickness

### Compatible Solvent

Reagent grade or analytical grade xylene only

### Coverslipping Film

Width: 24 mm

Length: 45, 50, 55, and 60 mm

Material-Cellulose Triacetate with Resin and Back Coatings

**CAUTION: Xylene substitutes are not compatible for use on the Tissue-Tek® Film® Coverslipper.**

# INSTALLATION

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## General Information

This section provides detailed installation and setup instructions for the Tissue-Tek® Film® 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 Film 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. Ample working space is necessary in front and on top of the instrument.

## 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 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.

## Unpacking

### *Removing the Outer shipper*

The Tissue-Tek Film Coverslipper is packaged in a sturdy cardboard shipping carton attached to a wooden pallet (Figure 2-A).



**Figure 2-A**

1. 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. In countries other than the USA, contact the nearest authorized Sakura distributor or representative.
2. If no visible signs of damage are evident, remove the protective tie wraps securing the outer shipper box to the pallet (Figure 2-B).



**Figure 2-B**

# INSTALLATION

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3. Remove the lid of the box and remove the accessory box positioned under the lid (Figure 2-C).



**Figure 2-C**

4. Remove the Styrofoam pieces surrounding the instrument. The outer cardboard box may now be lifted up and away from the instrument.
5. The instrument is positioned on the pallet and is protected by a plastic cover and Styrofoam packing material. If the Styrofoam has not already been removed, remove it from the corners of the unit. Remove the protective wrapping exposing the instrument (Figure 2-D).



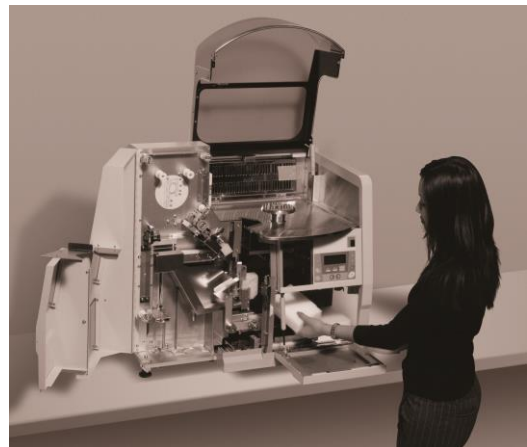
**Figure 2-D**

6. Carefully lift the coverslipper from the pallet and place it on a sturdy, level surface capable of supporting 75 kg (165 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 of the instrument.

**CAUTION:** Always transport the instrument in an upright position.

7. Remove any adhesive tape from the outside of the instrument.
8. Open the loading area door and remove any packing material.
9. Open the film door and carefully remove all adhesive tape securing the components. Remove the Styrofoam wedges and foam from the coverslipping area (Figure 2-E). Be sure not to dispose of these items until proper operation is verified.



**Figure 2-E**

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

## Removing the Metal Packing Piece

**CAUTION:** Make sure that the instrument is switched off and that the power cord is unplugged before beginning.

1. Open the film door (located on the left side of the instrument).
2. Locate the film waste tray. Directly to the right of the film waste tray is a tagged piece of metal (Figure 2-F).



**Figure 2-F**

3. Cut the wire securing the tag.
4. Remove the metal piece holding the two rollers (1, Figure 2-F).

**NOTE:** Failure to remove this metal piece will result in instrument malfunction.

## Unpacking the Accessories

When opening the accessory box, confirm that all accessories have been included with the instrument:

- Operating Manual (1)
- Warranty Card (1) (located inside the Operating Manual) (USA only)
- Power Cord (1)

- Slide Baskets (10)
- Slide Basket Adapters (10)
- Film (1 roll)
- Cutter Blades (5)
- Loading Drawer (1)
- Loading Drawer Cover (1)
- Xylene Bottle (1)
- Xylene Bottle Cap (1)
- Xylene Waste Bottle (1)
- Xylene Waste Bottle Cap (1)
- Spill Tray (installed) (1)
- Waste Drain Guide (Funnel) (1)
- 12-position Unloading Unit (1)
- Activated Carbon Filters (2)

## Positioning the Instrument

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, dust free, and have a firm, level surface capable of holding at least 75 kg (165 lbs) of weight. Be sure it is near a power source that meets the electrical requirements specified on the rating label located on the left of the instrument. The power outlet must be grounded and it should be a dedicated line. Avoid proximity to direct sunlight, open windows, sinks, ovens, hot plates, open burners, or radiators.

## Leveling the Instrument

Once the instrument is placed on a sturdy, level surface, it is important that it is leveled. Using a wrench, adjust the feet by turning the nut on each foot. Turning the nut clockwise will raise the instrument, counter-clockwise will lower the instrument.

Place a level on the inside, middle of the instrument and adjust the feet until it is level.

## Positioning the Accessories

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



# INSTALLATION

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## *Installing the Activated Carbon Filters*

**CAUTION:** Make sure that the instrument is switched off and the power cord is unplugged before beginning.

1. Open the top cover of the instrument.
2. If the 12-position unloading unit is installed, remove it by grasping the handle located in the middle of the basket and lift upward.
3. Open the filter cover by lifting up the hook located at the top center of the filter cover.
4. Lower the filter cover.
5. Remove the plastic wrapping from both carbon filters.
6. Place carbon filters horizontally in the appropriate location (Figure 2-G).



**Figure 2-G**

7. Push firmly against the filter cover to close and latch hook.

**NOTE:** It is recommended that the carbon filters be replaced periodically. See Section 6, *Care of The Instrument*, for maintenance schedule.

## *Installing the 12-Position Unloading Unit*

**CAUTION:** Make sure that the instrument is switched off and the power cord is unplugged before beginning.

1. Open the top cover to expose the unloading area.
2. Grasp the 12-position unloading unit by the handle (Figure 2-H), located in the middle of the unit.



**Figure 2-H**

3. Locate the positioning hole on the instrument and line it up with the peg on the underside of the unloading unit.
4. Lower the 12-position unloading unit until it is sitting correctly.

**NOTE:** The 12-position unloading unit is keyed to fit only one way. If it does not sit properly, lift back up and reposition.



### ***Installing the Xylene Bottle***

**CAUTION:** Make sure that the instrument is switched off and the power cord is unplugged before beginning.

1. Confirm the xylene bottle is free from dust or debris. If there is any debris inside the bottle, clean and dry completely.
2. Fill the bottle with Xylene.

**NOTE:** Use high-grade xylene only (e.g., reagent grade xylene)

3. Open the film door (located on the left side of the instrument).
4. Locate the priming lid on the lower left side.
5. Lift priming lid and set the xylene bottle under the lid by positioning the priming tube inside of the bottle (Figure 2-I).



**Figure 2-I**

6. Set the bottle down and lower the priming lid until lid is resting on top of the bottle.
7. Close the film door.

### ***Installing the Xylene Waste Bottle***

**CAUTION:** Make sure that the instrument is switched off and the power cord is unplugged before beginning.

1. Open the film door located on the left side of the instrument.
2. Position the xylene waste bottle in the designated area next to the xylene bottle on the lower left side (Figure 2-J).



**Figure 2-J**

3. Close the film door.

# INSTALLATION

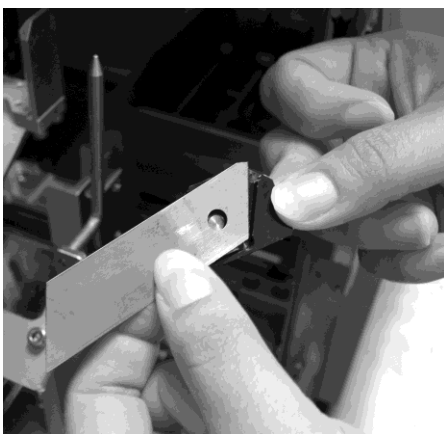
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## *Installing the Cutter Blade*

**CAUTION:** Make sure that the instrument is switched off and the power cord is unplugged before beginning.

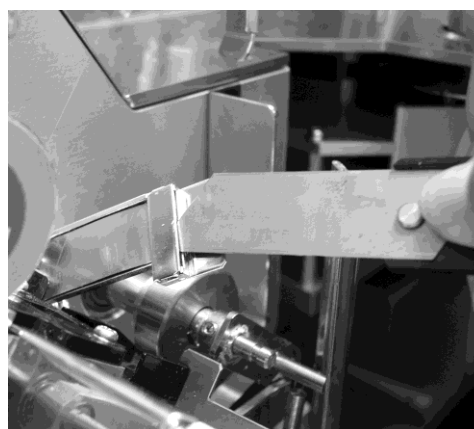
**CAUTION:** Use caution when handling the blades; even used blades are sharp.

1. Open the film door and locate the cutter blade handle positioned in the coverslipping area.
2. Pull the spring steel tab on the blade assembly to the right to clear the capture button on the black safety handle.
3. The handle, along with the blade, can be removed from the assembly by pulling it straight out. While removing, hold the blade against the safety handle, as it is not locked into place on the handle.
4. Lift the used blade off the safety handle and dispose of in an appropriate container.
5. Insert a new blade into the recessed area of the safety handle by aligning the hole in the blade to the peg on the handle (Figure 2-K). Notice that the blade fits into the handle in only one direction.



**Figure 2-K**

6. Holding the blade against the safety handle, carefully insert the blade into the slit of the guide piece on the blade assembly (Figure 2-L). Push the blade completely in without dragging the sharp edge of the blade along the guide piece. The black safety handle must be seated flush against the guide piece when the assembly is fully and correctly inserted. If resistance is encountered prior to this point, carefully use one finger of the opposite hand to press against the body of the blade (near the tip) while continuing to push the assembly in with the other hand.



**Figure 2-L**

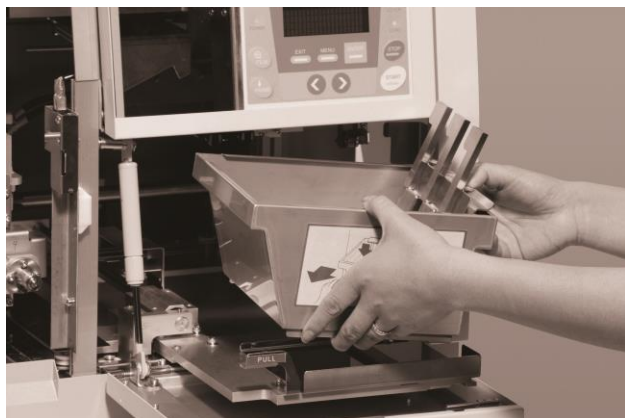
7. When the blade is fully inserted, press the spring tab over the capture button on the safety handle to ensure it is seated securely in place.
8. Close the film door.

### ***Installing the Loading Station***

**CAUTION:** Make sure that the instrument is switched off and the power cord is unplugged before beginning.

1. The loading station is positioned in the lower, right section of the coverslipper. Open the door to expose the loading area. Pull out the loading drawer.
2. Position the loading station along the guide rails in the loading drawer (Figure 2-M).

**NOTE:** Failure to orient the loading station properly will prevent the station from being secured on the drawer.



**Figure 2-M**

3. Place the sensor reactor fins in the loading station so that they face the right hand side of the loading station. Position them securely by engaging the locating pins inside the loading station.
4. Fill the loading station with xylene up to the designated line.

**NOTE:** Use high-grade xylene only (e.g., reagent grade xylene)

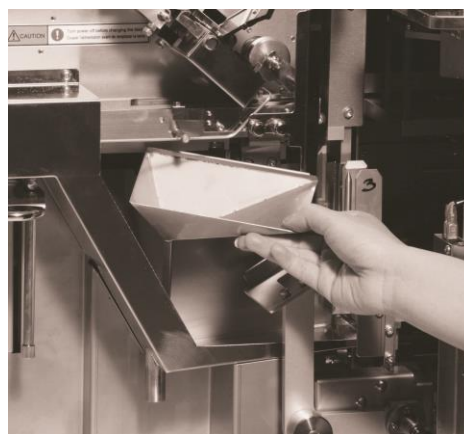
5. Cover the loading station with the lid making sure to position it so that the handle of the lid is next to the sensor reactor fins.

**NOTE:** Lid must be removed prior to instrument operation.

6. Slide the loading drawer back into the instrument being certain that the loading station is in the proper position.
7. Close the loading door.

### ***Installing the Waste Funnel***

1. Open the film door located on the left side of the instrument.
2. Position the funnel so that the narrow end is inserted slightly into the waste Xylene hole (Figure 2-N).



**Figure 2-N**

3. Twist the wide end of the funnel so that the edge of the funnel rests on the opening on the back wall.
4. Secure in place to make sure it is in the proper position

**Note:** The funnel edge should fit snugly on the back wall and should not move once installed.

# INSTALLATION

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## *Installing the Waste Tray*

1. Open the film door located on the left side of the instrument.
2. Locate the guide rails for the waste tray underneath the Xylene bottle and the Xylene waste bottle
3. Position the waste tray in between the guide rails (Figure 2-O) and push the tray completely in.

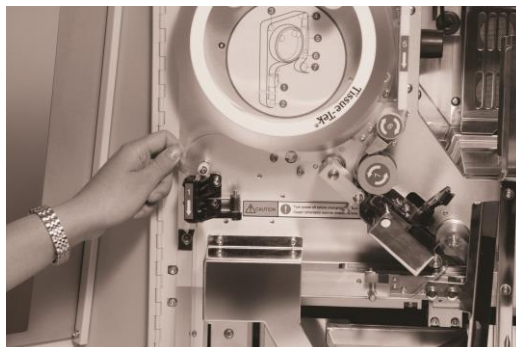


**Figure 2-O**

**Note:** Check the waste tray frequently to make sure there is no debris or Xylene.

## *Installing the Tissue-Tek Coverslipping Film*

1. Power the instrument on by pressing the power switch to the "I" position.
2. Open the film door located on the left side of the instrument.
3. Holding the film core made of white plastic with the Tissue-Tek Film facing forward set the film in the groove of the two film receiving rollers.
4. Thread the tip of the film outside of roller "1" and through guide "2" (Figure 2-P).



**Figure 2-P**

5. Pass the film along the perimeter of roller "3".
6. Pass the film over rollers "4" and "5" and then through guide "6".
7. Pass the film along the perimeter of roller "7".
8. Insert the tip of the film into the final roller and press the [Film] key to advance the film through the roller.
9. Release the [Film] key when the film is past the cutter blade (3 to 6 mm) (1/8 to 1/4")

**NOTE:** The cutter blade handle must be pressed down when the "Press [FILM] to feed and cut film" message is displayed.

**NOTE:** If the film jams while threading, turn the power to the off position, pull the film back through the last roller, power the instrument back on, and begin again with step 4.

10. Remove the cut film with forceps or fingertips.
11. Close the film door.

### ***Electric and Link Connections***

#### **Connecting the Power Cord**

1. Make sure the power switch is in the “O” position.
2. Plug the power cord into the power inlet **1** (Figure 2-Q) located on the rear of the instrument.
3. Plug the other end of the power cord into an appropriate AC electrical outlet. The outlet should be a dedicated line and it must be grounded.

**CAUTION:** Do not connect or disconnect power supply with wet hands. Doing so may cause electrical shock.

**CAUTION:** Connection/Disconnection of power cable by holding any other part but the plug body may cause fire or electrical shock.

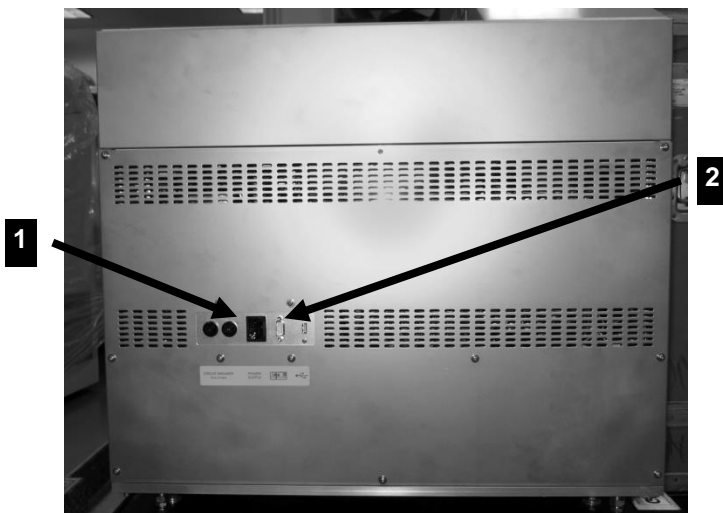
4. Switch the power switch to the on position labeled “I”.

#### ***Setting up the Link Connection (Optional)***

A data cable is part of the optional link connection that combines the Film® Coverslipper to the Tissue-Tek® Prisma® Automated Slide Stainer.

1. Connect one end of the data cable to the link inlet **2** (Figure 2-Q) located on the rear of the instrument, and the other end to the bottom right side of the Prisma Slide Stainer.

**NOTE:** Optional Link Station must be installed by an authorized Sakura Representative.



**Figure 2-Q**

# INSTALLATION

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## Preparation of Slides Prior to Coverslipping

Only stains that can be coverslipped with a solvent-based mounting medium should be used to stain slides that will be coverslipped on the Tissue-Tek Film Coverslipper. Stains that require the use of aqueous mounting medium are not appropriate for use in conjunction with this instrument.

Always use clean, reagent grade xylene in the final steps of specimen staining. Small amounts of water left on the slides may interfere with the adhesion of the coverslipping film. For best results, be sure that the final changes of xylene in the staining protocol are changed frequently. If small bubbles are noticed in the xylene containers or the xylene becomes cloudy or colored with stain, the xylene should be changed.

Slides should be free of paraffin, foreign debris, and staining residue.

This section states the importance of water and alcohol removal from the slide. Dehydration in three (3) changes of 100% alcohol for a *minimum* of 1 minute in each alcohol is a recommended practice for proper dehydration. Additionally, it is essential that the last 100% alcohol is absolutely clear. Any evidence of pink in the last 100% alcohol is evidence of the presence of water. Water is the carrier of (the pink) Eosin. The rotation of these alcohols may need to be increased to prevent the last alcohol from becoming too diluted, just as is done in tissue processing.

It is important that no trace of alcohol remains on the slide. Three (3) changes of Xylene for a *minimum* of 1 minute each is a recommended practice.

For best results, the time in the last reservoir of each series of reagents should be extended to 2 or 3 minutes. Note that the frequency of reagent rotation should be periodically reviewed by the laboratory to cope with increased slide workload.

Slides that are stained or prepared without xylene in the final step (e.g., hematology smears) should be immersed for several minutes prior to coverslipping to remove any immersion oil or other residues.

The coverslipping film has a resin layer of finite thickness. The available resin cannot accommodate wide variations in specimen thickness. Bubbles may occur and render specimens difficult to diagnose after storage.

**NOTE:** Cytology specimens (e.g., Pap smears, sputum preparations, and bronchial lavages) may present specimen thickness that may vary within wide extremes. Inspect slides to reduce and/or limit thickness variations to product quality Film Coverslipped slides.

# OPERATING INSTRUCTIONS

The Tissue-Tek® Film® Coverslipper is capable of performing continuous, rapid coverslipping by simple operating steps.

## Loading of Slides

Slides must be correctly inserted into the baskets in order to be properly coverslipped. Slides must be loaded into the baskets, taking the following precautions:

The specimen side of the slide must face forward (toward the words "UP SIDE" on the basket)

The label end of the slide must be to the outside (top) of the basket

Each slide must be in parallel grooves

Each basket holds 20 slides; the empty grooves in a partially filled basket may be anywhere in the basket.

To prevent damage to the specimens, keep the slides totally immersed in clean xylene when positioned in the loading station of the instrument.

## Preparation of Film

**CAUTION:** Before using a roll of Coverslipping Film, it is imperative that the film be allowed to acclimate for at least one full day (24 hours) to the laboratory conditions in which it will be used.

The film roll should be removed from the box and the plastic bag opened fully to allow complete exchange of air to the film. Alternatively, the film can be removed from the bag and stored in a cupboard or in the instrument, as long as it is protected from dust, moisture, and chemical vapors. Failure to allow complete acclimation may result in bubbles, curling edges, or poor adherence of the film to the slide, the degree of which depends upon the specific conditions (temperature and humidity) in the laboratory in comparison to the conditions of the film at the time of use.

The end of a new roll of film will be secured with a piece of adhesive tape. Carefully remove the tape, ensuring that all adhesive is removed with the tape. Discard the first 75 cm (2 1/2 feet) of Film before installing a new roll on the Coverslipper. This will ensure removal of the blemished area originally secured with tape.

## Storage of Unused Film

Avoid storing Film in humid areas. Storage conditions for Film prior to use:

Relative Humidity: 30 to 70%

Temperature: 10° C to 30° C (50° F to 86° F)

Packaged rolls of film should not be stored near laboratory chemicals. The solvent fumes will penetrate through the cardboard box and plastic bag, resulting in degradation of the Film coatings.

**NOTE:** We can only recommend the use of Tissue-Tek Coverslipping Film, Product Code # 4770.

## Routine Operation

1. Turn the instrument on by firmly pressing the power switch to the "I" position. The power switch is located on the front of the instrument on the control panel.

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

Solvent Setup  
 Film Setup  
 Instrument Check  
 [START] to start

2. Load film if not already done (see Section 2 *Installation* for film installation procedure).
3. Press the [FILM] key and feed the film so the film tip comes 1-2 mm past the cutter blade edge.

**NOTE:** Film will be continuously fed as long as the [FILM] key is pressed.

- a. Depress the front end of the blade cutter handle with a finger and cut the film.

**NOTE:** The cutter blade handle must be pressed down when the "Press [FILM] to feed and cut film" message is displayed.

- b. Remove the film end with forceps or fingers.
  - c. Close the film door.
4. Load the 12-basket unloading unit located under the cover on the top of the instrument (see 12-basket unloading unit installation)

# OPERATING INSTRUCTIONS

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5. Confirm that the loading station is positioned correctly (see loading station installation).
6. Execute the priming function. If xylene bottle has not already been positioned, it should be filled and set in the designated area. (See xylene bottle installation)
7. Press the [PRIME] key and confirm that the xylene is being dispensed.

**NOTE:** It is important the [PRIME] key is pressed until xylene dispensing is confirmed.

8. Press the [START] key on the control panel. This action starts instrument initialization. Once initialization is complete, the standby screen will

<Standby>  
Film Prime Count  
45mm Level 3  
012345  
>Set the basket

appear.

9. Check the film length, dispensing amount, and the counter number.

## Setup Procedures

### *Modifying the Setup Menu*

Using 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 is sometimes necessary to modify a parameter setting to meet the diverse needs of each lab.

On the control panel, the [<] and [>] keys move the cursor up and down, and left and right respectively.

There are seven options available from the Setup Menu:

1. Prime Volume
2. Film Length
3. Extended Prime
4. Count Reset
5. Key Sound
6. Alarm
7. Software Version

**NOTE:** The Setup Menu is only available when the instrument is in the Standby or Suspension mode.

### To Access the Setup Menu:

1. From the Main Menu, press the [MENU] key located on the control panel under the display. The following message displays:

<Menu>  
1. Prime Level  
2. Film Length  
3. Extended Prime

2. The cursor blinks on the number of the first option, "1. Prime Volume". To choose this option, press the [ENTER] key. To select another option, use the [<] and [>] keys to scroll up or down and press the [ENTER] key to choose the desired selection.



## Description of the Setup Menu Options

### 1. Prime Volume

The prime volume refers to the amount of xylene dispensed on each slide during coverslipping. The priming level is selectable in a range of 1-5, 3 being the default setting. When the [Prime] key is pressed once, the corresponding priming level is dispensed.

**CAUTION: Use xylene only in this instrument.**

**NOTE:** Dispense level is dependent on the film length chosen. For example, level 1 dispense level is greater for 60 mm film length than for 40 mm film length.

**NOTE:** Recommended dispense level is 2-3 for Histology slides, 3-4 for Cytology slides.

- a. Press the [<] and [>] keys to select option, "1. Prime Volume", and press the [ENTER] key. The following screen displays:

<Prime Volume>  
Level (1-5): 3  
[PRIME] to prime  
[ENTER] to save

- b. Press the [<] and [>] keys to select the priming level desired.
- c. Press the [PRIME] key to confirm that the xylene is being dispensed at the correct level.
- d. Press the [ENTER] key to save the new setting and bring the display back to the Setup Menu or press the [EXIT] key to return to the Setup Menu without saving the setting.

### 2. Film Length

The second parameter under the Setup Menu, "2. Film Length", refers to the length of the film placed on the slide to cover the specimen. There are four selectable lengths: 45 mm, 50 mm, 55 mm, and 60 mm.

- a. Press the [<] and [>] keys to select option, "2. Film Length", and press the [ENTER] key. The

<Film Length>  
45mm 50mm 55mm 60mm  
[<] [>] to select  
[ENTER] to save

following screen displays:

- b. Press the [<] and [>] keys to select the desired film length.
- c. Press the [ENTER] key to save the new setting and bring the display back to the Setup Menu or press the [EXIT] key to return to the Setup Menu without saving the setting.

### 3. Extended Prime

An extended prime must be done each time the xylene bottle is refilled. This prime ensures that there are no bubbles in the priming line. The extended prime will prime the line for 30 seconds. If bubbles are detected in the line, the instrument will prime for an additional 30 seconds. If

<Operator Action>  
Air bubbles in tube  
Check Solvent

bubbles are still detected, the unit produces an audible warning alarm and an error message appears.

- a. Press the [<] and [>] keys to select option, "3.

<Extended Prime>  
[ENTER] to prime  
system  
[EXIT] to exit

Extended Prime", and press the [ENTER] key. The following screen displays:

- b. Press the [ENTER] key to start Prime. The priming will run for 30 seconds and stop.

# OPERATING INSTRUCTIONS

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**NOTE:** If stopping the prime is required, press the [STOP] key to abort the prime. If there are bubbles detected in the priming line, Extended Prime will need to be repeated.

- c. Press the [EXIT] key to return to the Setup Menu.

## 4. Count Reset

The counter value is displayed in the lower left corner of the display in the standby or operation menu. The number increases by one (1) each time a slide is coverslipped.

- a. Press the [<] and [>] keys to select option, "4. Count Reset", and press the [ENTER] key. The

<Count Reset>  
Count: 012345

[ENTER] to reset

following screen displays:

- b. Press the [ENTER] key to reset the counter and bring the display back to the Setup Menu.
- c. Press the [EXIT] key to return to the Setup Menu without resetting the counter.

**NOTE:** When the counter value reaches the number 999999, it automatically resets and returns to zero (0).

## 5. Key Sound

The key sound can either be turned ON or OFF.

- a. Press the [<] and [>] keys to select option, "5. Key Sound", and press the [ENTER] key. The following screen displays:

<Key Sound>  
ON/OFF

[<] [>] to select  
[ENTER] to save

- b. Press the [<] and [>] keys to select ON or OFF.
- c. Press the [ENTER] key to save the new setting and bring the display back to the Setup Menu.
- d. Press the [EXIT] key to return to the Setup Menu without saving the setting.

## 6. Alarm Volume

There are four available alarm levels to choose from. Level 4 is the default setting.

- a. Press the [<] and [>] keys to select the option, "6. Alarm Volume", and press the [ENTER] key. The

<Alarm>  
1/2/3/4

[<] [>] to select  
[ENTER] to save

following screen displays:

- b. Press the [<] and [>] keys to select the desired alarm volume.
- c. Press the [ENTER] key to save the new setting and bring the display back to the Setup Menu.
- d. Press the [EXIT] key to return to the Setup Menu without saving the setting.

## 7. Software Version

The last parameter allows the user to access to the current software version in the instrument.

- a. Press the [<] and [>] keys to select option, "7. Software Version", and press the [ENTER] key. The following screen displays:

<Software Version>  
N74-900-0

[EXIT] to exit

- b. Press the [EXIT] key to return to the Setup Menu

## Coverslipping

1. Confirm that the [LOAD] LED located on the right side of the control panel is lit. The standby screen displays.

<Standby>  
 Film Prime Count  
 45mm Level 3  
 012345  
 >Set the basket

2. Open the loading door and gently pull the loading drawer out of the loading station. The loading station should be filled with xylene in order to keep specimens from drying out prior to operation. The xylene should be topped off or replaced when it appears to be dirty or contains a significant amount of debris. Two level lines are visible on the left edge of the loading drawer. The xylene should be filled so that it is at least at the lower level but not higher than the highest level. This will ensure that the volume of xylene is adequate to cover all specimens regardless of the number of baskets that are being processed.
3. To position slide baskets in the loading station, set the basket into the drawer with the “upside” marking on the slide basket directed toward the right side of the instrument. The loading drawer can accommodate up to three baskets at a time. Baskets will be coverslipped one by one from the front of the loading drawer.

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

4. When all slide baskets are loaded into the loading station, 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. When the door has been closed, coverslipping operation will start automatically.

**NOTE:** The counter value displayed on the LCD display increases by one when the coverslipping of each slide is completed.

5. A basket can be added if the [LOAD] LED on the control panel is lit. Repeat steps one through 4 to add an additional basket.

**NOTE:** The [LOAD] LED is not lit when a basket is being removed from the loading drawer. At this moment, the loading door cannot be opened because it is locked.

As operation begins, the robotic arm moves downward to the loading drawer and picks up the slide basket in the first position. If no basket is in the first position, the robotic arm moves to the second position, then third position, etc. until a basket is located. When a basket is retrieved the arm moves the basket to a position where another arm moves the basket adapter handle over. The basket is then moved to the coverslipping area.

The basket is ratcheted up one slide position at a time until a slide is detected in a slot. An ejector arm pushes the slide onto the coverslipping staging area where a pre-determined amount of xylene is dispensed on the slide. The coverslipping film is advanced past the cutter blade, cut, and then positioned on the slide.

**NOTE:** The preset film length can be adjusted using the instrument software 45 mm, 50 mm, 55 mm, or 60 mm length.

After the slide is coverslipped, it is returned to its original position in the slide basket. The coverslipping action is repeated until all of the slides in the basket have been coverslipped. The basket is then transported upward where it is placed into an open position in the 12-basket storage unit.

When the 12-basket storage unit is filled with baskets, a warning sound is issued and a CAUTION screen appears.

<Operator Action>  
 Remove Basket

The coverslipping operation is temporarily suspended until the baskets have been removed from the instrument.

Confirm that the COVER LED located on the control panel is lit before lifting the cover.

# OPERATING INSTRUCTIONS

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**CAUTION:** Open the cover only when it is required. It is important to minimize the amount of time that the cover is opened due to reagent fume exposure.

**CAUTION:** Do not open the cover when the COVER LED is not lit. Operating the instrument with the cover open may cause injury.

Open the cover and remove the baskets from the 12-basket storage unit. The baskets may be removed one at time, or the entire storage unit may be lifted completely out. Grasp the handle in the middle of the storage unit and lift upward and out of the instrument.

**NOTE:** If the 12-basket storage unit is removed, it must be replaced before beginning operation.

Once the baskets have been removed, close the cover and resume operation if necessary. The instrument will return to the standby mode and is again ready for 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 an occasion when the power fails during operation. In such cases, there are ways to stop operation each are described below.

### Making an Emergency Stop

If a malfunction occurs that necessitates stopping the normal operation, press the power switch to the "O" position. This stops all functions immediately.

**NOTE:** If an error has occurred, it is important to attend to the instrument immediately and remove any slides or baskets that may have suspended the operation.

1. Open all doors and covers
2. Remove all slides and baskets needed.
3. Return all slides that were not coverslipped to the loading station.

**CAUTION:** Keep hands away from gaps when operating the cover. Be careful to avoid catching a hand in the gap between the fixed section and the moveable section of the cover, or between the cover and the door when opening or closing the cover.

4. Close all doors and covers.
5. Press the power switch to the "I" position.
6. A caution screen appears after the power is restored to indicate that the system has experienced a power failure.

<Operator Action>  
Power Outage  
Check system  
[EXIT] to exit

7. Press the [EXIT] key to return the display to the Standby Menu.

8. Confirm film placement.

**NOTE:** The film may need to be re-fed if the power has been interrupted. (See the film installation procedure in *Section 2, Installation*, to verify film placement).

9. If baskets remain in the loading station, coverslipping will begin after the initialization.

### Using the Stop Key

There may be occasions to stop the instrument in order to retrieve slides or to remove a slide basket.

**CAUTION:** Never open the instrument while in operation.

1. To stop the instrument, press the [STOP] key on the control panel. A confirmation screen appears.

<In Process>  
Film Prime Count  
45mm Level 3  
012345  
[STOP] to hold

2. Press the [STOP] key again. The instrument completes the slide being coverslipped and then moves the basket in the coverslipping area to the 12-basket unloading unit.

**NOTE:** There may be slides in the basket that were not coverslipped. Be sure to put the slides not coverslipped back into the loading drawer.

3. If needed, remove any remaining baskets from the loading station.
4. After all needed slides and baskets have been removed from inside the instrument, operation can be resumed. The following message displays:

<Hold>  
Abort Operation?  
[START] to restart  
[STOP] to abort

The instrument will be in a “Hold” mode where the run can be aborted or the operation can be resumed.

5. To resume operation, press the [START] key on the control panel. Operation will resume immediately.
6. To abort the run, press the [STOP] key on the control panel. The run will be aborted and the operation may be resumed at a later time.

# OPERATING INSTRUCTIONS

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# SLIDE HANDLING

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## Handling of Coverslipped Slides

### *Removal of Immersion Oil*

Immersion oil can be removed from a coverslipped slide by dipping the slide into xylene for a few seconds, draining, and wiping the slide dry with a soft, nonabrasive, low-lint cloth.

### *Cleaning the Coverslipped slides*

Fingerprints can be removed from the coverslipped slides using a soft, non-abrasive, low-lint cloth.

### *Writing on the Coverslipped Slides*

If you wish to mark a suspicious area on the slide, a permanent, soft-tipped marker can be used. Transparency markers work the best; however, many other permanent markers can also be used. To remove the markings, gently wipe the slide with a soft, nonabrasive cloth dampened with alcohol.

### *Removal of the Coverslipping Film*

The unique properties of the coverslipped film make it easy to remove the coverslipped film from the slide as compared to a glass coverslipped slide.

This section proposes three methods for removing the coverslipping film. It should be noted that removal of the coverslipping film is usually not required, and is an indication that the operating instructions found in the Operating Manual were not adhered to.

“Method A” is the most common method used to repair a film coverslipped slide.

“Method B” results in retaining the original piece of coverslipping film. This would be necessary if any specimen is possibly attached to the Film and not to the slide.

“Method C” is used to completely remove the coverslipping film. Removed coverslipping film cannot be reused. This method should be used if there are no specimens adhering to the film.

## Equipment and Reagents Needed

Coplin jars  
Acetone  
Absolute alcohol  
Xylene-reagent grade  
Forceps or teasing needle

**Method “A”** has been tested using cytology, histology, and hematology specimens. The film is removed with virtually no damage to the specimen and the slide can be retained and/or recoverslipped.

1. Place the coverslipped slide into a coplin jar filled with acetone. Allow it to remain in the jar for three to five minutes. Remove the slide and, using a pair of forceps or a teasing needle, lift the coverslipping film off of the slide. A thin layer of mounting medium will remain on the slide.

**NOTE:** After three minutes of exposure to the acetone, the film will still be attached to the slide and must be gently lifted off. This limits the direct exposure of the stained tissue to the acetone, reducing the amount of depolarization. This shorter time period should be used if the slide is just being recoverslipped. After about five minutes of exposure, the film falls off the slide by itself. However, the tissue is not in direct contact with the acetone, and the stain will fade. This is not a problem if the tissue is to be decolorized and restained.

2. Transfer the slide through three changes of absolute alcohol for 30 seconds each to remove the acetone residue. Follow with three changes of xylene for one minute each to remove the mounting medium.
3. If the slide is to be immediately recoverslipped, remove it from the last xylene bath and immediately process it on the Tissue-Tek Film Coverslipper. If the specimen is to be decolorized and restained, remove the slide from the last xylene bath and place it into a fourth change of absolute alcohol for 30 seconds. Decolorize and restain the specimen as desired.

**Method “B”** results in retaining the original piece of coverslipping film. This would be necessary if any specimen is possibly attached to the Film and not to the slide.

1. Immerse the slide in xylene for approximately one minute to reactivate the film resin.

# SLIDE HANDLING

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2. Place the slide on a flat surface. Gently press the Film surface with a paper towel for five to ten seconds to absorb excess xylene and to tease out any bubbles. (Do not work out a bubble using any sharp object, which would mar the surface of the Film.)

**Method "C":** removes and prevents the reuse of that piece of coverslipping film. This would be used to completely remove the coverslipping film. This method would also be utilized if a bubble near the edge or edge release is observed.

1. Place slide in acetone for 30 seconds to five minutes to loosen the film.
2. Immediately place slide in 50% xylene/50% acetone solution for 30 to 45 seconds.
3. Carefully peel the loosened coverslipping film from the slide surface. If film is difficult to remove, repeat steps 1 and 2.
4. Immediately place the slide in xylene for one minute and gently agitate.
5. Transfer the slide to a second xylene rinse for one minute to ensure complete removal of coverslipping resin.
6. Re-coverslip the specimen slide using recommended operating procedures.

## ***Storage of Coverslipped Slides***

This section identifies the need to:

1. Store slides front-to-back.
2. Have slides be in direct contact with each other.
3. Avoid separating slides or storing them flat in trays.
4. Avoid humidity greater than 50%.
5. Avoid temperatures greater than 77°F and less than 67°F.
6. Avoid long exposure to fluorescent light or sunlight.
7. Conduct annual, random examination of archived slides.

It is also noted that the real time stability data goes back to 1988. As of June 2013, this represents 25 years.

As stated initially, long term negative conditions need to be addressed at the time of initial coverslipping. Review staining procedures and address deviations from Sakura recommendations as immediately as possible. Technical support is also available at 800-725-8723, menu option "2".

As a reference, the CLIA guidelines for archived slides are as follows:

### **Cytology Slides**

Negative, unsatisfactory: 5 years  
Suspicious, positive: 5 years

### **Histology Slides:**




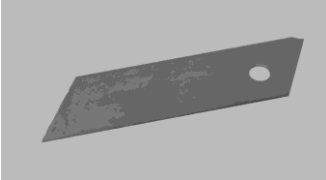

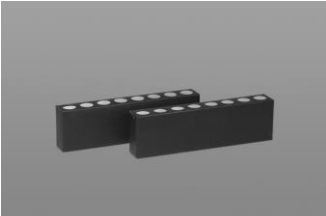
All stained slides: 10 years



# ACCESSORIES




## Standard Accessories

### Basic Unit

Product Code	Description	
4745	Xylene Bottle	
4746	Xylene Bottle Cap	
4748	Waste Bottle	
4749	Waste Bottle Cap	
4768	20-Slide Basket	
4770	Coverslipping Film	
4772	Cutter Blades	
6136	20-Slide Basket Adapter	
6160	Activated Carbon Filters	

## Optional Accessories

### Basic Unit

Product Code	Description	
6165	Duct Connection Adapter, 38mm dia.	
6166	Duct Connection Adapter, 75mm dia	
6508	Bar Code Reader (must be installed by Sakura Technical Support)	

# ACCESSORIES

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# CARE OF THE INSTRUMENT

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## General Maintenance

Keep the exterior of the Tissue-Tek® Film® Automated Coverslipper 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 a soft cloth.

## Daily Maintenance

Each day the internal components should be inspected and cleaned as needed. When cleaning or removing debris, it is necessary to turn the instrument power to the "O" Off position.

## Waste Bottle

The waste bottle should be emptied each day and at any time that it becomes full.

1. Open the film door.
2. Carefully remove the waste bottle from under the waste spout.
3. Empty the contents into an appropriate waste disposal container.
4. Clean the area under the waste bottle to remove any spilled xylene.
5. Replace the bottle under the waste spout.

## Periodic Maintenance

### Xylene Bottle

To ensure accurate dispense of solvent, the Xylene bottle should be refilled if a low solvent condition is detected. The bottle should be cleaned immediately and refilled with fresh Xylene if debris or cloudiness is apparent. If bubbles are detected in the solvent line, the line should be primed to remove all bubbles, since their presence would affect the dispense volume.

1. Open the film door.
2. Remove the xylene bottle from the platform.
3. Fill the bottle with xylene.
4. Purge the line to remove any air bubbles by using the Extended Priming procedure (see Section 4, Operating Instructions).

## Film Waste Tray

The film waste tray should be emptied and cleaned at least once each month.

1. Turn the thumbscrew on the receiver tray counter-clockwise until the screw is completely free of the instrument.
2. Remove the tray from the instrument by pulling it straight out. Empty the film scraps into an appropriate container, then wipe out the tray with a paper towel.
3. While the tray is removed, remove any resin dust from the rollers and blade assembly by carefully brushing with a small soft brush. If resin dust has accumulated and cannot be brushed away, moisten the brush with xylene and repeat. Unthread the film so that the plate to the left of the blade assembly can also be cleaned. Be sure the rollers are dry before reloading the film.
4. Replace the waste tray into the instrument as follows:  
Line up the screw in the tray with the hold in the instrument.

Slide the tray into its appropriate position under the rollers and blade assembly and tighten the thumbscrew to just past finger tight.

**NOTE:** When the waste tray is installed correctly, the left edge of the does not contact the surface of the rollers, and the right edge fits snugly into place around the corner of the lower film guide.

## Slide Baskets

After extensive use, excess resin/xylene residue may build up in the grooves of the slide basket, causing the slides to stick to the basket. This can potentially lead to two problems. Either the ejector arm is unable to dispense the slides onto the coverslipping staging area, or the slides will be unable to advance properly in the coverslipping process. In both cases, the instrument may continue to run; however, no slides will be coverslipped, nor will an alarm sound.

If the baskets show signs of residue accumulation, soaking them in xylene for several hours or overnight should clean them. Gentle agitation will increase the effectiveness of the soaking. This can be easily accomplished by placing the baskets in a large container filled with xylene.

# CARE OF THE INSTRUMENT

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Inspect the slide baskets for wear and evidence of stress weekly. The molded plastic material will wear with normal instrument operation and show signs of stress if heated to high temperatures during slide drying procedures. Discard and replace the stressed baskets immediately to prevent slide delivery and receiving malfunctions.

**CAUTION:** Placing slide baskets in a microwave oven, for any reason, is not recommended. Doing so may damage, disfigure, and shorten the life of the basket. Slide baskets that have been microwaved may cause operation problems when used with the Tissue-Tek Film Coverslipper.

## Activated Carbon Filters

It is recommended that the carbon filters be changed after two weeks of continuous use. Refer to Section 2, Installation, page 2.4, *Installing the Activated Carbon Filters*, for removal and replacement procedures.

## Cutter Blade

The cutter blade should be replaced after 10 rolls of film (approximately 10,000 slides) or if it becomes dull and can no longer cut the film efficiently. Refer to Section 2, Installation, page 2.6, *Installing the Cutter Blade*, for removal and replacement procedures.

## Film

It is recommended that if the instrument is to sit idle for an extended period of time, the instrument be powered down and the film rolled back onto the roll. This will prevent the film from taking on the curvature of the roller.

# TROUBLESHOOTING

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## General Information

The following section is divided into two sections to best explain how to recover from a situation that may occur during routine operation of the Tissue-Tek® Film® Automated Coverslipper. The first section, Messages, explains in detail, specific messages that may be displayed during routine operation. This section describes the message, status of the instrument and the action to be taken.

Lastly, the second section gives a detailed explanation of all error codes and how to recover from these potential errors.

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 the Sakura Finetek USA, Technical Support Department. If outside the USA, call the nearest Sakura representative.

## Power Failure

If the instrument suddenly loses power:

Determine if there is a general power failure

Check to see if the power cord is inserted correctly into the outlet and if there is power to the outlet.

Check the power switch to determine if it is turned to the "I" ON position.

# TROUBLESHOOTING

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## Messages

Various messages may be displayed if the instrument has operated erroneously or if necessary operational requirements have not been fulfilled. These messages are classified into two different types: descriptive messages and warning messages.

If the situation cannot be resolved by adhering to the appropriate actions described below, it will be necessary to contact the Sakura Finetek USA, Technical Support Department.

### *Descriptive Messages*

Message	Status	Action
Low Battery	Operation can be continued. If the backup battery is completely discharged, the coverslipping counter will return to "0" when the instrument power is turned off.	Contact Sakura for replacement of the backup battery.
Close the Cover	The cover has been left open	Close the cover. The instrument will continue operation.
Close the loading door.	The loading door has been left open.	Close the loading door. The instrument will continue operation.
Close the door.	The film door has been left open.	Close the door, and press the [START] key to resume operation. Should this door be opened while coverslipping is conducted, emergency stop of the system will take place. If this happens, operation cannot be resumed until all slides and baskets that are being processed have been removed.
Remove the slide Cut the film Close the door	The Film door is kept open when resuming film replacement.	Close the door, perform film feeding, and then press the [START] key to resume operation.
Air bubbles in solvent tubing	Air bubbles are detected in the priming tube.	Press the [PRIME] key to dispense the priming level. When a series of operations has been completed, the system will move to the standby screen, allowing the user to resume operation.
Return to Standby	When a signal of basket delivery is received from the stainer under a specific screen of coverslipper if a stainer is linked with the system.	Press the [EXIT] key and take necessary steps.
Link Error	A problem has been detected in the stainer or coverslipper when a basket is transferred from the stainer to the coverslipper. Only if stainer is linked to the system.	The coverslipper will conduct origin return, and the system will try to resume operation.
Replace Film	The minimum amount of remaining film is detected.	Replace the film. When the film is replaced the screen will automatically move to the resume screen.
Film Empty Install film	The film replacement has not been detected after film replacement screen.	Reinstall the film. When the film is replaced the screen will automatically move to the resume screen.
Press [FILM] to feed and cut the film before restart	The system has detected completion of film replacement.	Press the [START] key and operation will be resumed.
Remove the slide Cut the film	If the [ENTER] key is pressed (for resuming operation) on the screen when motor error is detected.	Follow the given messages, and press the [START] key to resume operation.
Install loading container	The loading drawer has not been placed into the loading station.	Set the loading drawer. After it is placed, close the loading station door; operation will automatically start.
Remove Basket	The storage section is full of coverslipped baskets.	Remove baskets and close the cover. This will automatically resume operation.

Message	Status	Action
Solvent low	The xylene is running low for coverslipping.	When the bottle is refilled with xylene, use the [PRIME] key to confirm priming, and after completion, press the [START] key to resume operation.
Install unloading Carousel	The 12-basket unloading unit has not been set when coverslipping is started.	Set the 12-basket unloading unit and close the cover, operation will be automatically resumed.
Power Outage Check system	A power failure has been detected or power supply is cut during operation.	If this message appears, remove all baskets and slides in the coverslipping area and start procedures from the beginning.
Remove the basket Cut the film	The [STOP] key is pressed (for complete stop of coverslipping) on the screen when motor error is detected.	Follow the given messages, and press the [ENTER] key to initialize the system.
Restart?	When a motor error is detected	To completely stop operation, press the [STOP] key. Or to resume operation, press the [START] key, and then follow the screen messages to take necessary steps.
Remove the cover of the loading container	The coverslipping has been started with the loading drawer lid on.	Remove the lid, and operation will start when the loading station door is closed.
Check basket Orientation	The robotic arm failed picking up a basket because baskets were improperly placed in the loading drawer or facing the wrong direction. The message will be given when the arm and the loading station have returned to the home position.	Properly orient baskets and replace them into the loading drawer. The operation will resume when the loading station door is closed. Refer to page 3.5, <b>Coverslipping</b> , paragraph 3.
Fan failure	A fault (stop) of fume control system fan is detected. The system continues operation.	Press the [EXIT] key and the screen will disappear. If this Warning continues, contact Sakura Technical support.

# TROUBLESHOOTING

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## 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 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.

Error code	Error message	Recovery Procedure
E1-E6	Motor Error (Basket Lifted)	Motor Missed a step while returning to the home position.  Press the <b>STOP</b> key. The robotic arm should return to the home position after the error recovery. If the error cannot be recovered, please contact Sakura Technical Support Department for assistance.  Remove and reseal 12-position unloading unit, check for obstructions.
	Motor Error (Ejector)	
	Motor Error (Arm)	
	Motor Error (Loading X)	
	Motor Error (Loading Y)	
	Motor Error (Storage)	
E14-E19	Motor Error (Basket Lifted)	Motor missed a step during normal operation.  Press the <b>STOP</b> key. The robotic arm should return to the home position after the error recovery. If the error cannot be recovered, please contact Sakura Technical Support Department for assistance.  Remove and reseal 12-position unloading unit, check for obstructions.
	Motor Error (Ejector)	
	Motor Error (Arm)	
	Motor Error (Loading X)	
	Motor Error (Loading Y)	
	Motor Error (Storage)	
E19	Motor Error (Storage)	The 12-position unload station is not at the correct position when trying to store a basket.  Check to make sure that there is not anything preventing the unload station from turning. Close the cover, and unload station will return to the home position. If it returns to home position, it will resume (continue) operation. If the error cannot be recovered, please contact Sakura Technical Support Department for assistance.
	Open cover and check	
E24	Memory Error Shut off power Contact Sakura Technical Support Dept. for Assistance.	Error issues detected while writing/reading through memory.  Failure of internal EPROM. Operation cannot be restarted. Contact Sakura Technical Support Dept. immediately.
E25	Pump Error Shut off power Contact Sakura Technical Support Dept. for Assistance.	Pump circuit failure.  Failure of pump that pumps out solvent (xylene). Operation cannot be restarted. Contact Sakura Technical Support Dept. immediately.



# SERVICE AND REPLACEMENT PARTS

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## Service Information

### *When a Problem Occurs*

When a problem occurs during operation of the Tissue-Tek® Film® Automated Film Coverslipper, refer to Section 7, *Troubleshooting*, to determine the most likely cause of the malfunction and to obtain recommended corrective actions. (Avoid problems by carefully following the proper operation and maintenance procedures described in this manual). If the problem cannot be solved and an instrument failure is apparent, our Technical Support Department is available to assist you.

Before calling for instrument service, please have **model number, installation date, and warranty period** ready for our Technical Support Department Representative. For your convenience and reference, record this information in the blanks below.

Film Coverslipper Model Number \_\_\_\_\_

Film Coverslipper Serial Number \_\_\_\_\_

Installation Date \_\_\_\_\_

Warranty Period \_\_\_\_\_

### *Where to Call for Service*

If located within the United States, contact the Technical Support Department of Sakura Finetek U.S.A., Inc. by calling toll free:

(800) 725-8723 - Menu Option 2

In countries other than the United States, contact the nearest authorized Sakura instrument distributor or representative for service information and assistance.

## Replacement Accessory Items

For All Models

Product Number	Description
6136	20-Slide Basket Adapter
4745	Xylene Bottle, 500 ml
4746	Xylene Bottle Cap
4748	Waste Bottle, 200 ml
4749	Waste Bottle Cap
4768	20-Slide Basket
4770	Tissue-Tek Coverslipping Film
4772	Cutter Blades
6160	Activated Carbon Filters

## Optional Accessory Items

For All Models

Product Number	Description
6134	Link System
6165	Duct Connection Adapter, 38 mm
6166	Duct Connection Adapter, 75 mm
6508	Bar Code Reader *

**Must be installed by Sakura Technical Support**

# **SERVICE AND REPLACEMENT PARTS**

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# BAR CODE READER

## Introduction

### Safety Precautions

**WARNING: DO NOT VIEW LED LIGHT DIRECTLY WITH OPTICAL INSTRUMENTS CLASS 1 LED PRODUCT**

LED Output: .564 mW. Wavelength: 470 nm; 525 nm; 617 nm.

IEC 60825-1:1993+A1:1997+A2:2001

## General Description

Tissue-Tek® Film® Automated Film Coverslipper with Barcode Reader is intended to automatically read bar codes imprinted upon microscope slides to be coverslipped by Film and output the data electronically.

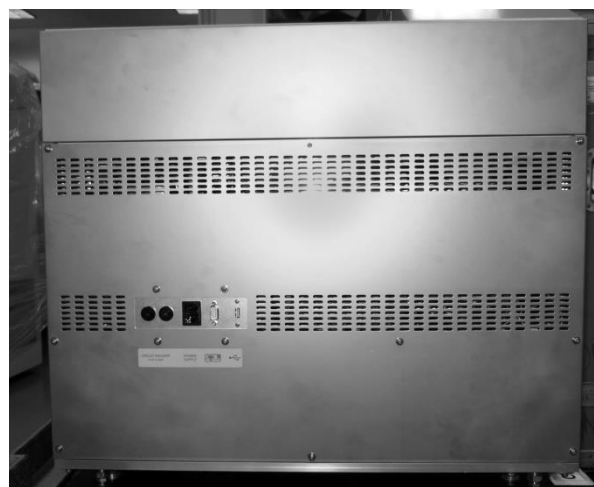
This unit includes a Quadrus Mini Velocity Bar Code Reader installed in the slide coverslipping area. This bar code reader will automatically scan slides with bar codes and outputs the data via a USB output: See picture below:



Data is output in ASCII format via USB. Consult with your IT department on methods of utilizing the data output from the bar code reader and for connection to information systems.. Reading of bar codes occurs automatically.

## Physical Characteristics

The Tissue-Tek Film Automated Film Coverslipper with Barcode Reader 4743 has the USB output on the back of the unit. The other outputs are not for bar code data delivery (operating manual page 2.9) See Picture below:



## Specifications

Default Scan Speed:  
1 second per slide

### Electrical:

Power: 4 Watts (max.) 5VDC +/- 5%,  
200 mV p-p max. ripple, 530  
mA @ 5VDC (typ.)

Optional Int: 10-28V Accy

LED: Class 1 Product

### Environmental:

Enclosure: IP54, category 2

Operating Temperature: 0° to 50°C (32° to 122°F)

Storage Temperature: -50° to 75° C (-58 to 167°F)

Humidity: up to 90% (non-condensing)

### Physical:

Height: 1" (25.4 mm)

Width: 1.8" (45.7 mm)

Depth: 2.10" (53.3 mm)

# BAR CODE READER

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Weight: 2 oz. (57 g)

**Types of Barcode Symbolologies that can be read:**

- A. *Linear (1D) barcodes*  
Code 39, Code128/EAN128, BC412, Interleaved 2 of 5, Code93, Codabar, UPC/EAN, Postal Symbolologies, GS1 DataBar (RSS)
- B. *2D barcodes*  
Data Matrix (ECCO-200), Aztec Code, QR Code, Micro QR Code, PDF417, Micro PDF417 *Stacked Symbolologies PDF417, MicroPDF417, GS1 DataBar (RSS) (Composite and Stacked)*
- C. *Composite symbols*  
Combinations of 1D barcodes (EAN-128, UPC-A, EAN-13, EAN-8, UPC-E, GS1 DataBar (RSS)) and 2D barcodes (PDF417, Micro PDF417)

**Connector:**

USB type A connector - included. High Density 15-pin D-Sub socket connector supported. 0006958-01 Rev.A

**Communications Protocols:**

Standard Interfaces:  
USB (installed), RS-232, RS-422 Data Output: ASCII

**Indicators**

LEDs:	Read Performance, Power, Status
Read	
Green Flash:	Good Read
Blue Target Pattern:	Symbol locator
Beeper:	Good Read, match/mismatch, Read, serial command confirmation, on/off
No	

**Read Parameters**

Pitch:	±30° Skew: ±30° Tilt: 360°
Decode Rate:	Up to 4 decodes per second
Focal Range:	2 to 6" (50.8 to 152.4 mm) (autofocus)

**Other Specs**

*Light Source:*

Type:  
High-output LEDs. Light Collection Options Progressive scan, square pixel; Software adjustable shutter speed, electronic shutter.

General Immunity for Light Industry:  
EN 55024:1998+A1:2001+A2:2003

Radiated and Conducted Emissions of ITE Equipment:  
EN 55022:1998+A1:2000+A2:2003  
for Class A products

Maximum LED output:  
.564 mW.

Wavelength:  
470 nm; 525 nm; 617 nm

WVGA:  
752 x 480 pixels

## Statement of Agency Compliance

The Quadrus MINI Velocity has been tested for compliance with FCC (Federal Communications Commission) regulations and has been found to conform to all applicable FCC rules and regulations.

To comply with FCC RF exposure compliance requirements, this device must not be co-located or operate in conjunction with any other antenna or transmitter.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The Quadrus MINI Velocity has been tested for compliance with CE (Conformité Européenne) standards and guidelines, and has been found to conform to applicable CE standards, specifically the EMC requirements EN 55024:1998+A1:2001+A2:2003, ESD EN 61000-4-2, Radiated RF Immunity EN 61000-4-3, ENV 50204, EFT EN 61000-4-4, Conducted RF Immunity EN 61000-4-6, EN 55022:1998+A1:2000+A2:2003 for Class A products, Class B Radiated Emissions, and Class B Conducted Emissions.

The Quadrus MINI Velocity has been tested by an independent electromagnetic compatibility laboratory in accordance with the applicable specifications and instructions..

## Installation

The bar code reader is installed and calibrated at Sakura Finetek USA, Inc. Labs that purchase the 4740 version may add a bar code reader at a later time. This unit, part #6508, must be installed by a Sakura Service professional.

## Customization of Settings

The Tissue-Tek Film Automated Film Coverslipper with Barcode Reader is pre-calibrated and pre-installed.

## Operating Instructions

The Tissue-Tek Film Automated Coverslipper with bar code reader option follows the same instructions as the original version with the following additions pertaining to the bar code reader. The bar code reader turns on automatically with the Film Coverslipper and turns off when the power Film Coverslipper power is turned off. If a bar code does not read, please check the bar code for low toner, light printing, or damaged bar codes. Otherwise call Sakura Technical support.

## Troubleshooting

If the unit no longer reads bar codes, please contact Sakura Service.

## Care of Instrument

### Cleaning:

The Quadrus MINI Velocity has a hard-coated window that should only be cleaned with alcohol (100% isopropyl).