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A Division of General Data Healthcare

*Histology Innovation for a NEW Generation*

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SC2500

**Operator's Manual**

# SHURCut™ 2500 Microtome

## Semi-Automated Rotary Microtome

**Catalog #**
**SC2500**

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## User Resources and Customer Support

Contact your TBS representative for customer support. For the latest information on TBS products and services, please visit the TBS website at: www.trianglebiomedical.com.

## Scope

This document contains basic information on the use and operation of a SHUR**Cut**™ 2500 Microtome and assumes you have received basic training on the instrument. Please contact your TBS representative for information not provided in this manual.

## Intended Use

The SHUR**Cut**™ 2500 Microtome is designed to section embedded specimens with up to .5 micron precision to provide best possible samples in the field of histology.

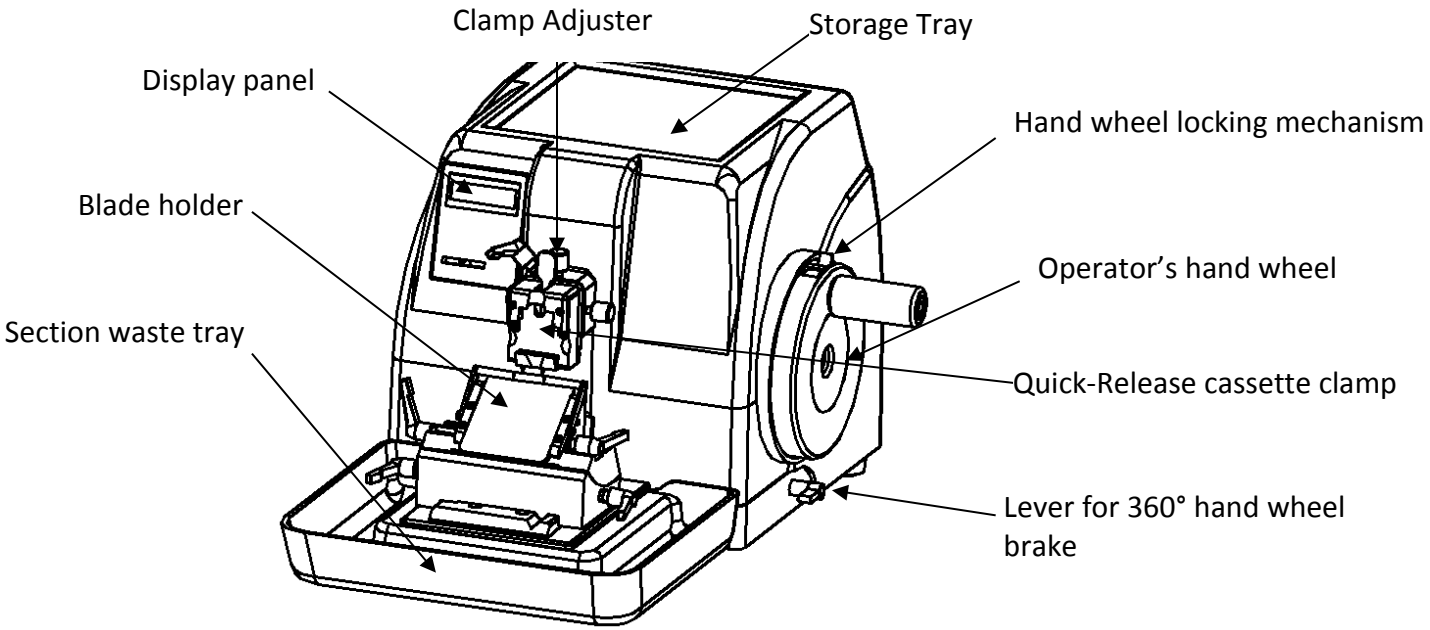
## Installation Procedure

The SHUR**Cut**™ 2500 must be installed, and instrument performance is to be verified, at the customer site by trained TBS representatives.

## Disclaimers

This manual is not a substitute for the detailed operator training provided by TBS, or for other advanced instruction. A TBS representative should be contacted immediately for assistance in the event of any instrument malfunction.

# Operator Controls and Components



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# Declaration of Conformity

Konformitätserklärung
Déclaration de conformité
Declaración de Confomidad
Verklaring de overeenstemming
Dichiarazione di conformità

We/Wir/ Nous/WIJ/Noi

**TBS-A Division of General Data Healthcare.**

Declare under our sole responsibility that the product,
erklären, in alleniniger Verantwortung,daß dieses Produkt,
déclarons sous notre seule responsabilité que le produit,
declaramos, bajo nuestra sola responsabilidad, que el producto,
verklaren onder onze verantwoordelijkheid, dat het product,
dichiariamo sotto nostra unica responsabilità, che il prodotto,

SHUR**Cut™** 2500 **Semi-Automated Rotary Microtome**

to which this declaration relates is in conformity with the following standard(s) or other normative documents.
auf das sich diese Erklärung bezieht, mit der/den folgenden Norm(en) oder Richtlinie(n) übereinstimmt.
auquel se réfère cette déclaration est conforme à la (aux) norme(s) ou au(x) document(s) normatif(s).
al que se refiere esta declaración es conforme a la(s) norma(s) u otro(s) documento(s) normativo(s).
waarnaar deze verklaring verwijst, aan de volende norm(en) of richtlijn(en) beantwoordt.
a cui si riferisce questa dichiarazione è conforme alla/e seguente/i norma/o documento/i normativo/i

# Instrument Compliance

TBS-A Division of General Data Healthcare hereby declares the equipment specified conforms to the Classification(s), Directive(s) and Standard(s) set forth in this document.

**Certifications: CE, TUV**

EMC Emissions

FCC 47 CFR Part 2, Part 15 CISPR PUB.22 (USA)

EMC Immunity:

EN 55011:2007: (Class B), EN 61000-3-2:2006/A2:2009, EN 61000-3-3:2008, EN 61326-1:2006
IEC 61000-4-2:2008, IEC 61000-4-3:2010, IEC 61000-4-4:2010, IEC 61000-4-5:2005, IEC 61000-4-6:2008
IEC 61000-4-8:2009, IEC 61000-4-11:2004

EN 61010-1: (Third Edition) :2001, EN61010-1:2010

# Section1 | Safety Instruction

## Summary

This instrument was built and tested in accordance with the safety regulations as specified below:

Gb9706.1-1995 medical electricity equipment

| | |
|---|---|
|  | **Note:** Safety instruction labels on the instrument must be kept in the original place to avoid an accident, personal injury, or damage to the instrument. |

## Safety Notes

The following instructions are regarding the transport, installation, regulation, operation and maintenance of the instrument which must be read and complied with.

### Warnings-Transport and Installation

| | |
|---|---|
|  | The instrument may only be transported in an upright position. |
|  | Never lift the instrument by the hand wheel or the cassette clamp. Always remove the section waste tray and blade holder before transporting the instrument. |
|  | Check to make sure that the voltage available at your facility complies with the requirements of this unit. |
|  | Connect the unit using the power cable provided. It is critical to connect to a grounded socket. |
|  | Do not operate in rooms with explosion hazards. |
|  | Do not tamper with the safety devices of the unit. |

### Warnings-Working with the Instrument

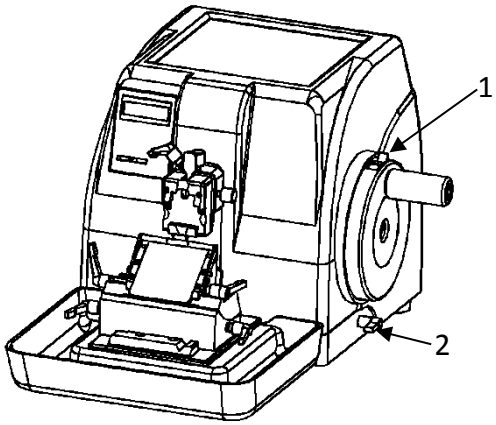
| | |
|---|---|
|  | Take great care in handling microtome blades. The cutting edge is extremely sharp and can cause serious injury. |
|  | Always remove the blade and put in a safe location before detaching the blade holder from the unit. |
|  | Always clamp the specimen block before inserting or clamping the blade. |
|  | Always keep the hand wheel locked when handling the blade or specimen on the unit. Cover the cutting edge with the blade guard. |

| | |
|---|---|
| | Place the blade guard over the blade when sectioning. |
| | Make sure that liquids do not enter the interior of the instrument. |

### 1.2.3 Warnings-Cleaning and Maintenance

| | |
|---|---|
| | Only authorized and qualified service personnel may access the internal components of the instrument for service and repair. |
| | Before each cleaning, switch the unit off, disconnect the power plug, and remove the blade holder completely and clean it separately. |
| | Lock the hand wheel before each cleaning. |
| | Do not use any solvents containing acetone or xylene for cleaning. |
| | Make sure that liquids do not enter the interior of the instrument when cleaning. |
| | Let the unit dry completely before powering up again. |
| | Turn the unit off and disconnect the power plug before replacing fuses. Only use fuses of the same specification and replace them as described in the manual. |

## Safety Devices

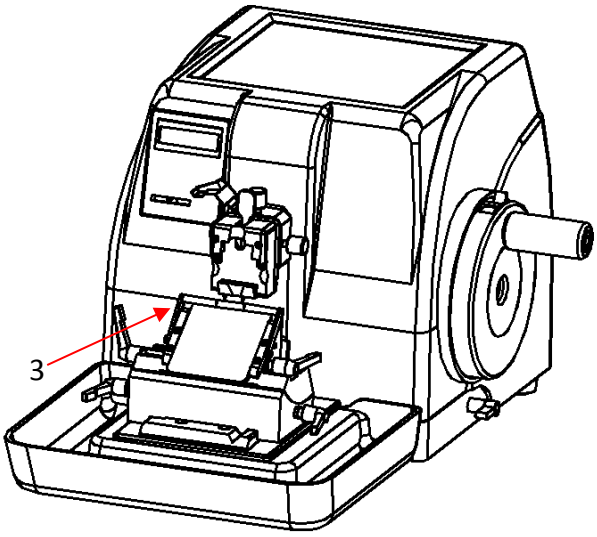



**Handwheel Locking Mechanism**

*There are two handwheel locking mechanisms.*

- **Locking mechanism** indicated by (1) on the diagram can be engaged by flipping the corresponding switch and rotating the hand wheel to the upper most position where it will lock into position.
- **Locking mechanism** indicated by (2) on the diagram can be engaged in any position of the handwheel by rotating the handle 180° clockwise. To unlock, rotate 180° counter clockwise.

| | |
|---|---|
| | Do not lock the handwheel (1) when the handwheel is rotating as it will damage the unit. |
| | Whenever cleaning the unit, changing the specimen, or changing the blade, make sure the handwheel is locked with either mechanism (1) or (2). |




**Blade guard**

- Position the **blade guard** (3) over the blade when **not** operating the unit to avoid personal injury and prevent damaging the blade edge.
- The **blade guard**（3）in Fig is shown in the up position where it protects the blade.

# Section 2 | Specifications

## Technical Data

| SC2500 | |
|---|---|
| Item: | Description: |
| Dimensions | Length: 21.6 in (55 cm)<br>Width: 16.5 in (42 cm)<br>Height: 12.6 in (32 cm) |
| Weight: | 92 lbs. (42 kg) |
| Environment requirements: | Working temperature：+10℃—40℃<br>Working humidity: <80%<br>Working pressure:（86～106）kpa |
| Power Supply: | 110/220 v ac±10 % |
| Frequency: | 50/60 Hz |
| Fuse: | 1.5 Amps |
| Safety Classification: | I - Type b |
| Blade Profile | Low Profile Blade – Recommended, DMB-LP SHUR/Sharp™ Disposable Microtome Blade, Low Profile, Teflon Coated; (0.012” x 0.312” x 3” |
| Trimming/Section Thickness: | 0.5 to 600µm<br>0.5 to 2µm - 0.5µm increments<br>2 to 10µm - 1µm increment<br>10 to 20µm - 2µm increments<br>20 to 100µm - 5µm increments<br>100 to 600µm - 50µm increments |

| SC2500 *(cont.)* | |
|---|---|
| Item | Description |
| Retraction thickness: | 20µm |
| Specimen horizontal feed: | 20mm |
| Specimen vertical feed: | 70mm |
| Maximum specimen size: | 40mm x 50mm x 30mm or standard cassette size |
| Specimen holder adjustment system: | Horizontal orientation: ±8°<br>Vertical orientation： ±8° |
| Left/Right Blade holder adjustment: | 50mm |

# Section 3 | Preparation

## Installation Site Requirements

| | |
|---|---|
|  | Place the unit on a well-supported table. Ensure the table is sitting level. |
|  | Ensure that the operating temperature and humidity is according to spec. |
|  | Ensure that there is nothing obstructing the handwheel operation. |

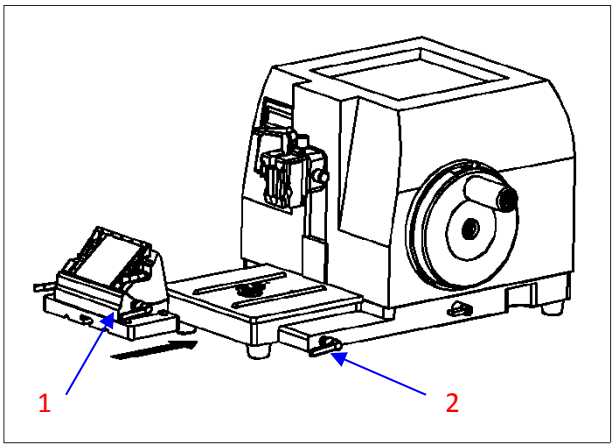
### Standard Accessory List

| Part: | Quantity: |
|---|---|
| Microtome | 1 |
| Blade holder | 1 |
| Quick Release Clamp for Standard Cassette | 1 |
| Waste Tray | 1 |
| M3 Wrench | 1 |
| M4 Wrench | 1 |
| Disposable Blades | 1 |
| Fuse | 2 |
| Operation Manual | 1 |

# Installation

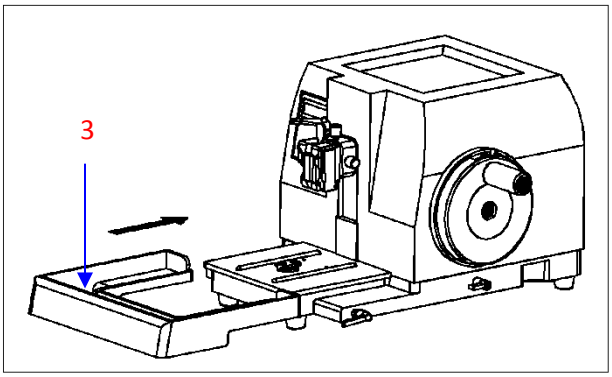
## Blade Holder

Remove the **blade holder** (1) from the box, and push it along the track as it is showed in the picture, and then rotate the blade holder **locking lever** (2) to lock the blade holder.




## Waste Tray

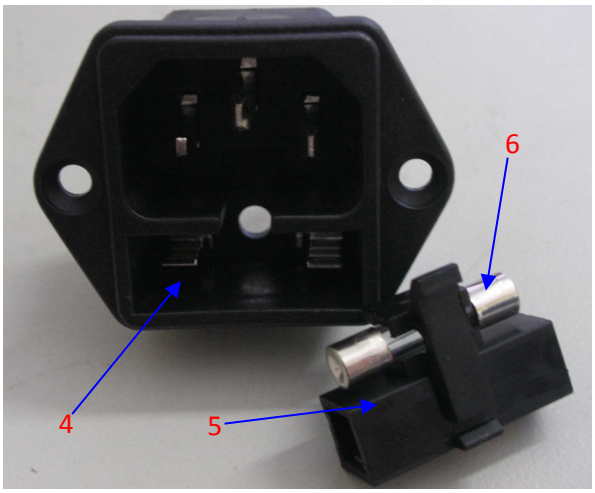
Remove the **waste tray** (3) out from the box and push it along the track as it is showed in the picture.



## Electrical Connection

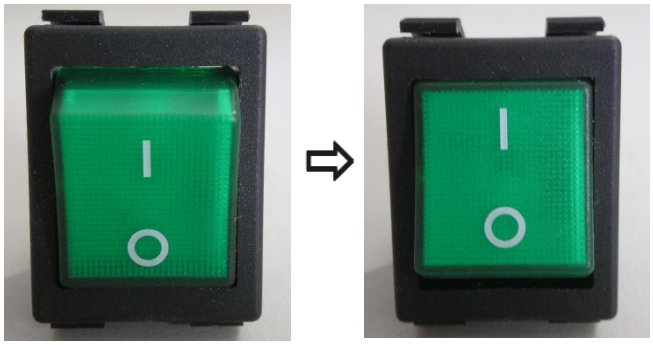
| | |
|---|---|
| ⚠ | Check to make sure that the voltage available at your facility complies with the requirements of this unit. |
| | Connect the unit using the power cable provided. It is critical to connect to a grounded socket. |
| | Before changing a fuse, make sure to disconnect power from the unit. |

1. Insert the fuse (6) into the **fuse socket** (5) as it is showed in the picture and the insert the whole fuse socket into the **socket** (4).




2. Energize the equipment with the switch at the rear right side. The instrument should initialize.

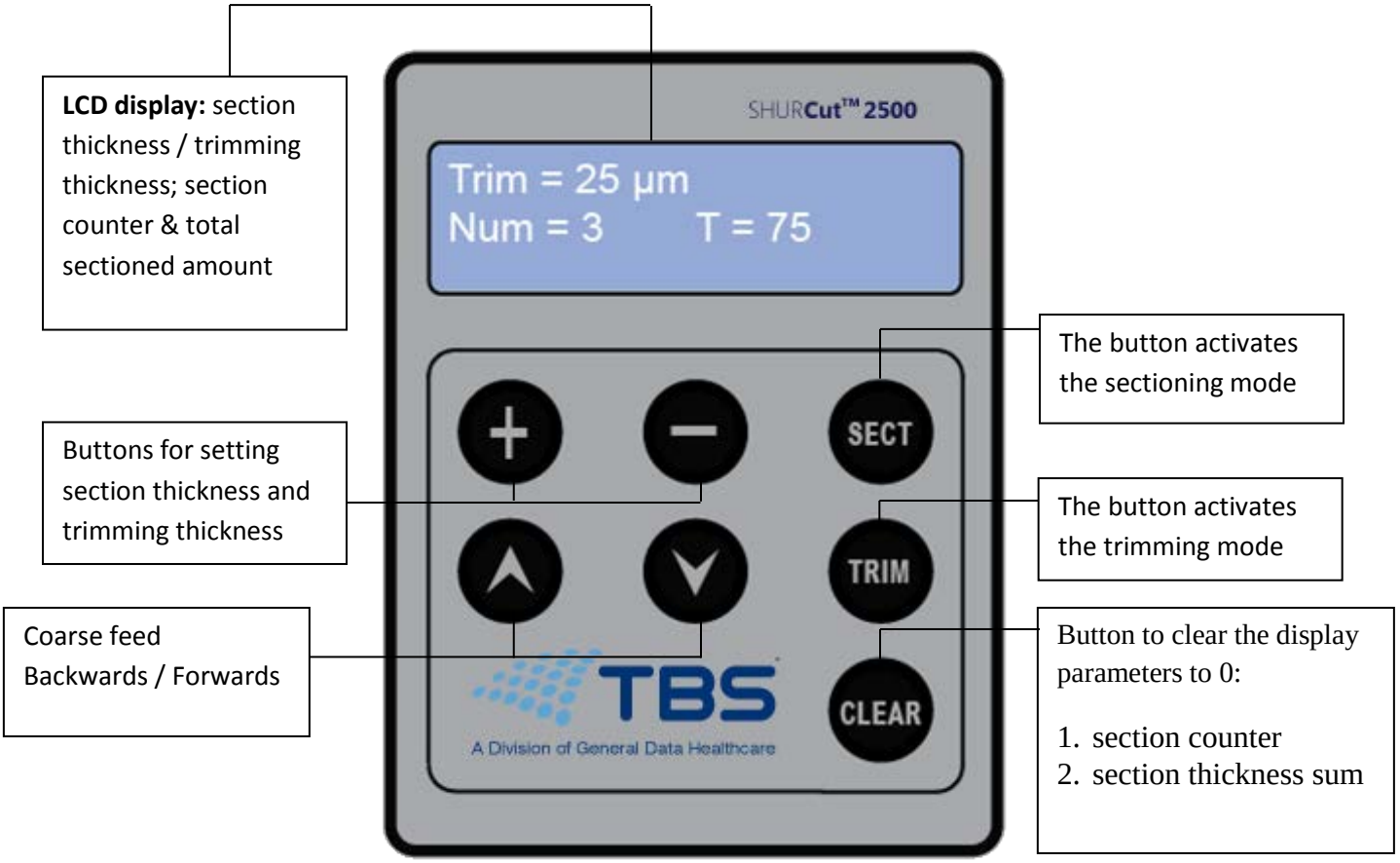
3. After the microtome is energized, the display field in the control panel will illuminate. The specimen holder will automatically retract back to zero. This is followed by a beep.

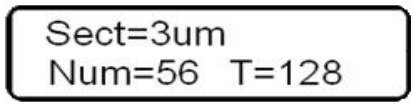


# Section 4 | Operation

## Control Panel and Its Features

All the parameters are set and displayed via the control panel. After being energized, use the control panel to operate the instrument, the following is a diagram explaining the functions of the control panel.




### Display Panel

- The value in the first line of the display window is the set sectioning or trimming thickness.
  The value in the second line of the display window is the section or trim counter and section or trim thickness sum (total advance).
- The system is in trimming mode after energize the instrument.


**SECT Button**

- SECT button activates the sectioning mode. The first line on the display will show [SECT=]. Used to adjust section thickness

**TRIM Button**

- TRIM button activates the trimming mode. The first line on the display will show TRIM=. Used for setting the TRIM thickness
- When the unit is powered on, it will display the last set value for the section or trimming mode.

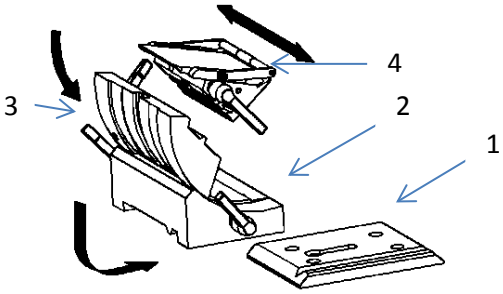

- Pressing the CLEAR button will clear the section / trimming counter and the thickness sum (total advance).When the instrument is energized, the value of the section counter and section thickness sum will automatically go back to zero.|

- Press the + (plus) button or – (minus) button to set the section or trim value.

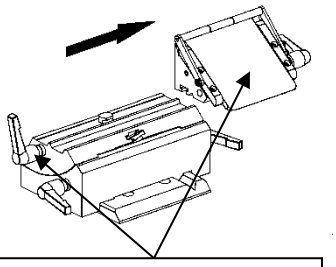
  **Adjusting range:** 0.5 to 600µm
  0.5 to 2µm, 0.5µm increments
  2 to 10µm, 1µm increment
  10 to 20µm, 2µm increments
  20 to 100µm, 5µm increments
  100 to 600µm, 50µm increments

- The arrow buttons control the forward and backward direction of the arm that holds the specimen. The advance and retract speed is 750µm/s.
- The max forward and backward distance is 20mm. If the maximum distance is exceeded, the specimen holder will stop moving and an alarm will sound.

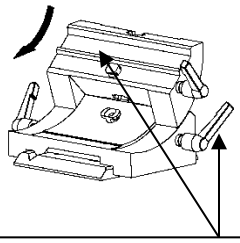
## Blade Holder



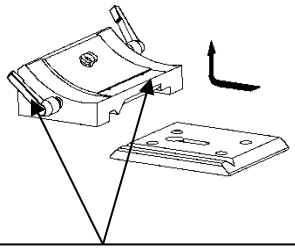

- The blade holder consists of the **blade holder base** (2), **X-axis slider** (3), and the **blade holder clamp** (4).
- The whole assembly sits on the **base plate** (1) attached to the microtome.
- The **X-axis slider** (3) allows for 10 degrees of adjustment of the blade with respect to the specimen.
- The pictures below explains which component each **lever** locks.



The lever on the left operates the blade holder clamp.



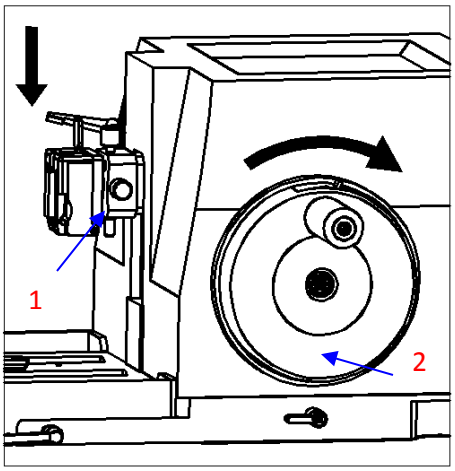
The lever on the right operates the X axis slider clamp.



The lever on the left operates the Y axis slider clamp.

| | |
|---|---|
| ⚠ | Always remove the blade first before detaching any of the components of the blade holder assembly. |
| | Always make sure that all 4 levers on the blade holder are tight before using the microtome to avoid potentially ruining a specimen sample. |

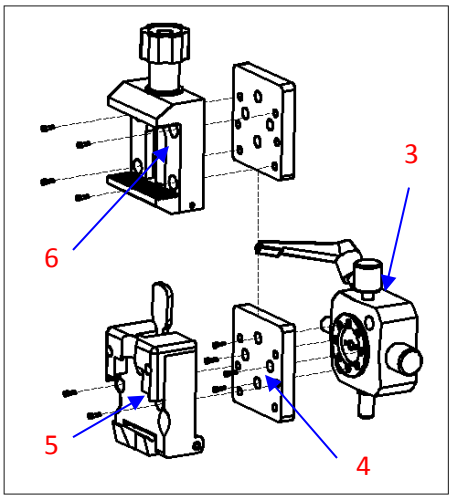
## Specimen Clamping System



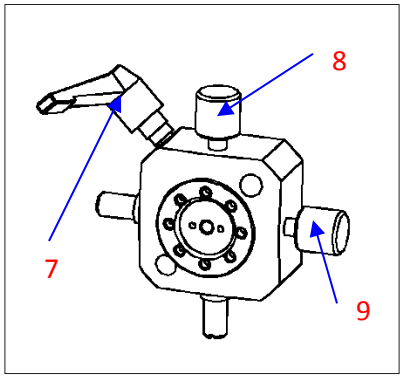

- To actuate the **specimen holding arm** (1), rotate the **handwheel** (2) clockwise.

- The specimen clamping system comes with two separate clamps:
  - **Quick Release Clamp (5):**
    Dimension of Specimen:
    40mm x 50mm x 30mm or the standard cassette size.

  - **C-Type Clamp (6) (Optional Accessory):**
    Dimension of Specimen:
    Accepts standard cassette size as well as any specimen carrier that is less than 40mm in length/width. The clamp will also accept carriers as small as 12mm in length/width.

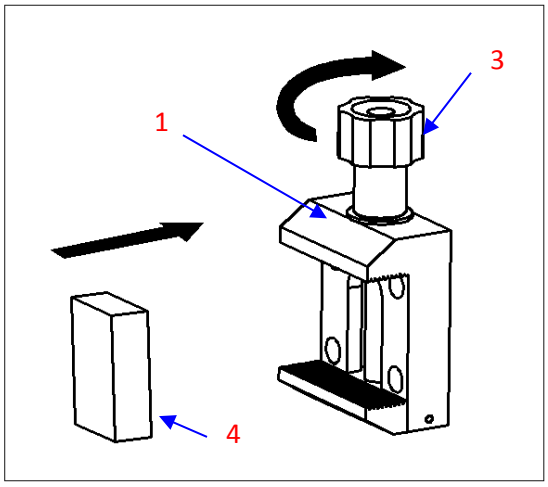



- The **clamps** (5 or 6) attach to a **connector** (4) which attaches itself to the **adjuster** (3).
- To attach a clamp, first attach the **connector** (4) to the **adjuster** (3) using four screws. Then attach either the **Quick Release Clamp** using two screws or the **C-Type Clamp** using four screws.



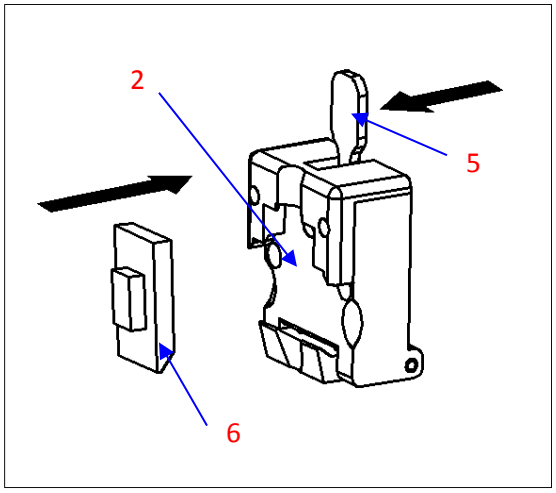

- The specimen clamp adjustor allows for the specimen to be swiveled in the horizontal and vertical direction:
  - Horizontal orientation: ± 8°
  - Vertical orientation: ±8°
- To make an adjustment, first loosen the **lever** (7). Next, you are able to either adjust the vertical orientation using the **knob** on top (8) or the horizontal orientation using the **knob** of the right side (9). After the adjustments are made, retighten the **lever** (7).

## Clamping the Specimen and Blade Installation



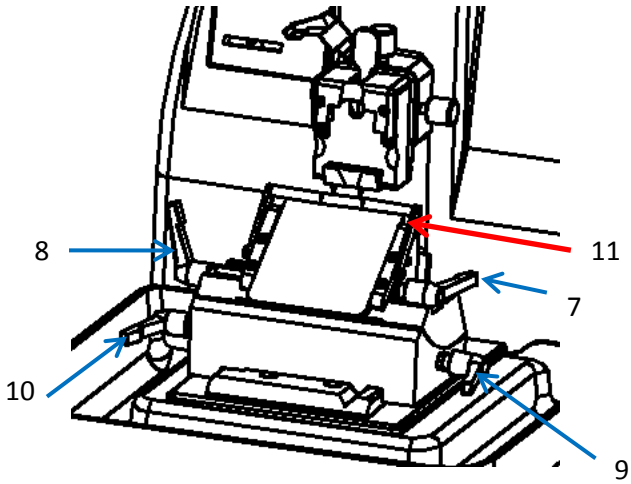

**Clamping the specimen:**

- Using the C-Type Specimen Clamp:
  - Put the **specimen** (4) into the **clamp** (1) as is shown in the picture. Then rotate the **nut** (3) clockwise to tighten the clamp. To remove the specimen, rotate the nut counterclockwise.




- Using the Quick Release Clamp:
  - Pull the **clamp handle** (5) in the direction showed in the picture. The clamp will open. You can now insert the **specimen** (6) into the clamp (2). Release the **handle** (5), the specimen will be clamped automatically. To remove the specimen, repeat the same operation.

| | |
|---|---|
| ⚠ | Always clamp the specimen first before installing the blade to avoid injury. |




**Installing the blade:**

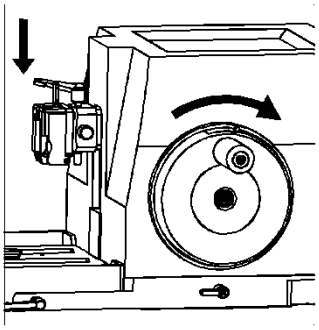
- Before installing the **blade** in the **blade holder clamp**, make sure that the **blade holder base** is secured (9). Then, choose the angle of the X-Axis slider and secure it using **lever** (10). Choose the lateral location of the **blade holder clamp** and secure it using **lever** (8). Finally, place the **blade** in the **blade holder clamp** as shown by the red arrow (11) and secure it using **lever** (7).

## Activating Trimming


- To activate the trimming mode, press the  button. The screen will display the set parameters of trimming.

- To set the trim thickness, press the  button. The screen will display the trim thickness value.

- Press the directional  buttons to adjust the specimen forward and back to ensure the specimen is lined up with the cutting edge.



- Finally, make sure the levers that secure the blade holder are all tightened. The unit is now ready to section. Unlock the handwheel and begin to rotate it clockwise to section.

## Activate Sectioning


- To activate the SECT mode, press the  button and the instrument goes into sectioning mode, and the screen will display the set parameters of sectioning.

- Press the  buttons to set the sectioning thickness value.

- To obtain optimum quality sections, the following factors need to be taken into consideration:
    a. The hardness of the specimen
    b. The angle of the cutting blade
    c. The blade is clamped tightly
    d. The specimen is clamped tightly.
- To obtain a quality section, first adjust the proper angle of the cutting blade and the specimen:
    a. The smaller the angle, the less the section will be compressed.
    b. The harder the specimen, the larger the angle will be needed.
    c. If the section is not good, try increasing the angle from zero.

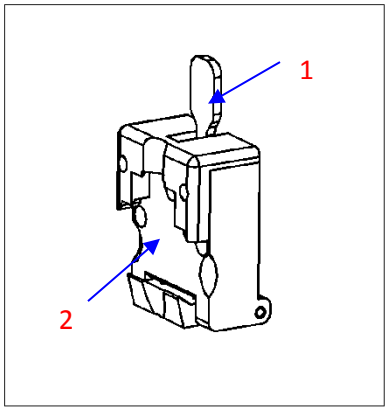
| | |
|---|---|
|  | When finished sectioning, turn the handwheel until the specimen is in the upper most position, lock the handwheel, remove and safely dispose of the blade. |

# Section 5 | Cleaning and Maintenance

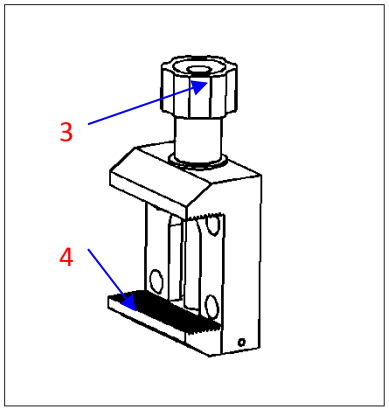
- **Cleaning the Unit:**
  Use a damp cloth to clean the areas that are always touched when operating the instrument. For example, the handle and the base holder locking lever and the storage area on the housing can be cleaned with a damp cloth. Use a dry cloth to clean the other sections.

- TBS offers PARA**Gard™ Paraffin Repellent** for cleaning the SHUR**Cut™** 2500 Microtome. Please contact your TBS representative for more information.

## Cleaning the Clamp

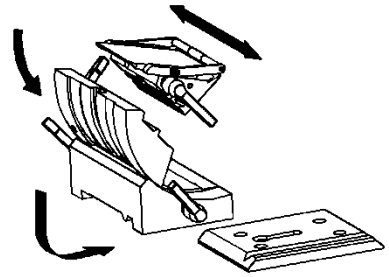



- Quick Release Cassette Clamp
  - Position (1) which is often touched when operating, and position (2) which is in contact with the specimens, need to be cleaned frequently to ensure there is no contamination.




- C-Type Specimen Clamp
  - Position (3) which is often touched when operating and position (4) which is in contact with the specimens need to be cleaned frequently to ensure there is no contamination.

## Cleaning the Blade Holder:



- Remove all the parts of the knife holder as it is showed in the picture and then clean all the parts separately. Remember to clean the blade clamp every time before installing the blade to ensure good sectioning and no cross contamination.

To obtain a high quality section, it is important to keep the instrument clean. The user must clean the instrument regularly according to recommendations of the manual to consistently obtain the best sectioning quality.

| | |
|---|---|
|  | Only authorized and qualified service personnel may access the internal components of the instrument for cleaning and maintenance. |
|  | Makes sure the unit is off and disconnected from the outlet before starting to clean the instrument. |
|  | The blade must be removed before taking off the blade holder for cleaning. |
|  | Lock the handwheel before cleaning. |
|  | Do Not use any solvents for cleaning the unit. |
|  | Make sure no liquid enters the interior of the unit when cleaning. |

## Section 6 | Troubleshooting

Below is a list of the problems that most frequently occur in the operation of the SHUR**Cut™** 2500. Be aware that some issues are operator controlled, so please read the Operator's Manual carefully before using this instrument.

| Problem | Description | Remedy |
|---|---|---|
| • No display, no reaction to buttons pressed after the instrument is energized. | • Mains cable not properly connected or there is a break in the circuit<br>• Main fuses defective<br>• The input voltage does not match with the voltage specified for the unit. | • Check if mains cable is properly connected or replace the main cable<br>• Replace the fuses<br>• Contact TBS to review the correct voltage requirements. Do not connect the instrument as it may cause damage. |
| • The section is uneven alternately in thick and thin sections. In extreme case, every second section is skipped, being followed by a varied thickness. | • Insufficient blade angle.<br>• The clamping setting is not steady | • Increase the blade angle until optimum clearance has been found<br>• Check if all the levers are tightened |
| • The section is not continuous | • The angle between blade and the embedded cassette is too large<br>• The set sectioning thickness is too thick<br>• Blade edge is dull. | • Decrease the angle between the blade and the embedded specimen<br>• Adjust the thickness setting.<br>• Replace the blade or adjust the position of the blade. |
| • The section is curved or damaged | • The wax is wedge shaped.<br>• The embedded specimen is not parallel with the cutting edge | • Trim the embedded specimen to make the top line parallel with the bottom line, and the width of the embedded specimen must be even.<br>• Adjust the specimen clamping to ensure the top line and the bottom line of the embedded specimen parallel with the cutting edge. |

| Problem | Description | Remedy |
|---|---|---|
| ·The section is curved or damaged *(cont.)* | • The density of the paraffin is uneven<br>• Other outside factors (light, heater or ventilation affect the temperature around the embedded specimen) | • Remove the uneven paraffin and embed the specimen again<br>• Operate the microtome in a temperature controlled environment. |
| • The section is extremely compressed or wrinkled | • Blade edge is dull.<br>• Ambient temperature is too high<br>• The inclined angle of the blade is too small<br>• There is a build-up of paraffin wax on blade edge.<br>• The wax has been used several times which cause the section to be damaged | • Sharpen the knife or change the blade, or adjust the blade position in horizontal orientation<br>• Cool down the embedded specimen and blade in an ice bath or embed the specimen with the paraffin which is not too soft and not too hard<br>• Increase the angle to avoid the incline plane rubbing the embedded specimen<br>• Use the wet-cotton and the cleansing liquid to clean two sides of the blade from the bottom. Never clean the blade from the blade edge because it may damage the blade and result in personal injury<br>• Change the paraffin, and embed the specimen again |
| • The section is broken or the specimen is torn. | • The tissue is not completely dehydrated, or it is not cleaned correctly.<br>• If the specimen is too soft, it means the specimen is not completely penetrated with paraffin.<br>• The specimen is immersed in the paraffin too long, or the paraffin is too ho.t<br>• The specimen is too hard. | • Dehydrate or clean the tissue again.<br>• Penetrate the specimen with paraffin and embed it again.<br>• **S**aving the specimen is impossible because of damage to the tissue.<br>• Embed the specimen (tissue) again in the plastic（histo resin）or paraffin not too hard and not too soft. |

| Problem | Description | Remedy |
|---|---|---|
| • The section is broken or the specimen is torn. (cont.) | • The blade is uneven | • Sectioning in the even edge of the blade or change the blade |
| • The section splits or there is a scratch in length orientation | • The blade has debris on it.<br>• The specimen is scratched by hard particles | • Clean the blade.<br>• Filtrate the paraffin and pump it slowly |
| • The section sticks to the blade | • The blade edge has debris. | • Clean the blade |
| • The blade produces scraping sounds when sectioning, and the sections are scratched and show vibration marks | • The angle of blade is not proper | • Clean the blade |
| • The blade produces scraping sounds when sectioning, and the sections are scratched and show vibration marks | • The angle of blade is not proper | • Reinstall the blade and adjust the angle of the blade holder. |
| • The surface of the section is wavy. | • The angle of blade is not proper | • Readjust the angle of the blade holder. |

**If there are any other maintenance or service issues that cannot be resolved, please contact TBS-A Division of General Data Healthcare.**

## More Information

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