



**SHUR/Cut™ 4500 Microtome  
Catalog # SC4500  
Operator's Manual  
Version 1.1, May 2010**

*Be certain to read this manual thoroughly  
before proceeding with unpacking and installation.*

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## INTRODUCTION

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Thank you for selecting the **SHUR/Cut™** Series of Microtomes. These instruments were carefully designed to be easy to use, safe to operate and capable of producing consistent, high quality results.

This operation manual introduces the instrument's components, key features and proper use. Please read this operation manual carefully before utilizing the microtome.

The employees of TBS thank you for your support. Feel free to call TBS customer service at 919-384-9393 or e-mail us for support at [service@trianglebiomedical.com](mailto:service@trianglebiomedical.com).

### **TBS Corporate Headquarters**

Phone: 919-384-9393  
Fax: 919-384-9595  
E-mail: [TBSUSA@trianglebiomedical.com](mailto:TBSUSA@trianglebiomedical.com)  
Web: <http://www.trianglebiomedical.com>

### **Product Service Department**

Phone: 919-384-9393  
E-mail: [service@trianglebiomedical.com](mailto:service@trianglebiomedical.com)

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## UNPACKING AND INSTALLATION

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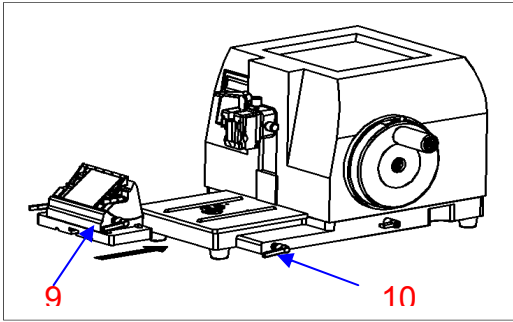
Be certain to inspect the shipping container carefully for any signs of damage to the outer carton. In the event of apparent mishandling, note the damage accordingly on the bill of lading and take pictures for future reference. Save the shipping carton and all packing material for proof of noted damage and / or for future shipment of the instrument back to the manufacturer for any future service needs. Failure to document external damage to the carton may limit your ability to obtain compensation for damage.

Remove the equipment from the shipping carton carefully. Notify the carrier immediately if there is any visible damage to the contents.

### Contents

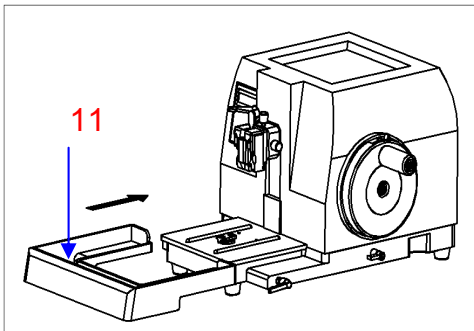
- Microtome
- Handpad
- Handpad data cable
- Foot pedal with connection cable
- Knife holder
- Clamp for standard cassette
- Waste tray
- Stainless steel screw (m4X25)
- M3 wrench
- M4 wrench
- Power cord
- Fuse
- Disposable blades
- Paraffin sample
- Operator's manual

# Installation

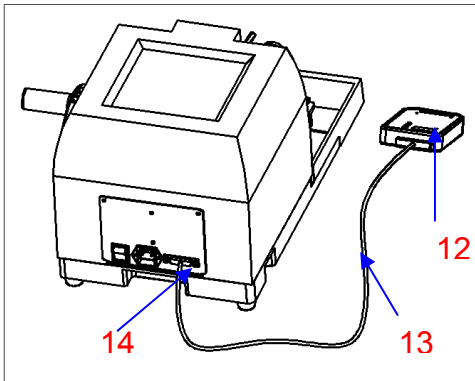


Remove the instrument and components from the shipping container.

Align the knife holder (9) on the track and rotate the knife holder locking lever (10) as shown.



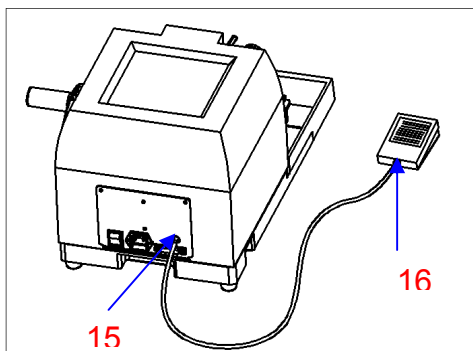
Install waste tray (11) as shown.



Connect the handpad (12) to the instrument utilizing the provided cable (13) inserted into the port (14). Tighten cable screws.

Insert included power cord into the socket. Turn the instrument on using the green power switch.

The instrument will initialize. The display field will illuminate and the specimen holder will retract to zero. The instrument will beep following initialization to indicate that the microtome is ready for use.



Connect foot pedal (16) to instrument in port (15) as shown.

## OVERVIEW AND SPECIFICATIONS

### Specifications

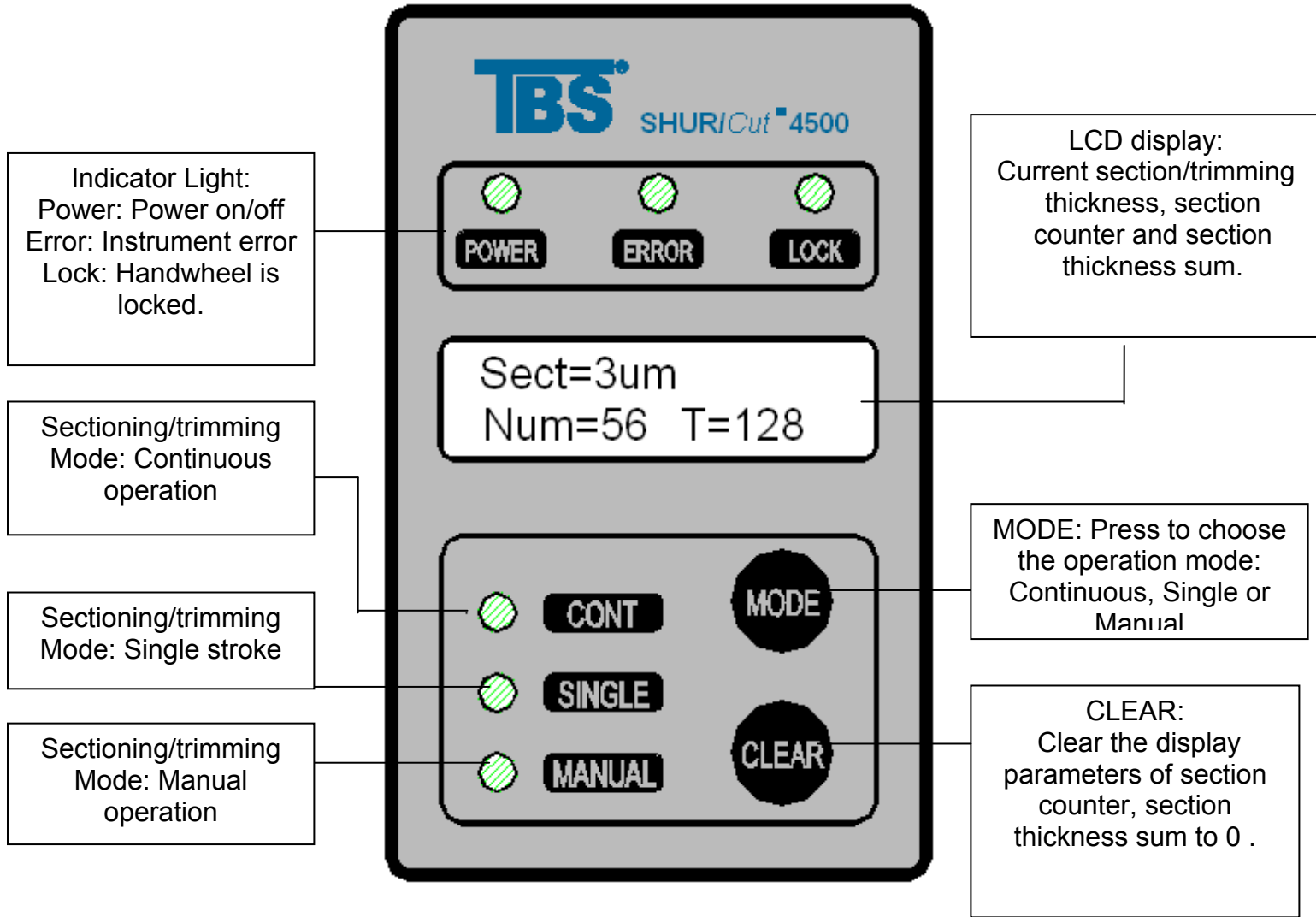
<b>Section Counter</b>	LCD readout of # of revolutions & total amount advanced. Reset with push of a button.
<b>Sectioning/Trimming Settings</b>	0.0-2.0 in 0.5 $\mu$ m increments 2.0-10 in 1.0 $\mu$ m increments 10-20 in 2.0 $\mu$ m increments 20-60 in 5.0 $\mu$ m increments 100-600 in 50 $\mu$ m increments
<b>Horizontal Specimen Advance</b>	20mm $\pm$ 1mm via stepper motor
<b>Vertical Cutting Stroke</b>	70mm $\pm$ 1
<b>Automatic Retraction</b>	Can be turned off
<b>Specimen Clamp</b>	Quick release type for standard & biopsy cassettes, forward/backward operating lever  Quick release type for standard & biopsy cassettes, left to right operating lever (Optional)  C type object holder for larger blocks, Max size (40X50)mm, screw type (Optional)
<b>Specimen Orientation</b>	X/Y Axes 8°, Z Axis 360°
<b>Specimen Arm Locking</b>	Handwheel locking of specimen in uppermost position Secondary 360° locking mechanism
<b>Motorized Specimen Feed</b>	Single speed forward & return Two speed forward & return Variable speed forward & return
<b>Permissible Storage Temp Range</b>	5°C to 55°C
<b>Dimensions: mm (inches)</b>	Depth 550 (22) Width 420 (17) Height 320 (13)
<b>Weight: kg (lbs)</b>	Microtome 36 (79) Microtome, crated 46 (101)
<b>Manual Operation</b>	Yes
<b>Push-Button Switching</b>	Membrane switching between trimming & sectioning
<b>Electrical Requirements</b>	100-120VAC, 50/60Hz, 77W; 220-240VAC, 50/60Hz, 77W
<b>Accessories Included</b>	Specimen orientation mechanism (SC1000); Quick release clamp (SC2000A); Disposable blade holder (SC3000HPLP) that accepts both high & low profile blades; 1-PK low profile blades (DMB-LP+); Section waste tray (SC5000); Dust cover; Tool kit; Lubrication kit; Operator manual & sample bottle of <b>PARA</b> /Gard™

# Symbols and Conventions



**Important Notice**

## Control Panel and Features



**Sect=3um**  
**Num=56 T=168**

### LCD display

The first line displays: Current set value of section /trimming thickness.

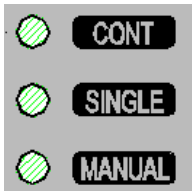
The second line displays: section/trimming counter and section thickness sum.

### Indicator Light

If Power LED is illuminated, it indicates the power is on.  
If Error LED is illuminated, it indicates instrument error and alarm will sound.

If Lock LED is illuminated, it indicates the handwheel is locked.





### **Operation Mode indicator light**

If CONT is illuminated, it indicates the instrument is in continuous operation mode.

If SINGLE is illuminated, it indicates the instrument is in single stroke mode.

If MANUAL is illuminated, it indicates the instrument is in manual mode.



### **Operating Mode selection button**

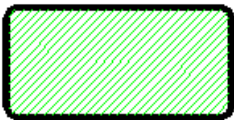
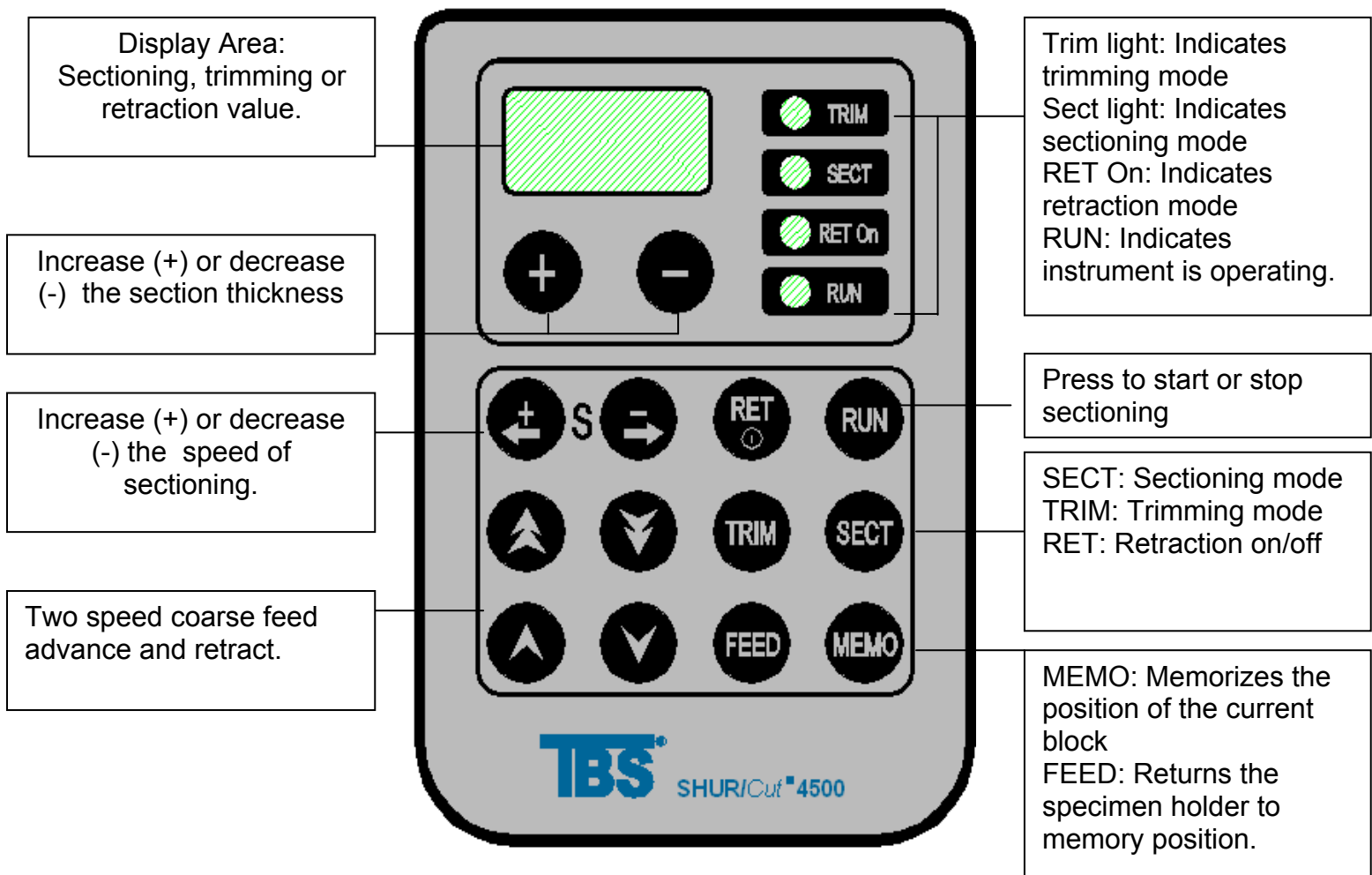
MODE: Press this button to choose desired operating mode (CONT, SINGLE or MANUAL)



### **CLEAR button**

Clear the display (section counter and section thickness sum) to 0.

- The system will automatically clear the section count and thickness when microtome is powered on.



**Display Area**

Shows the section, trimming or retraction set value.



**Action display LED**

TRIM: Indicates trimming mode is activated.  
 SECT: Indicates sectioning mode is activated.  
 RET On: Indicates retraction function is activated.  
 RUN: Indicates instrument is operating.

**Buttons for setting the section/ trimming thickness and retraction value**

Increase (+) or decrease (-) the speed of sectioning.



Section thickness setting range: 0 $\mu$ m to 600 $\mu$ m  
Setting values: 0 $\mu$ m to 2 $\mu$ m in 0.5 $\mu$ m increments  
2 $\mu$ m to 10 $\mu$ m in 1 $\mu$ m increments  
10 $\mu$ m to 20 $\mu$ m in 2 $\mu$ m increments  
20 $\mu$ m to 100 $\mu$ m in 5 $\mu$ m increments  
100 $\mu$ m to 600 $\mu$ m in 50 $\mu$ m increments  
Retraction values: 5 $\mu$ m to 100 $\mu$ m in 5 $\mu$ m increments.



**Buttons for adjusting sectioning speed.**

The two buttons can be used in motorized operation to adjust the sectioning speed, the range is 100-420mm/s $\pm$ 10%.



**Buttons for coarse feed advance/retraction.**

Fast coarse feed advance/retraction at 900 $\mu$ m/s.

Slow coarse feed at 300 $\mu$ m/s.

Maximum specimen feed is 20mm.



**Button for trimming**

Activates trimming mode.



**Button for sectioning**

Activates sectioning mode.



**Button for retraction**

Activates retraction feature.

**Button to start and stop automated sectioning**



Press the button three seconds to start automated sectioning. Press the button again to stop automated sectioning.



**Memorize coarse feed value and feed.**

MEMO: Memorize the current specimen coarse feed value.  
FEED: Move specimen to the last memorized feed position.

**Knife Holder**

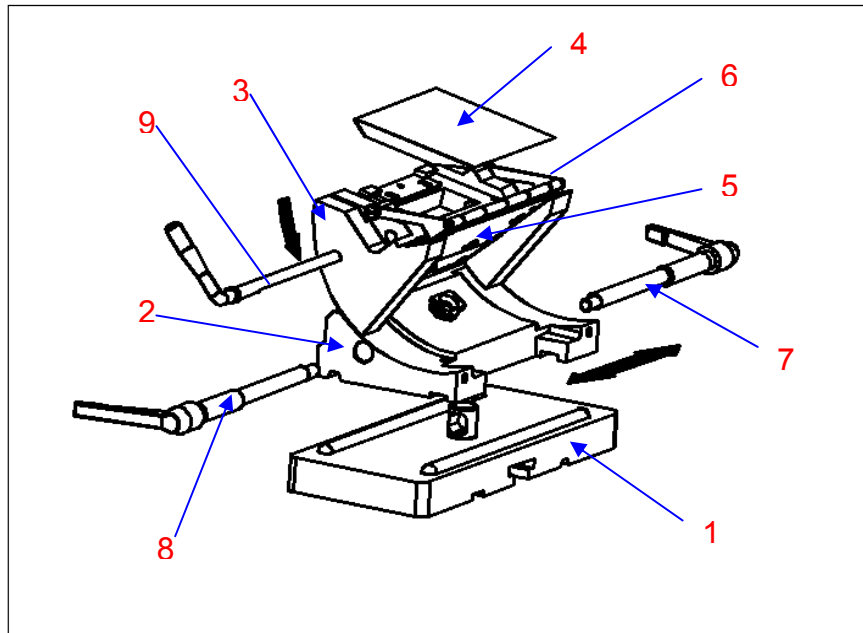
The knife holder is made up of base holder(1), horizontal movable jaw (2), rotating movable jaw(3), movable knife clamp(4), fixed knife clamp(5), knife guard(6), fixed pole1(7), fixed pole2(8), fixed pole 3 (9).

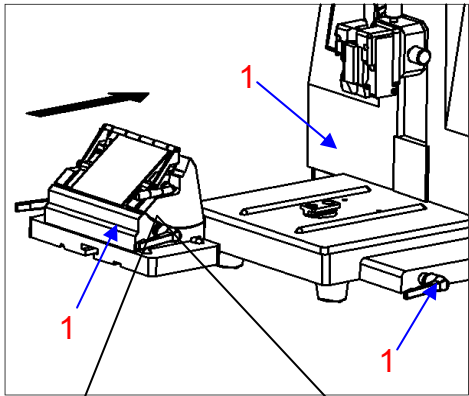
Insert the horizontal movable jaw into the track of the base holder, and then insert the fixed pole1 (7) and rotate it until the movable jaw securely clamped and then adjust the adjustable handle of the fixed pole 7 to horizon position.

Rotate the rotating movable jaw(3) to slide it into the horizontal movable jaw(2), and then insert the fixed pole 2 (8) and rotate it until the movable jaw securely clamped, and then adjust the adjustable handle of the fixed pole2 (8) to horizon position.

Place the movable knife clamp(4) on the rotating movable jaw (3) and fixed knife clamp(5), and then insert fixed pole 3 (9) and rotate it to the vertical position to tighten the movable knife clamp (4) and the fixed knife holder.

Rotate the knife guard(6) over the knife edge to avoid accidental injury.

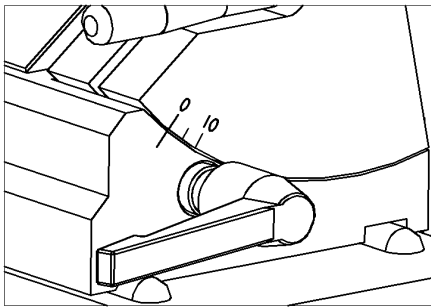




### Knife holder and instrument base holder

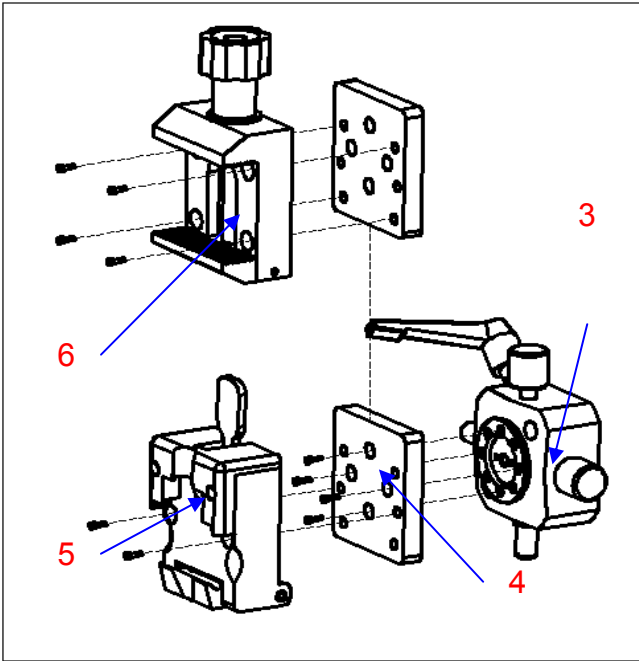
Insert the knife holder (11) along the track of the base holder (12), and then rotate fixed pole 4 (13) and adjust the adjustable handle of the fixed pole 4 to horizon position.

▲ **Attention:** Always remove the knife before detaching the knife holder from the instrument.



Tighten the knife holder and the base holder with the four fixed poles. Adjust the angle as needed before tightening. The angle can be set from 0 to 10 degrees (see picture).

## Specimen Clamping System



The specimen clamping system is made up of adjuster(3) connector (4) and clamp(5-6). There are two kinds of clamps: standard specimen clamp (6) and universal cassette clamp (5).

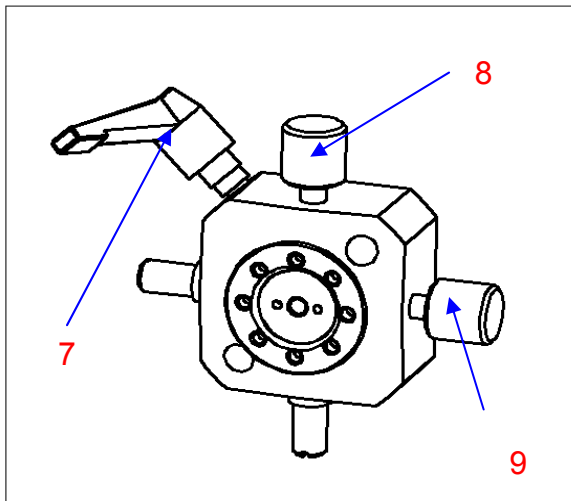
### Standard specimen clamp

Dimension of specimen:  
40\*50\*30MM or the standard cassette.

### Universal cassette clamp

Dimension of specimen:  
Standard cassette

Use the screws to fix each component. The specimen clamp can be changed by removing the screws as seen at left.



### The specimen clamp adjuster

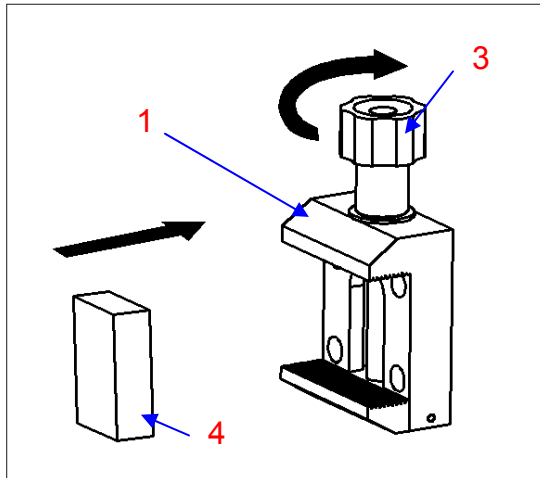
Loosen the fixed pole(7). The vertical adjusting knob(8) can be used to adjust the vertical angle of the specimen; and the horizontal adjusting knob(9) can be used to adjust the horizontal angle of the specimen. After adjusting clamp, tighten the fixed pole(7) to preserve settings.

Specimen adjusting system:

Horizontal orientation:  $\pm 8^\circ$

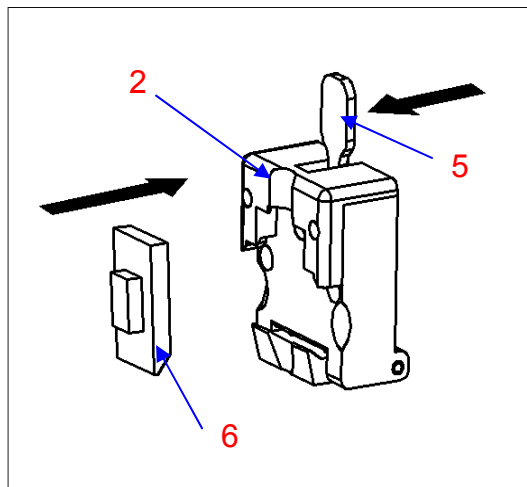
Vertical orientation  $\pm 8^\circ$

## Clamping the Specimen and Knife Installation



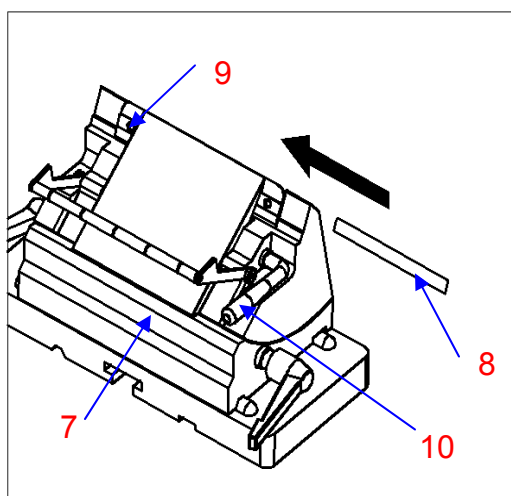
### Clamping the specimen

Standard Specimen Clamp:  
insert the specimen (4) into the clamp (1) as shown at left. Rotate the nut (3) clockwise to tighten the clamp. Remove the specimen by rotating the nut counterclockwise.



Universal Cassette Clamp:  
Pull the clamp handle (5) forward as shown at left. Insert the specimen (6) into the holder. Release the clamp handle. Repeat to remove the specimen.

- Always clamp the specimen before install the blade to avoid causing injury.



### Install knife

Loosen the fixed pole(10), and then pull the blade (8) into the blade holder (7), and then rotate the fixed pole (10) to clamp the blade.

There are two kinds of blades can be used in the instrument: the Low disposable blade as it is showed in the picture and the High disposable blade. To use High disposable blade, just take out the shelf (9) to put into the High disposable blade..

## Trim



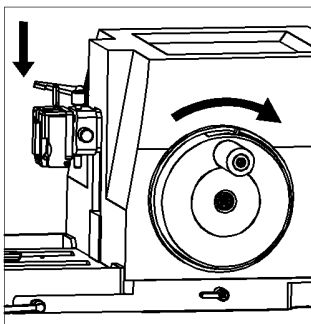
Press this button to activate trimming mode.



Press these buttons to set the section/trimming thickness value.



Press these buttons to advance or retract the specimen.



Ensure the three fixed poles on the knife holder, fixed pole on the base holder and the fixed poles on the specimen clamping system are tightened. Unlock the right handwheel to section or trim.

- Before changing the specimen and/or the blade, the specimen clamp must be locked in the uppermost position.

## Section



Press this button to activate sectioning mode.



Press these buttons to set the section thickness value.  
after the above, it can run the section function.

To obtain the best section, the following factors are important:

- A** the hardness of the specimen
- B** the angle of the cutting blade
- C** if the blade is clamped tightly
- D** if the specimen is clamped tightly

To obtain the best section, first adjust the blade and the specimen to the proper angle. The smaller the angle, the lesser the incidence of section compression. The harder the specimen, the larger angle is needed for optimal sectioning.

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# PRECAUTIONS AND MAINTENANCE

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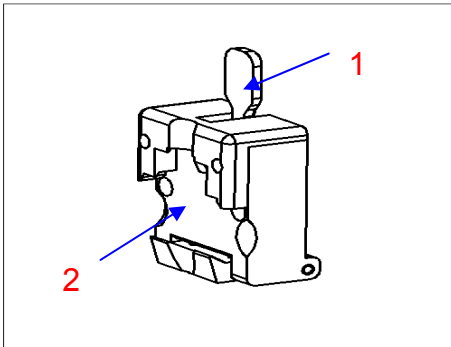
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## Cleaning

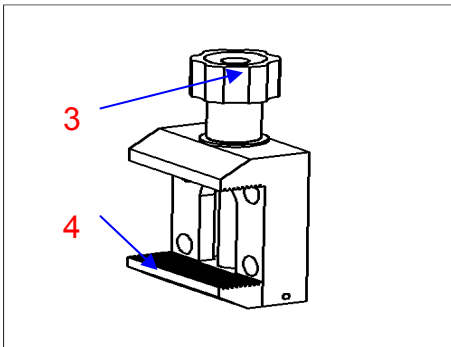
### General Instrument Cleaning

Use mild detergent or Para/Gard™ and a soft cloth to clean the exterior surfaces of the instrument.

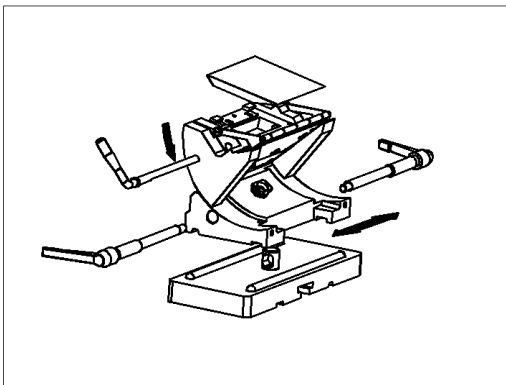
### Cleaning the clamp



Clean the universal cassette clamp handle (1) and holder (2) daily to ensure optimal operation.



Clean the standard specimen clamp Handle (3) holder (4) daily to ensure optimal operation.

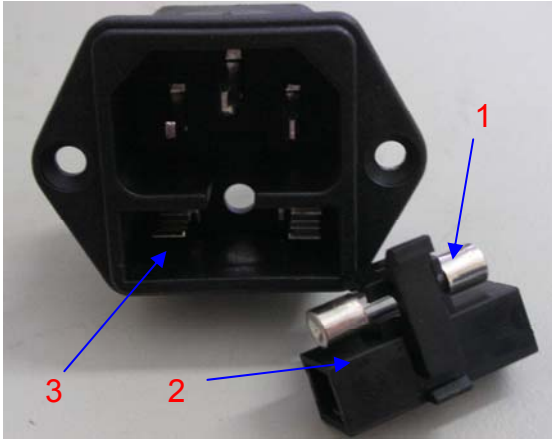


### Cleaning the knife holder

Disassemble the knife holder as shown at left. Cleaning all the parts separately.

## Maintenance

### Changing the fuse



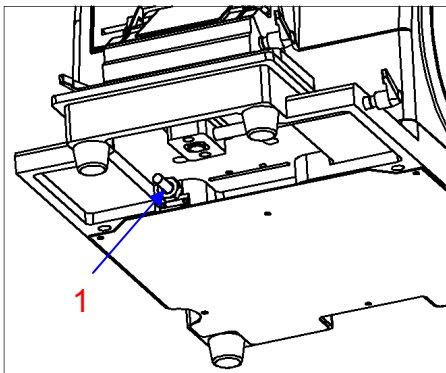
- Put the fuse (1) in the fuse holder (2) then insert the holder into the socket(3).
- Disconnect the power supply before changing the fuse.

### Maintenance for the knife holder

Fixed poles, the fixed installations for the knife holder and other parts of the instrument, need to be maintained regularly.

Disassemble the holder and coat the fixed poles with **SHUR/Lube**™ to extend the life of the instrument.


### Balance



The balance of the handwheel is controlled by a spring in the instrument. It may need to be adjusted as the stress of spring changes with extended use.

To adjust the balance spring, lock the handwheel and remove the knife holder from the instrument. Raise the instrument from the bottom and turn the nut (1).

# SERIAL NUMBER LABEL

<b>TBS</b> <sup>®</sup>	<b>TRIANGLE BIOMEDICAL SCIENCES, INC.</b> <small>3014 CROASDAILE DRIVE • DURHAM, NC 27705-2507 • USA            919.384.9393 • FAX 919.384.9595 • www.trianglebiomedical.com</small>	Model	SHUR/Cut Microtome
<b>CAUTION:</b> NO USER SERVICEABLE PARTS INSIDE - REFER SERVICING TO QUALIFIED SERVICE PERSONNEL ONLY. TO PREVENT ELECTRIC SHOCK, DO NOT REMOVE ANY ENCLOSURE PARTS.		<b>CAT #</b>	SC4500
<small>AT THE DATE OF ITS MANUFACTURE, THIS INSTRUMENT HAS BEEN TESTED AND FOUND IN FULL COMPLIANCE WITH THE STANDARDS          LISTED IN THE MANUAL.</small>		<i>Serial Number</i>	
 <b>Made in China</b>		21006SC450001-01	
		<b>Rev. #</b>	01
		<b>MFG</b>	June 2010
		Volts	100-240
		<b>Amps</b>	0.35A
		<i>Hz</i>	50/60

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## REGULATORY COMPLIANCE

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The **TBS SHUR/Cut™** microtome has been tested by a registered independent body to rigorous international quality and safety standards, and has been found to be in compliance with the following regulations and specifications:

### **Emissions – North American and Japan**

- US - FCC Class B for the 120VAC version
- US - FCC Class A for the 230VAC version
- US - ISO Standard 17025:2005 (Lab code: 200094-0)
- Canada - ANSI C63.4-2003
- Japan - Regulations for Voluntary Control Measures

### **Emissions – European Community**

- EN 61326-1:2006 Product Family Standard Immunity
- EN 61326-1:2006 Product Family Standard Emissions
- EN 55011:2007
- EN 55011:2007
- EN61000-3-2:2006
- EN61000-3-3:1995 +A1:2001 +A2:2005
- EN61000-4-2:1995 +A1:1999 + A2:2001
- EN61000-4-3:2006
- EN61000-4-4:2004
- EN61000-4-5:2005
- EN61000-4-6:2007
- EN61000-4-8:1993 +A1:2001
- EN61000-4-11:2004

### **Safety**

- UL 61010A
- CSA 61010-1
- CE EN61010-1

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## CONTACT INFORMATION

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**Customer service** (919) 384-9393

**Fax** (919) 384-9595

**Mailing address** Triangle Biomedical Sciences, Inc.  
3014 Croasdaile Drive  
Durham, NC 27705 U.S.A.

**Sales and product information** [sales@trianglebiomedical.com](mailto:sales@trianglebiomedical.com)

**Customer service questions** [service@trianglebiomedical.com](mailto:service@trianglebiomedical.com)

**All other inquiries** [info@trianglebiomedical.com](mailto:info@trianglebiomedical.com)

**Please visit us at**  
<http://www.trianglebiomedical.com>