

Campden Instruments Ltd.

 **A Lafayette Instrument Company**

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INSTRUCTION MANUAL



7000smz

5000mz

Vibrating Blade Tissue Slicers

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1. Introduction

The 7000smz and 5000mz Tissue Slicers by Campden Instruments are oscillating blade microtomes and are the result of more than 25 years experience in the design and manufacture of tissue slicers.

The 7000smz is a programmable unit that allows the instrument to 'learn' a cutting cycle input by the operator and then repeat that cycle a desired number of times. The cycle may have a varying speed/distance profile so that particular areas of tissue can be sliced at different speeds.

The 5000mz is similar in most respects to the 7000smz except that it is not programmable and does not have the superior accuracy specification.

A number of researchers have found that certain combinations of oscillation frequency; oscillation amplitude and tissue advance rate can give superior slice quality for a given tissue. The 7000smz and 5000mz allow these combinations to be developed solely by input from the keypad.

For machine stability and long life the amplitude of cut is related to the frequency of oscillation – the larger the amplitude, the lower the maximum frequency available and vice versa.

Experienced users of oscillating microtomes will no doubt be aware that large amplitudes and/or high oscillation frequencies can lead to excessive vibration and unstable tissue fluid. The 7000smz and 5000mz instruments benefit in this area by being built on a heavy, rigid cast base giving exceptional immunity to secondary vibration transmission.

The purpose of this manual is to allow the user to achieve expertise in the use of the 7000smz and 5000mz instruments. Please read and understand the information contained in this manual before using the instrument. Only competent and capable personnel should use the instrument.

This document should be retained for future reference as it contains the name and address of the manufacturer within the EC.

PACKAGING

Please retain the original packaging for future use.

Instruments will not be accepted for service or repair unless the unit has been adequately and properly packaged. Additionally instruments will not be accepted without prior authorisation and have been certified as being uncontaminated with any material that may be hazardous to the health of service personnel. A Returns Authorisation and Decontamination Certificate blank form is included in Section 9 of this manual and may be photocopied as required. Blank forms can also be obtained by contacting Campden Instruments.

Campden Instruments Limited
PO Box 4148
Loughborough
Leicestershire
LE12 7XT
UK

Telephone: (+44) 0150 9814790
Fax: (+44) 0150 9817701
E-Mail: mail@campdeninstruments.com

www.campdeninstruments.com

2. Description of the instruments

Both the 7000smz and 5000mz instruments feature a removable cutting head mounted on a deep section parallel leaf spring assembly giving exceptional resistance to vertical (z axis) deflections and motion errors.

Blade motion is by non-contact magnetic attraction giving a high degree of immunity from out-of-plane forces whilst allowing variable oscillation rates.



The blade holder can be adjusted to ensure that the blade edge travels parallel to the vibration axis resulting in a cleaner slice with minimal damage to the surface of the tissue. A mountable non-contact metrology device is able to monitor the blade edge travel profile giving feedback to facilitate adjustment.

The blade is advanced into the tissue under motor control via a rotary control on the front of the instrument allowing continuous adjustment of speed. This is particularly useful when different areas of tissue need to be cut at different speeds. Blade retraction is carried out at maximum speed and only after the uncut tissue has been lowered away from the blade, eliminating the possibility of the blade being dragged back across the uncut tissue causing damage.

Dynamic feedback on the oscillation and advance axes maintains accurate control over speed and (in the case of the advance axis) distance travelled.

Raising the tissue up into the path of the advancing blade controls section thickness. This movement against gravity reduces lost motion and uncertainty to a minimum allowing section thickness to be controlled accurately. An innovative double convergent dovetail arrangement for mounting the tissue bath gives a positive location of the bath whilst still allowing easy removal.

A sealed LCD display and membrane keypad allows the user to control the instrument and set the parameters governing blade frequency, section thickness, etc. As the unit can be operated under fully automatic control an emergency stop facility is provided.

The entire instrument is enclosed in a moulded enclosure giving protection against liquid ingress from spillage and is tolerant of most commonly used solutions.

Both instruments have a memory facility for storing the requirements of up to 8 users or combinations of cutting parameters.

The 7000smz has two additional features over the 5000mz instrument:
The 7000smz has a memory facility to remember the cutting profile and can auto-repeat that profile.
The 7000smz has an enhanced amplitude/speed range.

The instrument is supplied with a tissue bath having a ceramic magnet to locate and retain the specimen platen. A fixed specimen platen with removable tissue support is supplied as standard. An adjustable tissue platen is available as an optional extra. The tissue bath is also located and held in place within the outer bath by magnets.



Inner and outer tissue bath (background) with standard tissue platen (front left) and adjustable tissue platen (front right)

A stereoscopic zoom microscope, magnifying glass and a cold light source are available as optional extras.

The stereoscopic microscope, with magnification factors of between 10 and 40x allows close observation of the cutting procedure.



7000smz fitted with the stereoscopic microscope

The light source incorporates focusable LEDs and allows concentrated, cold illumination to be directed selectively at the specimen being processed.

A lower power (2x) magnifying lens assembly can be fitted as an alternative to the microscope.



7000smz fitted with magnifying glass and cold light source

3. Microtome Blades

Whatever features and controls an oscillating microtome possesses, the quality of the slice can be enhanced by good blades and degraded by poor blades.

The average razor blade consists of a triple bevel on both faces of a thin foil made from either carbon or stainless steel. The triple bevel terminates in a relatively non-acute angle and is designed for cutting when being drawn across a surface perpendicular to the edge of the blade. The thin foil of a razor blade will almost certainly flex when clamped into a blade holder.

Carbon steel is relatively hard compared to stainless steel and a carbon steel blade will keep its cutting edge longer however it has the inherent disadvantage that it will rust quickly when exposed to moist air. To prevent rusting in storage carbon steel blades have a film of oil that must be removed before the blade can be used. The corrosion process is, of course, accelerated significantly in a.c.s.f. saline.

For these reasons normal razor blades and carbon steel blades are not recommended for precision tissue sectioning.

Campden Instruments supplies two types of blade for its oscillating microtomes:

7550-1-SS Stainless Steel Blades

Made from surgical quality stainless steel these are double bevelled on both faces, honed to an acute cutting edge.

Because of the relative softness of stainless steel, for optimum performance it is recommended that stainless steel blades should be used once only or, at a maximum, changed every day.

7550-1-C Ceramic Blades

Made from ultra hard zirconium, this is a material that can be lapped to the finest of edges and the body of the blade is very rigid maintaining a straight cutting edge. The result is that slice quality is substantially improved with prolonged slice life especially in the most difficult tissues such as young brain where structures are yet to be formed or very old brain with build up of extracellular proteins and added structures. Additionally, the blade has a much longer life due to the ultra hard cutting edge not losing its sharpness and being impervious to corrosion.

For studies where the deposition of metal into the slice would have undesirable effects the benefit of ceramic blades is clear.

The initial higher cost of the ceramic blade is more than offset by its longevity.

To facilitate fitting of the narrow blades a special blade holder tool is provided. This helps ensure correct blade alignment and reduces the risk of personal injury when fitting the blade. Further details are shown in Section 6.8 Fitting blades.

The 7000smz and 5000mz instruments are supplied with fixed angle titanium blade holders suitable for the 7550-1-SS stainless steel and 7550-1-C ceramic blades.

Sample 7550-1-SS and 7550-1-C blades are included with each instrument.

4. Cleaning, Sterilizing and Autoclaving

The blade holder can be fitted to or removed from the vibrating head using the hexagonal driver supplied.

The blade holder may be autoclaved by normal methods.

Replacement blade holders are available as spares should the original items be lost or damaged.

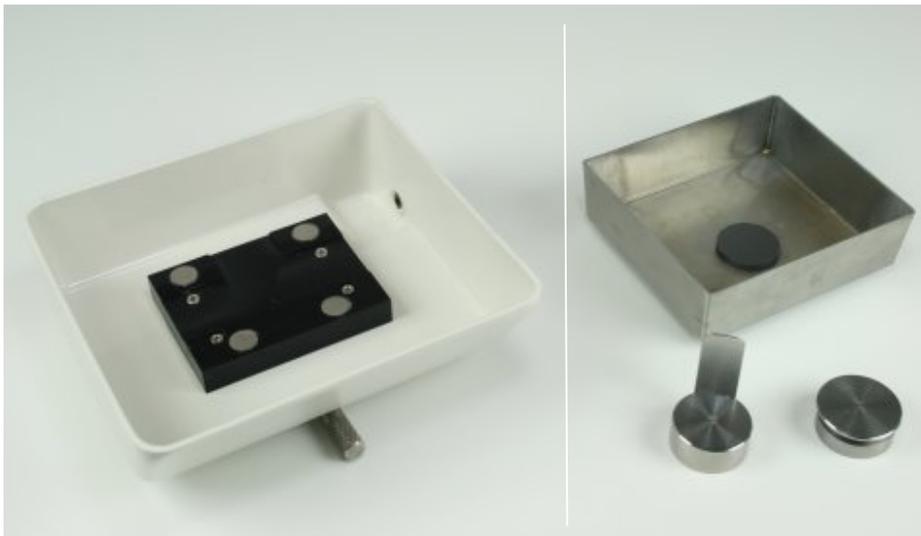
The stainless steel inner bath and specimen platens are made from a magnetic stainless steel; this steel is not completely immune from the effects of a.c.s.f. and the items should be thoroughly rinsed with clean water on a regular basis.

The specimen platen and the inner (stainless steel) bath as shown in the illustration below are autoclavable. The specimen holder is located by a circular magnet in the inner bath. They may be separated by simply pulling the two items apart. The inner bath is also located in the outer bath by magnets.

Autoclaving of the specimen holder and inner bath may be carried out using normal procedures.

The outer bath and its associated parts are not autoclavable, nor should they be dismantled.

Additional or replacement outer baths, inner baths and specimen platens are available as spares.



Outer bath – not autoclavable

Inner bath & specimen
platens- autoclavable

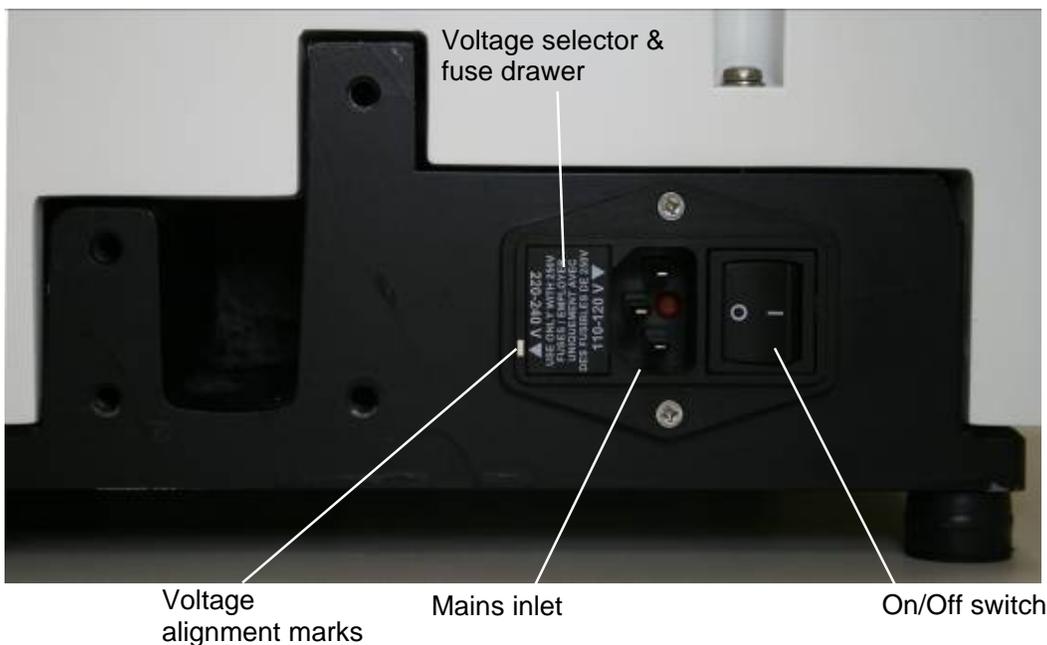
5. Installation

The unit should be placed on a sturdy bench. Although the unit has a very high static mass to vibrating mass ratio and absorbent rubber feet, a rigid support bench will enhance immunity from secondary vibration transmission.

If any accessories – microscope/magnifier attachment or light source - have been supplied with the instrument, reference should be made to the appropriate section of this manual for the fitting and setting up procedure.

Before connecting the unit to a mains supply, the unit must be set for your particular voltage supply.

The voltage is set by prising out the fuse holder drawer and re-inserting it such that the voltage legend for your supply is aligned with the mark on the inlet moulding. See below.



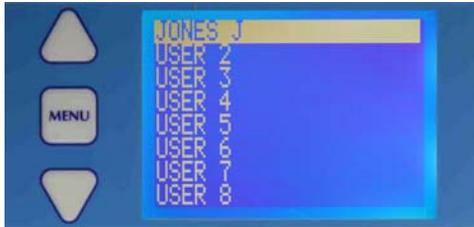
Voltage supply selector (example shown is set to 220-240V)

The inlet moulding accepts a standard IEC socket. Where possible a standard mains lead - IEC socket/mains plug – suitable for your mains outlet will have been supplied with the instrument. The instrument must not be operated unless it is connected to a suitably earthed (grounded) mains supply.

See Section 7 for fitting the light source, magnifier and microscope.

6. Operation

6.1 Edit an existing user name or registering a new user name



When the instrument is switched on the display will be as shown, showing any personalised user slots. This screen can also be accessed from the main menu.

Use the Δ or ∇ keys to scroll to the desired user name or to an unused position.



Press the 'MENU' key to go to the display shown. This is the normal operating display.



Press the MENU key again and the display will change to that shown. Use the Δ or ∇ keys to scroll to the line 'SETTINGS'.



Then scroll to the line 'EDIT USER NAME' and select.



Use the Δ or ∇ keys to scroll to the line (in the example shown) 'USER 2'. Pressing 'MENU' again will cause the 1st letter of the name to be highlighted. The rotary knob can now be used to scroll through the alphabet to select a new letter or symbol. Press the Δ to confirm and move to the next letter position; use the rotary knob to select a new letter. (∇ selects the previous position). Continue until the new user name is acceptable.



Press the MENU key - this will highlight the new name.

Use the \triangle or ∇ keys to scroll to the line 'CHANGE'

Press MENU to confirm the change. Any changes to the oscillating frequency, amplitude and section thickness will be remembered under that user name so that when that user comes back to the instrument and selects that user name those settings will also be selected for immediate use

An existing user name can be deleted by scrolling to the line 'CLEAR NAME' and pressing MENU.

Press MENU again to revert to the normal operating display.

6.2 Change the operating parameters:

Frequency
Amplitude
Section thickness



Press the MENU key to display the basic menu screen as shown:



Use the Δ or ∇ keys to scroll to the desired parameter:

Frequency – amplitude - section.

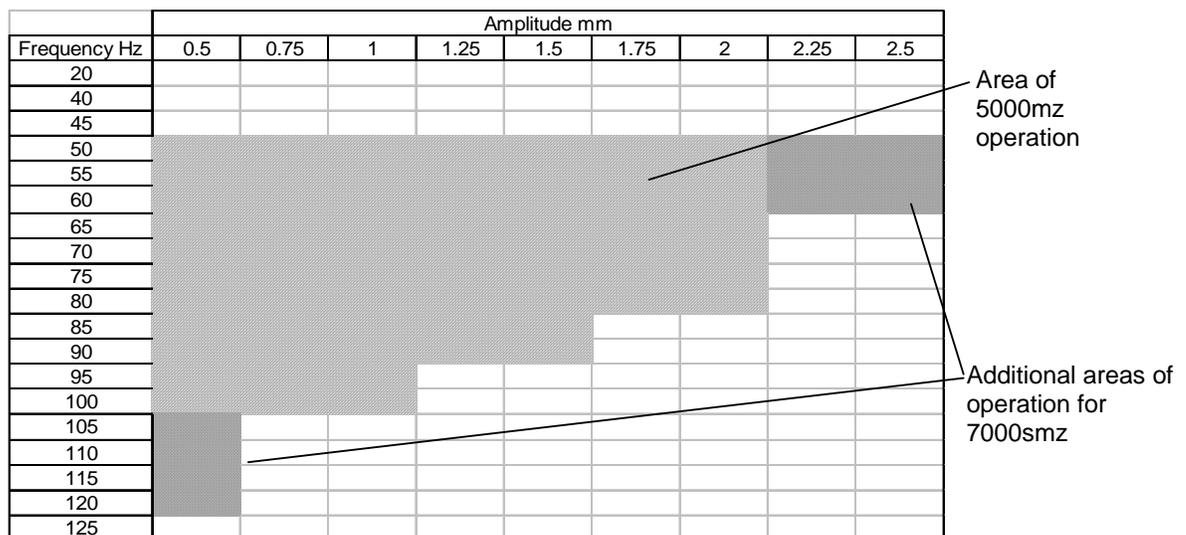
Press the MENU key to select that parameter and highlight the value.

The Δ or ∇ keys can now be used to change the parameter's value. Press the MENU key to confirm and store the change.

Frequency settings can be changed in 5Hz steps and amplitude can be changed in 0.25mm steps.

Note that there are restrictions limiting the amplitudes available for any given frequency – see the following chart: The instrument may only be operated within the shaded area.

Note also that the 5000mz has a maximum frequency of 100Hz and a maximum amplitude of 2mm



6.3 Load or Unload the specimen bath



Press the 'LOAD BATH' key and the display will change to that shown. The bath table will be moved to its lowest position to allow a specimen bath to be loaded (or an existing one removed).



Once the table has reached its lowest position the display will be as shown. The specimen bath is located on the rising table by a convergent double dovetail slideway and clamping screw.

To remove the bath, unscrew the securing knob whilst pulling the bath away from the instrument.



Pressing 'LOAD BATH' keypad will cause the table to rise to a preset (nominal) position.

The display will then revert to the 'home' display.

6.4 Manual Operation

When the instrument is first switched on, scroll to the desired user name and press MENU. All cutting parameters associated with that user will be recalled.

If desired, make any changes as described in Section 6.2 and scroll to the 'EXIT MENU' line and press the 'MENU' key. If necessary load a bath to the table and press the 'LOAD BATH' key. The table will raise the bath to a nominal position and the operating screen will change to that shown in the following illustration:



Note that the 'SLICE ON/OFF' key is now illuminated green and the advance speed as shown on the display is 0.00mm/s.

Bringing the Blade to the Start height



Press the 'HEIGHT' key.

Press the 'LOAD' key to quickly raise the table. Press again to stop.

Set a movement amount using the rotary knob. Press the 'RETURN' key to raise the table by this amount. Press the 'SLICE' key to lower the table by this amount.

Press the 'AUTO' key to reset the height datum.

Press the 'HEIGHT' key once more to exit.

Bringing the specimen to the start position



Press the 'ADVANCE' key and using the rotary knob to control the advance speed. Press the 'SLICE' key to switch the movement on or off.

Bring the cutting blade into a suitable position for commencement of cut. When the blade is in a suitable position, press the 'ADVANCE' key again to exit.

(This selects the start position such that when the 'RETURN' key is pressed [see next page] this is the position the blade will return to).

Cutting a slice



Press the 'SLICE ON/OFF' key to commence the cut. The 'SLICE ON/OFF' key will now change to a red illumination. Use the rotary knob to control the advance speed as the blade moves through the tissue.

(Note that, if desired, the advance speed can be reduced past zero and the cutting head moved in reverse).

When the cut has been completed press the 'SLICE ON/OFF' key to halt the process.



The 'RETURN' key may now be used to retract the head to the position you had selected as the start position above. Before the head retracts the bath will be lowered so that the blade does not drag across the surface of the specimen. After the head has been retracted the bath will be raised to its previous position and then raised once more by the thickness of the section in readiness for another cut.

When the cutting head has been retracted to the start position, the section thickness will be highlighted on the display. If required, the section thickness may be changed by pressing the height button and making any adjustment required via the rotary control knob. Note that this will change the section thickness for this slice only. If you want to change the repeat thickness this should be done by changing the general operating parameters – see the section above 'Changing the operating parameters'.

The cut may now be repeated as often as you wish (7000smz only). If you want to make repeated cuts using the same parameters the automatic repeat can be used – see the next section 'Automatic Operation'.

6.5 Automatic operation – Slice Window Mode

Once a cut has been taken as described in the manual slice procedure, the start point and end point of that slice operation is stored in memory. In slice window mode the user can slice between these points and the unit will automatically stop at the end point. The user can select if the slice operation finishes at the end point or automatically retracts to the start point ready for the next slice (see section 6.10).

If you try to operate the instrument in the slice window mode without having previously set a slice window, via the manual slice procedure, the display will indicate 'NO SLICE PROFILE HAS BEEN CREATED'. This display will time out and revert to the basic manual operating screen.



When a satisfactory cut window has been made, press the 'AUTO REPEAT' key once until the slice window screen is displayed. The led adjacent to that key will be illuminated in red as a warning.

Pressing the return button will take the slicer to the start point and increment the section thickness for the next slice.

Press the 'SLICE ON/OFF' key to commence cutting or to stop cutting.

The unit will automatically stop cutting at the stop point.

6.6 Automatic operation – Profile Repeat Mode (7000smz only)

Once a cut has been taken as described manual slice procedure, the speed profile of that cut is stored in memory and the instrument is able to repeat that profile under automatic conditions. All that is further required is for the number of sections to be entered. The user can select if the slice operation finishes at the end point of the slice or automatically retracts to the start point ready for the next slice (see section 6.10).

If you try to operate the instrument in the automatic mode without having previously set a cutting profile, via the manual slice procedure, the display will indicate 'NO SLICE PROFILE HAS BEEN CREATED'. This display will time out and revert to the basic manual operating screen.

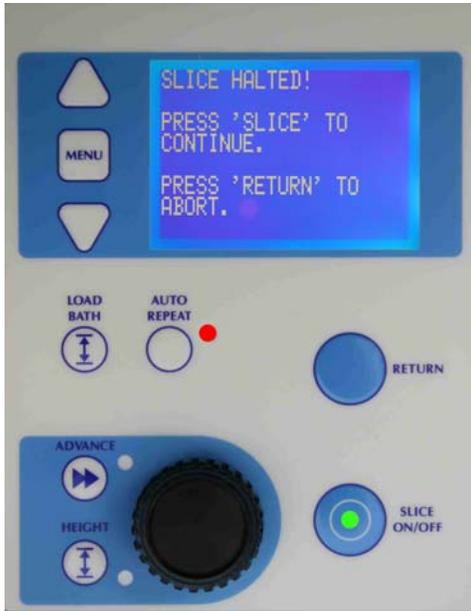


When a satisfactory cut profile has been made, press the 'AUTO REPEAT' key twice until the profile repeat screen is displayed. The led adjacent to that key will be illuminated in red as a warning.

Use the Δ or ∇ keys to input the number of cutting cycles required.

Press the 'SLICE ON/OFF' key to commence cutting.

The instrument will now carry out the number of cycles under automatic control.



The automatic slicing process may be halted prematurely by pressing the 'SLICE ON/OFF' key in which case the display will change to that shown. Follow the instructions on screen to CONTINUE or ABORT the procedure. Pressing 'MENU' at this stage will allow access to menu functions permitting changes to frequency and amplitude etc.

*Note that the **EMERGENCY STOP** button on the right front of the instrument may be used to halt the process at any time. See next page for details of the recovery procedure.*



6.7 Recovery from an Emergency Stop

If the instrument has been halted by use of the Emergency Stop facility it must be reset before operations can continue: Twist the red Emergency Stop button clockwise to unlatch it. When the button is unlatched the instrument will revert to initial user select screen.

6.8 Fitting blades with the blade fitting tool

The fixed angle blade holder accepts only 7550-1-SS Stainless Steel Blades and 7550-1-C Ceramic Blades.



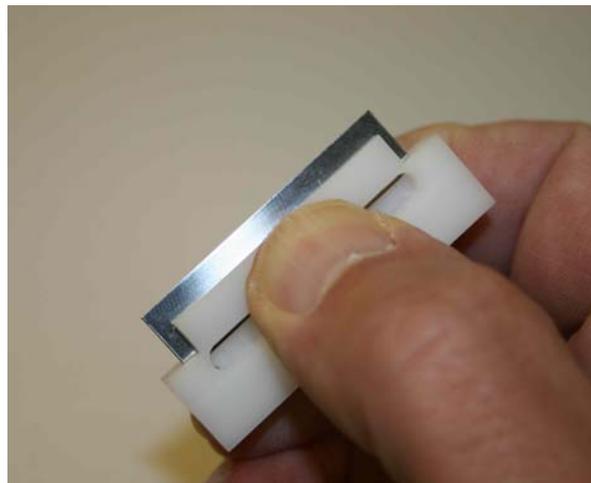
7000smz



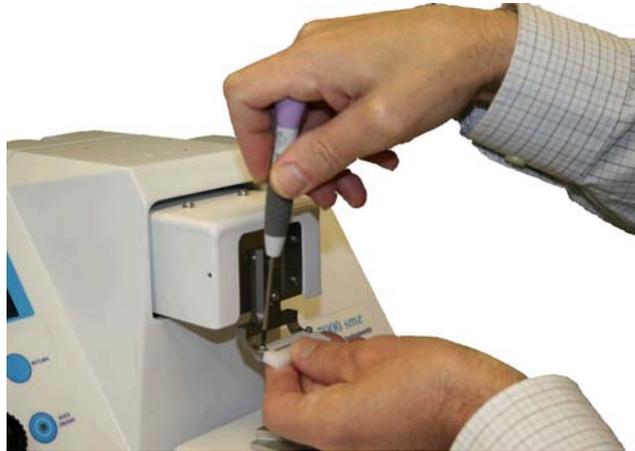
5000mz

When fitting or removing blades, care must be taken as the blades supplied by Campden Instruments are very sharp. *Always use the blade holding tool supplied.* The blade tool has been designed so that the blade may be safely handled without the effective cutting length of the blade edge being exposed to possible damage or injuring the operator.

After carefully unwrapping the blade it should be placed, sharp edge first into the slot of the blade tool. The blade tool can then be squeezed using the thumb and forefinger – see the illustration below.



The blade is now safely gripped with its cutting edge protected from damage and can be safely handled during the fitting operation with minimal risk of personal injury.



The blade should be fitted by loosening the two screws on the arms of the holder and sliding the blade under each washer and pushing it firmly back against the rear stops. The screws should not be over-tightened. See the illustration above.

7000smz: Note that the left hand screw has a left hand thread and should be turned counter-clockwise to tighten it. The right hand screw has a normal right hand thread.

5000mz: Both left hand and right hand screws have normal right hand threads.

Once the blade has been fitted it should be aligned to the axis of oscillation in order to reduce Z axis (vertical) errors to a minimum and achieve optimum performance. Note that the alignment calibrator is supplied as standard only with the 7000smz; it is available as an optional extra for the 5000mz instrument.

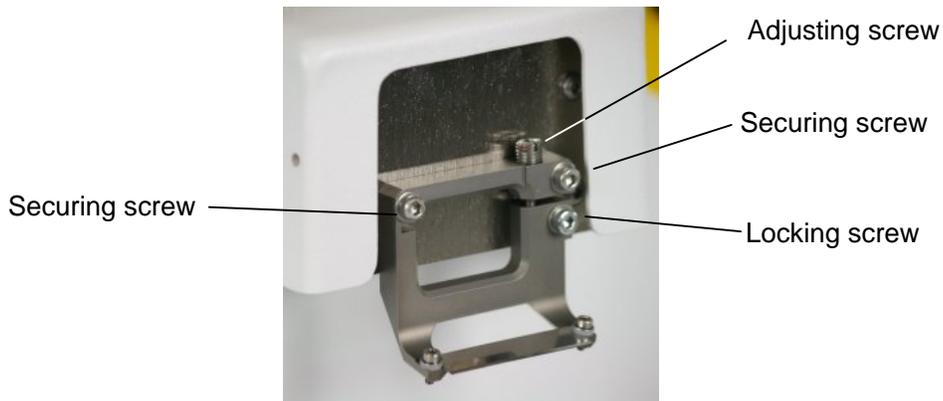
See Section 6.9 'Alignment of the blade with the axis of oscillation' for detailed guidance on the use of the alignment calibrator.

6.9 Alignment of the blade with the axis of oscillation.

The mechanism of the slicer controls the lateral oscillation of the blade within very fine tolerances. Owing to manufacturing variations and tolerances in blades, blade holder, etc., and inconsistencies in mounting the blade in its holder, the blade edge should be aligned with the lateral motion to ensure the best possible cut with least damage to the tissue.

7000smz

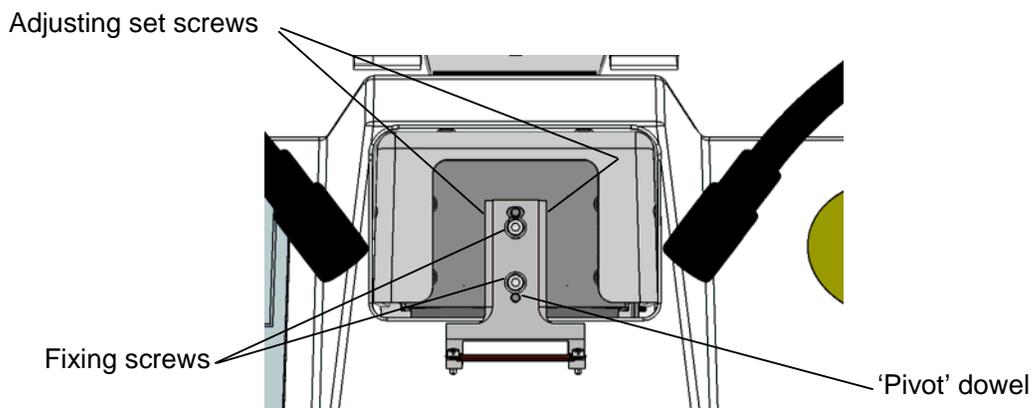
The blade holder is secured by two screws to the oscillating faceplate. A third screw locks the blade holder in position once the alignment procedure has been completed. See the illustration below.



Fit the blade holder as shown and tighten the two upper securing screws. The lower locking screw should be tightened sufficiently to just grip the lower portion of the blade holder.

5000mz

The blade holder is mounted on two dowel pins and secured by two screws to the oscillating faceplate. The lower dowel acts as a pivot about which the holder can be rotated whilst the upper dowel allows fine adjustment to be effected by reacting against two set screws in the blade holder. See the illustration below.



The two set screws in the sides of the blade holder should be withdrawn slightly to allow the blade holder to be fitted over the two locating dowels. The two socket cap head screws with washers should then be fitted and tightened only sufficiently to lightly grip the blade holder. Screw in the two set screws so that they just touch the upper locating dowel – note that there are two access holes in the vibrating head cover to allow the hexagonal driver (supplied) to pass through and reach the set screws.

7000smz and 5000mz

In order to facilitate alignment of the blade with the axis of travel and so minimise the z axis deflections, the instrument uses a demountable calibration device.



When the calibration device is plugged into the instrument its presence will automatically be detected and it will take control of the amplitude and frequency settings, adjusting them to a magnitude that allows best adjustment of the blade alignment error. The alignment process also automatically moves the blade so that the cutting edge is in its optimal position relative to the calibration device for best alignment evaluation.

From the main menu screen scroll down to the option 'BLADE ALIGNMENT' and press 'MENU' to activate the process and then proceed as follows.

The display will change to that shown on the left below.



When the unit has been connected, the instrument will detect the connection and the display will change again as shown.

When you press the 'SLICE' key the table and vibrating head will retract to a loading position. Once the Loading position has been achieved the display will change instructing you to fit the alignment device.

Fit the device and press 'SLICE' again.



You must now choose which type of blade you want to calibrate. Scroll to the appropriate blade using the Δ or ∇ keys and press 'MENU' to select.

Press 'SLICE' to continue. The instrument will now re-position the blade with respect to the alignment device ready for adjustment.



The display will now change to that shown on the left. Note that the uppermost line shows the current Z axis (vertical) deflection. At this point it indicates zero because the blade is not moving.

Press 'SLICE' as instructed and when the blade is vibrating note the Z axis deflection reading.

Press 'SLICE' again to stop the blade vibration.

7000smz

Loosen the lower locking screw just sufficiently tight to retain its grip on the blade holder but without locking it in place.

The blade holder can be tilted in a clockwise direction by turning the adjusting screw clockwise using a cross-head (e.g. Philips, PoziDriv) screwdriver. Tighten the lower screw.

Conversely, the blade holder can be tilted in a counter-clockwise direction by turning the adjusting screw counter-clockwise.

Press 'SLICE' to set the blade vibrating again and note the Z axis deflection. Stop the blade vibrating. If the error has increased you should repeat the adjustment but in the opposite direction.

Continue the above process until the Z axis deflection has been reduced to acceptable limits. Once the blade is within acceptable limits the lower locking screw may be fully tightened.

Recheck the blade alignment. Repeat the adjustment procedure if required.

5000mz

Loosen the upper and lower blade holder securing screws and retighten them just sufficiently to grip the blade holder without locking it in place.

The blade holder can be rotated clockwise by first loosening the right hand set screw and then tightening the left hand set screw.

Conversely, the blade holder can be rotated counter-clockwise by first loosening the left hand set screw and then tightening the right hand screw.

Press 'SLICE' to set the blade vibrating again and note the Z axis deflection. Stop the blade vibrating. If the error has increased you should repeat the adjustment but in the opposite direction.

Continue the above process until the Z axis deflection has been reduced to acceptable limits. Once the blade is within acceptable limits the cap head securing screws may be fully tightened.

Recheck the blade alignment. Repeat the adjustment procedure if required.

7000smz and 5000mz

When you have completed the alignment procedure press the 'RETURN' key and follow the removal instructions as shown on the display.

In certain circumstances, for example if a steel blade is fitted and you have specified a ceramic blade, the control system may position the blade incorrectly and not detect the blade edge. In these instances the display will show the following message:



Correct any problems and press 'SLICE' to retry.

6.10 Settings



From the basic menu screen use the Δ or ∇ keys to scroll to the line 'SETTINGS' and press the MENU key.

1) The display screen may be adjusted for brightness and contrast to suit local conditions.



Use the Δ or ∇ keys to scroll to line required and press the MENU key. The feature value will be highlighted and may be adjusted using the Δ or ∇ keys. Press the MENU key to confirm the change.

Use the Δ or ∇ keys to scroll to line EXIT MENU and press the MENU key to get back to the basic menu display.

2) When in an automatic slice mode, the park position for the slicer can be set as either at the end of the slice just taken or at the beginning of the next slice.



Use the Δ or ∇ keys to scroll to the AUTOSTOP line. Press the MENU key to toggle between AUTOSTOP AT END or AUTOSTOP AT START. Use the Δ or ∇ keys to scroll to line EXIT MENU and press the MENU key to get back to the basic menu display.

7 Options

7.1 Light Source (optional)

The 7000smz and 5000mz instruments may be (optionally) supplied with an LED cold light source. The light source should be fixed to either the top of the covers of the instrument or (if you have the optional magnifier) to the mounting bracket for the magnifier. If the light source is fitted directly to the instrument cover, place the neoprene cushioning pad between the cover and the light source body before fitting and tightening the fixing screws. Do not over-tighten the screws. This is illustrated below.



The light source can be switched on and the light intensity controlled via a combined rotary switch/potentiometer on the body of the light source where the flexible arms are mounted.

The output beams may be focussed by rotating the lens ferrule at the end of each flexible arm.

The power supply is supplied with a number of adapters and should be fitted with the appropriate adapter to suit the available power outlet.

CAUTION – UV LED Class 3B LED product

The device contains UV light LEDs. The LED during operation radiates intense UV light. Do not look directly at the UV light with unprotected eyes. If there is the possibility of looking at reflections of the light you should use suitable UV light protective glasses.

7.2 Magnifier (optional)

The 7000smz and 5000mz instruments may be (optionally) supplied with a low power magnifier (2 x magnification).

When fitting the magnifier, place the neoprene cushioning pad (supplied) between the magnifier mount and the instrument cover. The magnifier should then be fixed to the top of the instrument cover using the screws provided. Do not over-tighten the screws. This is illustrated below.

If you also have the optional light source, the magnifier should be fitted before the light source which should then be fitted to the magnifier mount.



To adjust the lens, slacken the tightening screw and pivot the lens as required. Re-tighten the screw.

7.3 Microscope (optional)

Two microscopes are available for use with the 7000smz and 5000mz instruments:

1. A stereoscopic zoom microscope having a magnification range of 10x - 40x.
2. A stereoscopic fixed magnification microscope. Interchangeable lenses to give 5x or 10x magnification are supplied.

The microscope is attached to the instrument via screws to a dedicated mounting pad on the rear of the instrument; this ensures a rigid mount rendering the microscope free from vibration.

If you are using the optional light source (see above) with a microscope, for ease of access you should fit the light source before fitting the microscope.

The following illustrations show the general arrangement of the zoom microscope as fitted to the instrument.



8 Maintenance and Service

The 7000smz and 5000mz instruments have been designed to give reliable, trouble-free service.

When the equipment has been in service for a number of years it may be advisable to have a comprehensive service, Campden Instruments or its local agents will be pleased to advise on this and we operate a fast turn around on equipment returned for service or repair.

Instruments will not be accepted for service or repair unless the unit has been adequately and properly packaged.

Additionally, instruments will not be accepted without prior authorisation and have been certified as being uncontaminated with any material that may be hazardous to the health of service personnel. A Returns Authorisation & Decontamination Certificate blank is shown on the next page. The form may be photocopied as required. Further blanks can be obtained by contacting Campden Instruments.

Before returning the instrument you should contact Campden Instruments to obtain a Returns Authorisation Number.

9 Returns Authority & Decontamination Note

Note – You must complete the following form before returning the equipment, failure to do so may result in a refusal to accept the shipment and may cause delays in processing the service or repair.

Number	Date

Return Address
4, Park Road, Sileby, Loughborough. LE12 7TJ. U.K.

Customer	Address
Contact Name	Contact Details

Product Number & Serial Number	Product Name / Description
Description of problem / reason for return. (Continue on separate sheet if necessary)	
Please note: Blade must be removed from the blade holder	

Returns from outside the EU must be stated as “Temporary Export, of Nominal Value” and state IP Authorisation number IP/0905/151/08. Failure to do this will incur customs charges.

The following Declaration of Decontamination status applies to all items returned to Campden Instruments. If the answers to Sections A2 and all B questions are NO then ignore Sections D to F. Otherwise all Sections must be completed. You must complete and sign the Declaration.

- A** 1. Has the package been opened? YES/NO 2. Has the product been used? YES/NO
- B** Has the product been exposed internally or externally to any of the following?
1. Biological Hazards (pathogenic viruses, bacteria, fungi etc) YES/NO
 2. Radioactive Sources YES/NO - ****IF YES DO NOT RETURN****
 3. Chemical Hazard (mercury, salts, acids, bases etc) YES/NO
 4. Rabies, BSE, CJD, nCJD etc YES/NO
 5. Any Other Hazard – PLEASE SPECIFY – YES/NO
- C** Does your laboratory contain animals that need to be shielded against pathogens? YES/NO
- D** Provide details of any hazard indicated above. Include detail of names and quantities of agents, Material Safety Data Sheets and First Aid Information.
- E** Describe your methods of decontamination, including agents used for this purpose.
- F** Are there likely to be any areas of residual contamination? Please be specific.

DECLARATION – I declare that the information given above is true and complete to the best of my knowledge and belief, and that I have taken all reasonable steps to ensure its accuracy. If there is any subsequent outbreak of an infectious agent in my laboratory I will inform Campden Instruments immediately.

Authorised Signature..... Date.....

Name (Print)..... Position.....

Tel No..... Fax No.....

10 Technical support

techsupport@campdeninstruments.com

Should you have experience any problems with the instrument Campden Instruments has a Technical Support facility. Before you contact Technical Support it would be helpful to have the following information available so that your enquiry may be dealt with more efficiently. Technical Support can only help with queries relating to the instrument function, queries regarding instrument application should be directed to the sales department at Campden Instruments.

Instrument model number
Instrument serial number
Build date
Blade run time
Software revision code
Any error codes that you may have witnessed

This information may be readily accessed from the basic menu screen as follows.



Use the \triangle or ∇ keys to scroll to the line 'ABOUT' and press the MENU key.



The screen will now display the parameters required to contact Technical Support.

Pressing the MENU key once more will exit this screen

Error Codes

Note that if an error code occurs the instrument will stop. The instrument must be restarted by recycling the power.

Code 1: Internal communications error. Restart the instrument. If the problem persists contact Technical Support for advice.

Code 2: Internal communications error. Restart the instrument. If the problem persists contact Technical Support for advice.

Code 3: Advance limit switch fault. If the error occurs repeatedly during normal use contact Technical Support for advice.

Code 4: Table limit switch fault. Contact Technical Support for advice.

Code 5: Advance drive overload.

If the blade has collided with an obstruction, restart the instrument and carefully drive the blade away from the obstruction.

If the error occurs repeatedly during normal use contact Technical Support for advice.

Code 6: Oscillating head fault. Restart the instrument. If the problem persists contact Technical Support for advice.

Code 7: Oscillating head fault.

If motion of the vibrating head has been obstructed, restart the instrument and carefully drive the blade away from the obstruction.

If the error occurs repeatedly during normal use contact Technical Support for advice.

Code 8: Instrument overheat fault. Contact Technical Support for advice.

Code 9: Memory Fault. Restart the instrument. If the problem persists contact Technical Support for advice.

Code 10: Alignment tool communications error.

If the alignment tool has been unplugged during the blade alignment procedure, restart the instrument.

If the error occurs repeatedly during normal use contact Technical Support for advice.

11 Packing List

7000smz/5000mz Tissue slicer	1 off	
Blade holder	1 off	(for 7550-1-SS & 7550-1-C blades)
Mains lead	1 off	
Tissue bath assembly	1 off	
Outer bath assembly	1 off	
Specimen holder	1 off	
Opti-Cal - optical Calibration unit	1 off	(optional extra with 5000mz)
Stainless steel blades	10 off	(7550-1-SS)
Ceramic blades	2 off	(7550-1-C)
Cross head (Philips/PoziDriv) screwdriver	1 off	
Hexagonal drivers	2 off	
Carrying handles	4 off	
Operator's handbook	1 off	
Unpacking instructions	1 off	
Transit crate	1 off	

Microscope, cold light source, magnifying glass: Optional extras, as ordered.

12 Spare Parts and Accessories

When ordering, please order by part number and description.

Magnification

Stereoscopic zoom microscope	7000-1-1
Stereoscopic fixed magnification microscope (5x & 10x lenses included)	7000-1-2
Magnifying glass (2X)	7000-1-3

Illumination

Cold light source	7000-2-1
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Tissue bath assemblies

Complete tissue bath assembly (inner bath + outer bath)	7000-3-1
Inner tissue bath assembly	7000-3-2
Outer bath assembly	7000-3-3

Specimen holders

Replacement specimen holder (standard)	7000-4-1
Replacement adjustable specimen holder	7000-4-2

Blade holders

5000smz Blade holder <i>(Also fits 7000smz prior to serial number 7000-020)</i>	7000-5-1
Blade holder – special angle <i>Non-standard part – contact Campden Instruments</i>	7000-5-2
7000smz Blade holder <i>(From 7000smz serial number 7000-020 onwards)</i>	7000-5-3

Blade alignment equipment

Opti-Cal optical Calibration unit	7000-6-1
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Blade Handling

Blade Handling Tool	7000-7-1
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Blades

Stainless steel blades (pack of 50)	7550-1-SS
Ceramic blades (pack of 5)	7550-1-C

Miscellaneous

Tool set	7000-50-1
Transit Crate	7000-60-1

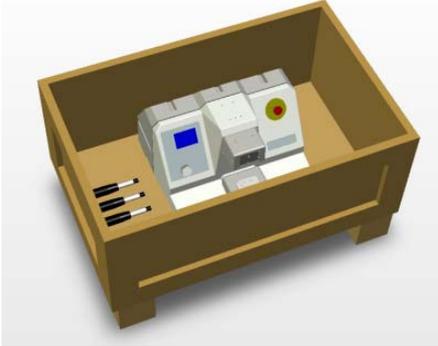
13 Specifications

Section thickness step size	0.001 mm
Bath table rise & fall speed	1.0 mm/sec maximum
Maximum (vertical) travel of bath table	19 mm
Cutting head advance speed	Minimum: -4.0 mm/sec (-1.00 during slicing) Maximum: +4.0 mm/sec (+1.00 during slicing)
Cutting head retraction speed	4.0 mm/sec
Maximum travel of cutting head	40 mm
Blade oscillation frequency	
7000smz	Minimum: 50 Hz Maximum: 120 Hz (amplitude dependent)
5000mz	Minimum: 50 Hz Maximum: 100 Hz (amplitude dependent)
Frequency step size	5 Hz
Blade oscillation amplitude	
7000smz	Minimum: 0.5 mm (nominal) Maximum: 2.5 mm (nominal)
5000mz	Minimum: 0.5 mm (nominal) Maximum: 2.0 mm (nominal)
Amplitude step size:	0.25 mm (nominal)
Power requirements (Selectable)	115VAC 60Hz 230VAC 50Hz
Power rating	100W
Fuse rating (115V)	T2A 250VAC
(230V)	T2A 250VAC
Light source	100-240Vac 3W
Weight	33Kg (excluding microscope)
Boxed shipping weight	60Kg (excluding microscope)

14 Copy of Unpacking Instructions

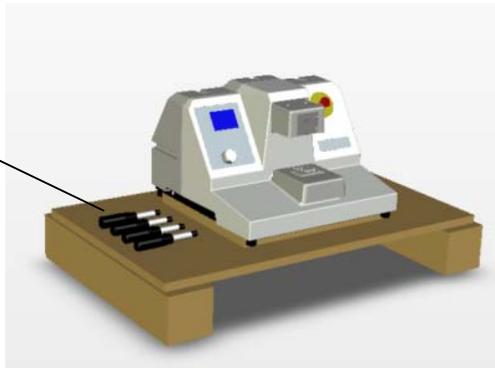
The 7000smz/5000mz weighs approximately 35 kg and requires two people to lift it.

When moving the instrument, always use the carrying handles provided. After unpacking the instrument, please save all packaging, & screws for future use.

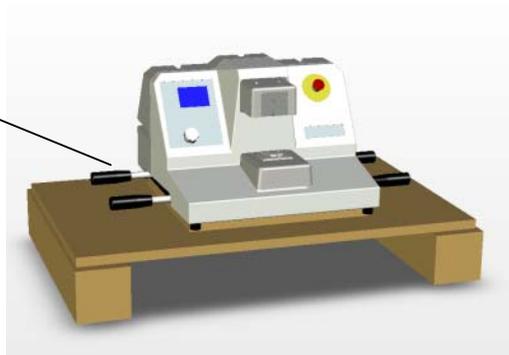


1. Remove all packing materials and accessories

2. Detach four carrying handles from the transport base.



3. Screw four carrying handles into the instrument base.
Ensure the handles are fully screwed in.



If it is necessary to return the instrument for service or repair, please repack the instrument in the original packing. The packing procedure is a reversal of the above procedure ensuring that the instrument is securely packed.