AST 580 (Version：AMOSAST580OP20240326）

Fully-automatic Cryostat Microtome

Operation Manual

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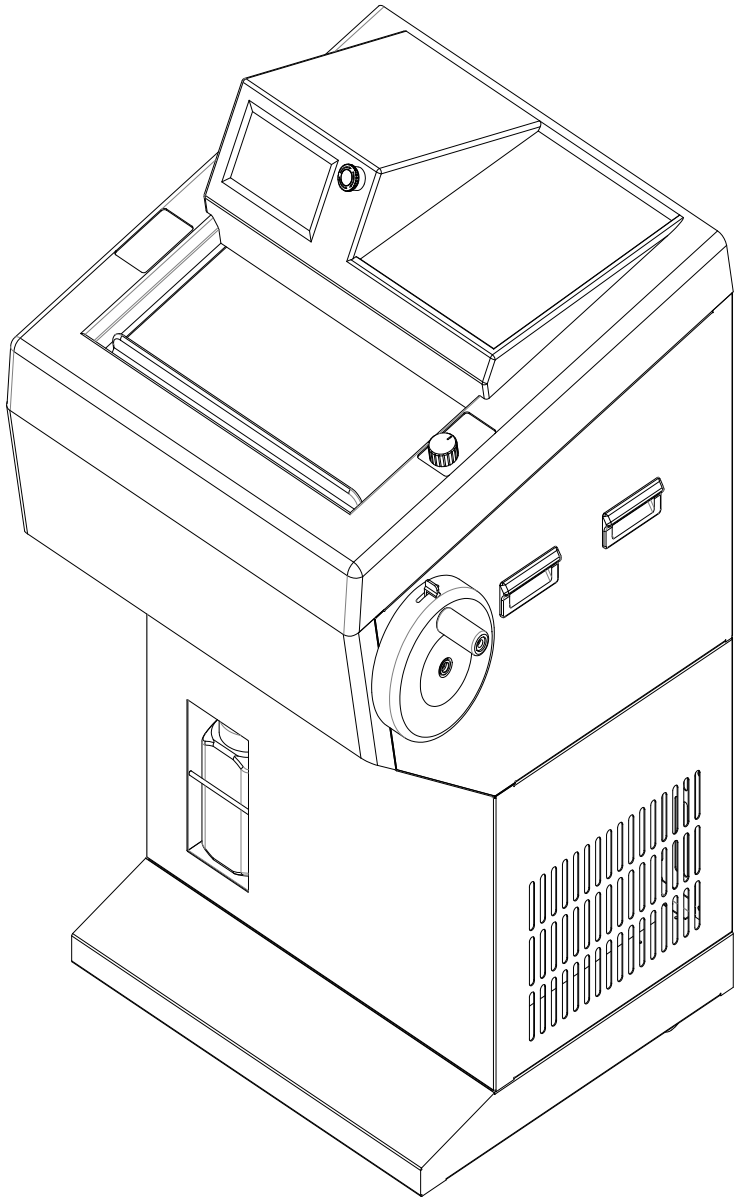


Presented in this Operation manual are the structure, functions and using notice. Reading carefully prior to operating the instrument.

Foreword

AST580 Cryostat Microtome is a fully-automatic microtome designed with input from global customers, capable of meeting diverse requirements in routine sectioning.

To ensure the machine's smooth, durable, and safe functioning, it is essential to read this operational manual thoroughly.

Our company takes responsibility for the maintenance of the products sold. Additionally, we have provided relevant training to our authorized agents. To ensure smooth and timely repairs, customers can directly contact local authorized agents.

Note: Our products undergo continuous updates and refinement in line with evolving technology. Please note that any enhancements or modifications to the technical specifications and structure of this product may not be included in this manual.

Contents

1. Safety Notes

1.1 Overview

The Operation Manual contains important safety instructions and information. The operation manual is an important part of the instrument, which the operator must read carefully prior to startup to ensure safe operation. It performs a critical role in maintaining personal safety and preventing equipment damage. Please keep the Manual near for timely access.

This instrument was built and tested in accordance with the safety regulations: GB4793.1-2007 Medical Electrical Equipment First Part: Current Requirements for safety

▲ **Note:** Do not remove or modify safety marks and devices on the equipment and accessories to prevent harm to the user or the equipment itself.

1.2 Safety Warning

The following safety warnings concern aspects relating to transport, installation, calibration, operation, maintenance, cleaning, and others. It is crucial that all users carefully read and strictly follow these guidelines to ensure safe and efficient operation.

1.2.1 Warning during transport and installation

- The instrument must always be transported or moved in an upright position, ensuring that the tilt angle does not exceed 45℃.
- After installation, it is crucial to remove the knife holder before any transportation or movement.
- The input voltage has been set at factory, please check if this setting complies with your local power requirement before connecting the equipment to the power supply.
- Please use the power cord provided. If in need of change, ensure that the replacement cord has an earth wire to maintain safe operation.
- Don’t operate in room present with explosion hazards.
- The safety marks and devices on the equipment and its accessories should not be removed or modified. This is essential to prevent harm to the user or damage to the equipment itself.

1.2.2 Warning of Operation

- Take special care when handling knife holder and the microtome blades, as the cutting edges are extremely sharp and can result in serious injury.
- Always remove the blade before detaching the knife holder from the equipment. When not in use, securely place the blade back into the storage box.
- Never position the knife with its cutting edge facing upwards, and avoid taking out the blade with bare hands.

- Always clamp the specimen block before securing the knife.
- Prior to changing the specimen and knife, always lock the handwheel first. If changing the specimen alone, always cover the cutting edge with the knife guard.
- Turn the handwheel in a clockwise direction to maintain the desired sectioning results. Incorrect rotation may affect the sectioning outcome.
- While sectioning, avoid frequent back-and-forth rotation of the handwheel when it is positioned at the top or bottom, as this may impact the thickness of the sections.
- Ensure that no liquid is to enter the equipment during work.

1.2.3 Warning during cleaning and Maintenance

- Only authorized personnel may perform service and repair.
- Before cleaning, ensure the equipment is powered off, disconnected, and the blade holder is removed for separate cleaning. Remove the blade from the holder beforehand.
- Lock the handwheel before cleaning.
- Do not use cleaning solvents containing acetone or xylene on the equipment.
- Ensure no liquid enters the equipment's interior during cleaning.
- Do not activate the equipment until it is completely dry after cleaning.
- Before replacing the fuse, power off the equipment and disconnect it. Use a fuse with identical specifications and follow the instructions provided in this manual.

1.3 Safety Device

Handwheel locking mechanism

As shown in the diagram, (1) is the locking lever. Push the lever in clockwise direction to lock the sample at topmost position. To unlock, push the lever (1) in the counterclockwise direction.

The diagram illustrates the handwheel in locked position. When locked, the instrument's control panel will illuminate the LOCK indicator. In this state, sectioning is not possible, and the automatic run button is inactive.

- Don't lock the handwheel when the handwheel is rotating, this would damage the instrument.

▲ **Attention:** Before removing the instrument , changing specimen/blade or cleaning the instrument, the handwheel must be locked.

Fig.1

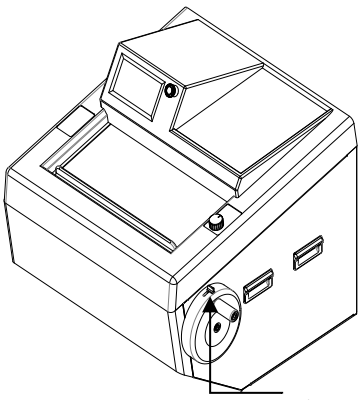
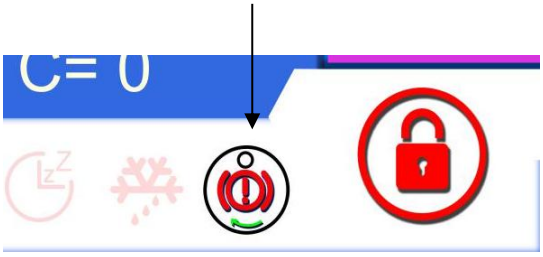


Fig. 2

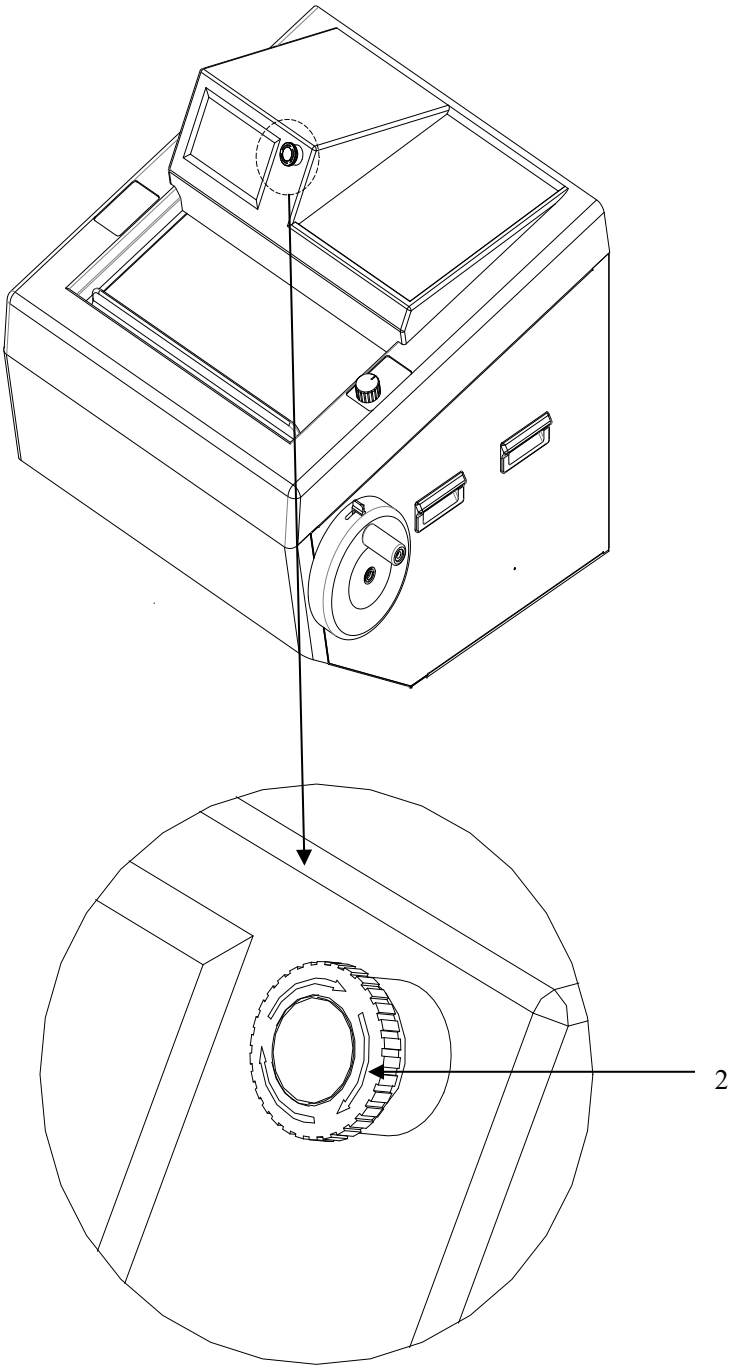


Emergency Stop Function

Pressing the Emergency Stop (E-stop) switch (2) shown in Fig. 3 immediately cuts off the main power supply of the instrument, halting all motion, while a red "STOP" blinks on the display screen. To release, rotate the switch in the direction indicated by the arrow until the button pops out.

●Correct use order:

Activate emergency stop switch - Troubleshoot the cause of the emergency stop - Release emergency stop switch - Resume work.



2. Performance & Parameters

2.1 Product Description & Intended Use

Cryostat Microtome is typically made up of a control system, mechanical system, drive system, blade holder, blades, and housing. It is used to slice human tissue samples for pathological analysis.

2.2 Overview-Instrument Components

The main structure of cryostat microtome is shown in Fig. 4 as below:

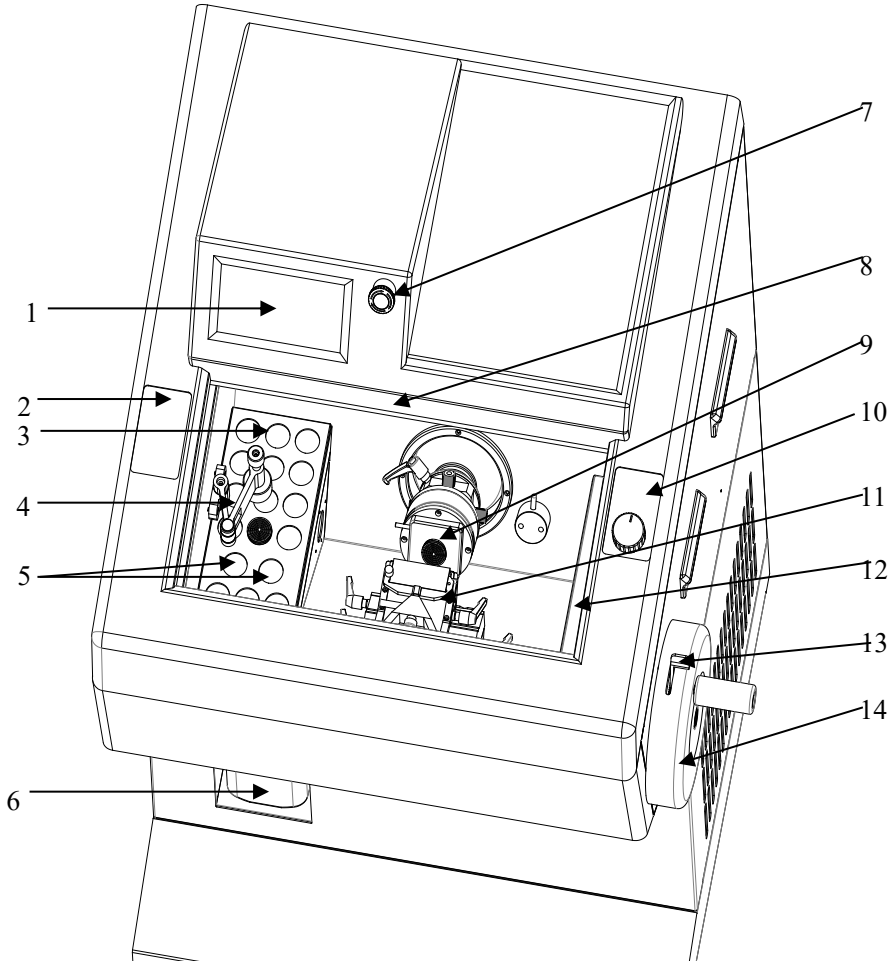


Fig. 4

1	Touch Panel		8	Heating glass
2	Left control panel		9	Specimen Clamp

3	Freeze Shelf		10	Right control panel
4	Stationary heat extractor		11	Blade holder
5	Peltier on freeze shelf freezing area		12	Tool Shelf
6	Waste container		13	Lock lever
7	E-stop switch		14	Handwheel

2.3 Performance Index

AST 580 is a fully-automatic cryostat microtome. The movement and feed of the sample are automatically controlled by a stepper motor, ensuring higher sectioning precision and simplified operation. Below are some performance features of the device:

⊙ The instrument adheres to ergonomic design principles for a more aesthetically pleasing appearance, crafted through CNC for precision.

⊙ Touchscreen interface, convenient, user-friendly operation, and is easy to learn.

⊙ The included sample retraction feature prevents the sample from contacting the blade during the upward movement.

⊙It equips a counter to show total quantity of sections.

⊙Adopt UV and O_3 disinfection to sterilize for 30 minutes every time.

⊙The specimen clamp semiconductor refrigerating function is enabled or disabled.

⊙Defrosting at fixed time or manually controlled.

⊙Sterilization at fixed time or manually controlled.

⊙Sleep at fixed time or manually controlled.

⊙Large freezing shelf could load 17 samples simultaneously.

⊙Two running way: manual and automatic.

⊙Under automatic operation, it has continuous mode and multi-mode (1~5).

⊙Quick feed function.

⊙Waste section suction function.

⊙Alarm information query.

⊙Emergency stop function: Press the red button to stop running when emergency occurs.

2.4 Technical Parameter

⊙ Environment requirement：Temperature Range：+15℃～+30℃，

Air Humidity： ≤60%

Working pressure：（86～106）kPa；

⊙ Nominal Voltage：220～240V AC/100～120V AC

⊙ Normal Frequency：50/60 Hz

⊙ Power： ≤1000VA

⊙ Fuse： 8A/20A

⊙Safe Classify：Classify I - Type B

⊙Lowest freeze chamber Temperature ：-35±2℃

⊙Lowest freeze shelf Temperature：-45±5℃

⊙Lowest temperature of peltier unit on freeze shelf：-55±5℃

⊙Lowest temperature of peltier unit on specimen clamp： -50 ± 5 ℃ (Working time of peltier :15 minutes)

⊙Electric coarse feed：Slow 300μm/s±30μm/s

Rapid 900μm/s±30μm/s

⊙ Section thickness range： 0 to 100μm

0 to 3μm， in 0.5μm increments

3 to 10μm, in 1μm increments

10 to 20μm, in 2μm increments

20 to 100μm， in 5μm increments

⊙ Trimming thickness range: 0 to 600μm

0 to 50μm， in 5μm increments

50 to 100μm, in 10μm increments

100 to 600μm, in 50μm increments

⊙Retraction ： 0~80μm, in 5μm increments

⊙Specimen feed：24mm ±0.2mm

⊙Vertical stroke：54mm±1mm

⊙Specimen Max：35×35mm

⊙Repositioning of blade holder base(left-right) ： 50±1mm

⊙Motorize cutting speed : 75～230mm/s ± 10% .

⊙ Dimension: Width：715mm ,

Length：765mm ,

Height：1230mm ,

⊙ Weight: About 130kgs

3. Preparation before operating

3.1Installation site requirement

⊙This machine is mobile with four caster wheels and two fixed support feet. Use the front casters for movement, then adjust the support feet to stabilize it.

⊙ Start the instrument after let it rest for at least 2 hours .

⊙ Do not place any objects on either side of the machine, leaving a minimum clearance of 300mm to ensure proper ventilation and heat dissipation.

⊙ Ensure that the ambient temperature and humidity in the environment where the instrument is placed comply with the specifications outlined in the technical parameters.

⊙ Due to the movable nature of the rotating handwheel, sufficient space must be provided to allow for its movement.

▲ Notice: **Do not operate the instrument in room with explosion hazard .**

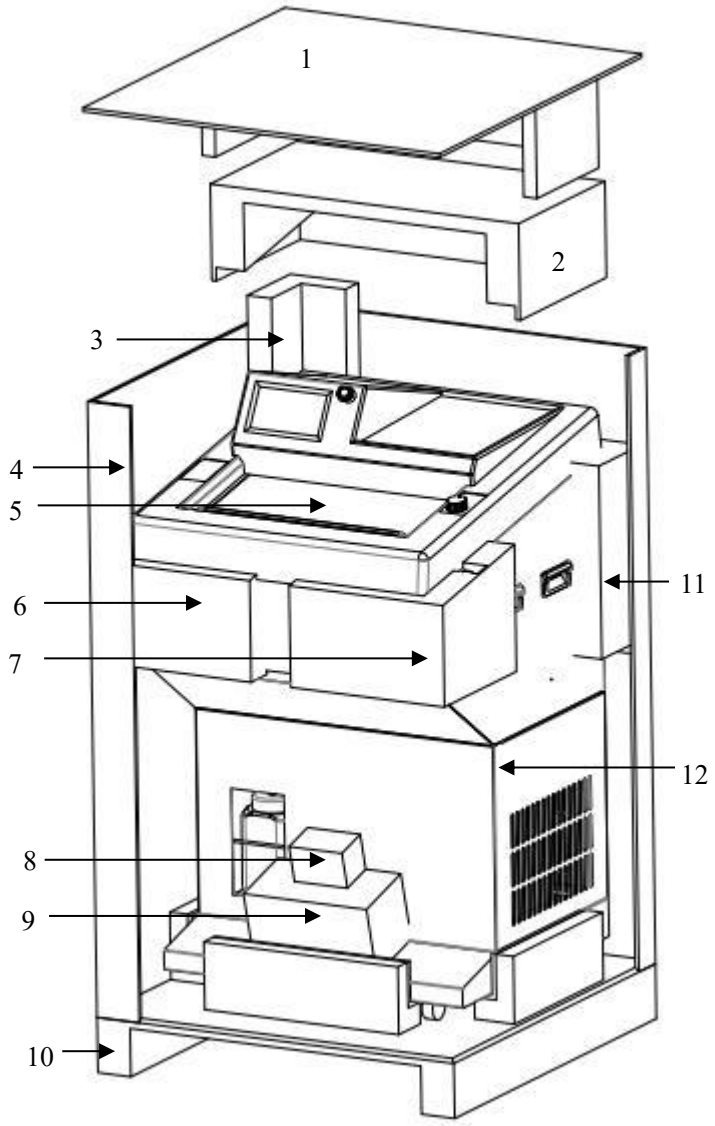
3.2 Standard Delivery

AST 580 Cryostat Microtome	1set		7mm Wrench	1pc
Blade holder	1set		Disposable Blade	1box
Handwheel	1pc		Power Cord	1pc
Specimen clamp	18pcs		Fuse	2pcs
M5 Allen Key	1pc		Brush	1pc
M3Allen Key	1pc		Operation Manual	1pc

● Upon unboxing, please verify the completeness of the standard listing provided above. In the event of any discrepancies or issues, please contact the supplier in time. If you need special conFig.uration or requirements, please specify before ordering.

3.3 Installation

3.3.1 Unpacking



As showed in the diagram, the following is the instrument accessories:

Remove the carton cover (1) and carton body (4), then take out the following things in order: Upholder (2), Corner Support 1 (3) , Corner Support 2 (6) , Corner Support 3 (7) , Corner Support 4 (11) , Handwheel (8) , Blade Holder (9), Cryostat Microtome (12), Glass Support (5).

Open the individual packages of each component and proceed to the next installation step.

1	Carton Cover		7	Corner Support 3
2	Upholder		8	Handwheel
3	Corner Support 1		9	Blade Holder
4	Carton body		10	Carton Base
5	Glass Support		11	Corner Support 4
6	Corner Support 2		12	Cryostat Microtome

3.3.2 Handwheel Assembly

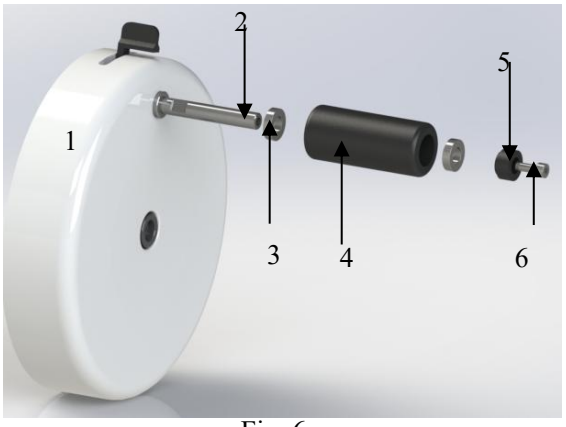


Fig. 6

After unpacking the handle parts, screw the handle shaft (2) into the handwheel (1) using a 7mm wrench, then assemble the bearings (3), handle sleeve (4), bearings (3), and handle pad (5) in sequence. Finally, secure them with M5×16 hexagon socket screws (6).

1	Handwheel		4	Handwheel Sleeve
2	Handwheel shaft		5	Handwheel Pad
3	Bearing		6	M5×16 hexagon Socket Screw

3.4 Electrical Connection

- Ensure the input voltage is correct before installation to avoid equipment damage.
- Use a power supply with a grounding wire for safety during operation.
- Please use supplied power cord; in the event of replacement, must use power cord equipped with a grounding wire.
- Insert the fuse (1) into installation part (2) as shown and insert the whole into the socket (3) .

Attention: Ensure power is off before replacing the fuse. To ensure trouble-free operation, please comply with the instructions outlined in the operation manual.

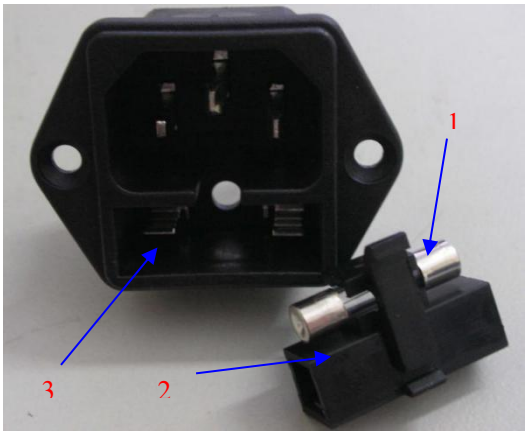


Fig. 7

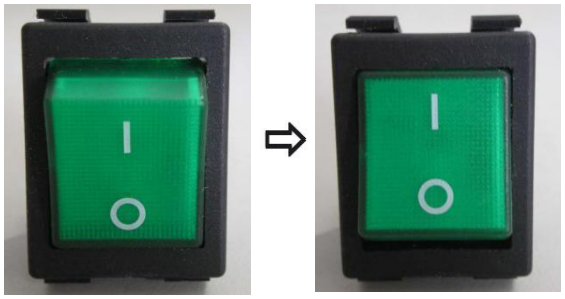


Fig. 8

- As Fig. 8 shows power switch, power off (left) and power on (right).
- Upon turning on the power switch, the LCD screen on the panel will initiate display. Simultaneously, the specimen clamp will automatically perform a zeroing action. A single beeping sound will signal the process's conclusion.

4. Operation

4.1Operation Panel Function & Control

All the parameters are set and displayed via Touch Panel. After power on, use the control panel to operate the instrument as follows:

4.1.1 Touch Panel Main Interface

The touch panel main interface is as followed:

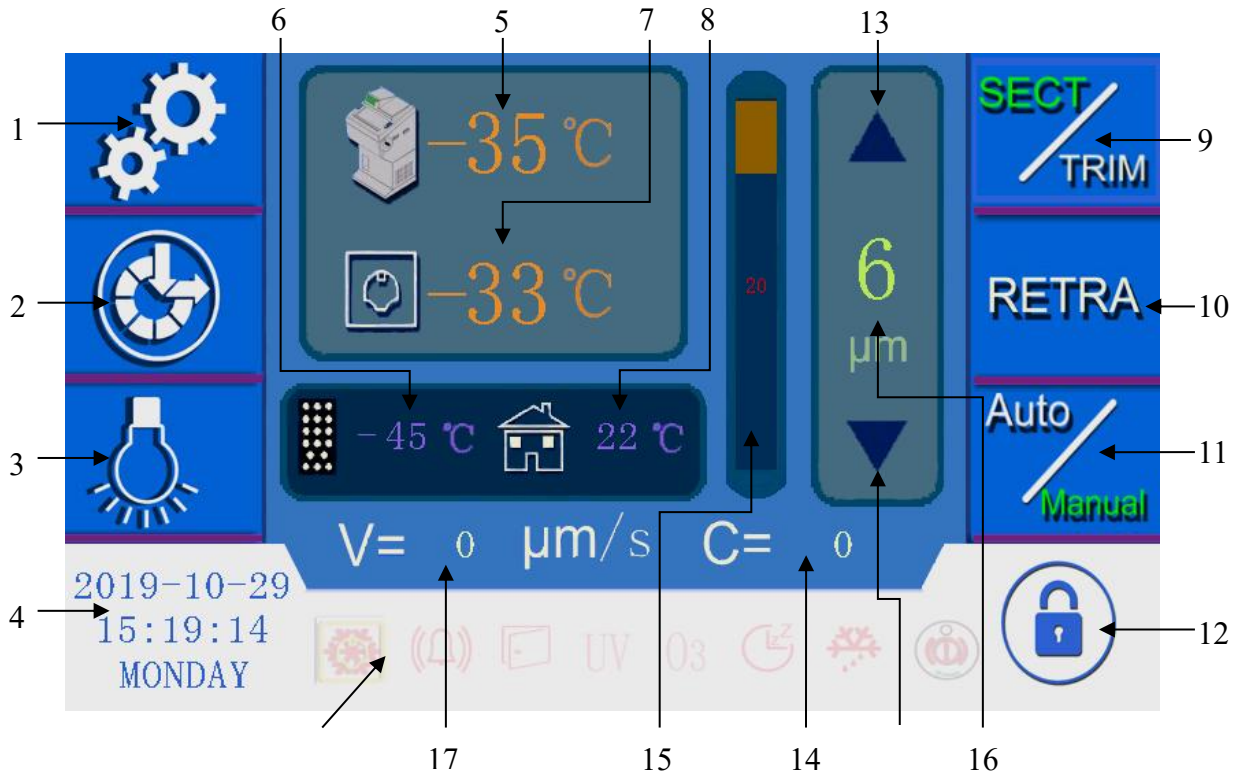


Fig. 9

1. Time setting	Touch the icon to open a submenu where you can set the timing
2. Auxiliary Function	Touch the icon to open a submenu and select auxiliary functions
3. Lamp	Touch the icon, turn on/off the lamp

4. Time display and setting	Display current date and time. Touch the icon, set the date and time
5. Cryo chamber temperature set and	Display the actual cryo chamber temperature; touch the number to set the desired chamber temperature
6. Freeze shelf	Display the freeze shelf temperature
7. Specimen clamp temperature setting	Display specimen clamp temperature; touch the number to set the desired clamp temperature
8. Environment	Displays the temperature of the equipment's environment
9. SECT/TRIM: alternative select key	Touching the icons changes the "SECT" and "TRIM" fonts to green, indicating sectioning and trimming modes, respectively. Corresponding thickness values are displayed at 15. Touching these values opens a numerical keyboard to modify settings, constrained by the parameters in section 2.4. For example, with a sectioning thickness range of 0 to 3μm and an increment of 0.5μm, entering 2.8 would default to 3μm.
10. Retra: Retraction key	Touching the icon turns the "RETRA" font green, signifying retraction mode. The thickness value for this function is displayed at 15 and can be adjusted via a numerical keyboard, constrained by the parameters in section 2.4.
11. Running mode	Display the current Sectioning mode
12. Lock key	Touch the icon to lock/unlock the screen. The lamp key is not controlled by this key
13.Value increasing	Touch this key to increase item 15 thickness
14. Section count sum	Displaying section count sum, when exchange between sectioning and trimming, the value will return to zero automatically.
15. Progress display	Display the sample clamp progress
16. Section thickness setting	Selections 9, 10, and 11 correspond to sectioning, trimming, or retraction values. Adjust settings using arrows or input directly via the numerical keyboard. Pressing confirm applies changes, with values constrained by section 2.4 parameters.
17. Section speed	Display sectioning speed in automatic mode
18. Auxiliary function status	When the auxiliary function is activated, the corresponding icon is highlighted
19.Value decreasing	Click this key to decrease item 15 thickness

4.1.2 Left control panel

The left control panel is primarily used to move the sample along the feed direction and adjust its distance from the blade holder, as shown in Fig.ure 9：

Fast forward/fast backward (two arrows)

Adjust the specimen position rapidly; the speed could reach 900±30μm/s

Slow forward/slow backward (single arrow)

Adjust the specimen position slowly; the speed could reach 300±30μm/s

- Specimen feed range is 24mm. Once exceeding this distance, the buzzer will beep, and the specimen movement stops.
- The forward and backward keys are valid only under manual mode.

4.1.3 Right Control Panel

The right control panel is mainly used for switching sectioning modes, run/stop under automatic mode and section speed adjustment as below Fig. 11.

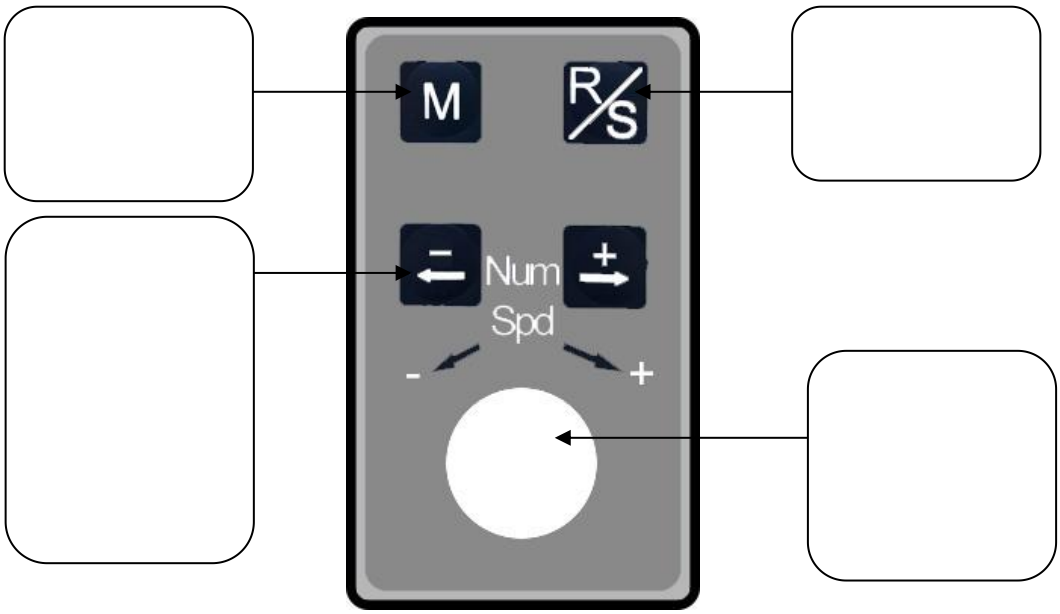


Fig. 11

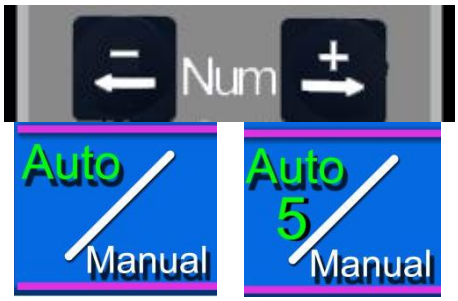
Mode selection between manual and automatic:

Press the button to switch between manual and automatic sectioning modes. The current mode is shown on the right side of the touchscreen: "Cont." for continuous automatic mode and "Manual" for manual mode.

Run/Stop key:

In automatic mode, long-press to start automatic sectioning (when the handwheel lock is released); short-press to stop. Operation status turns green when running and white when stopped.

Switch running mode under automatic mode.



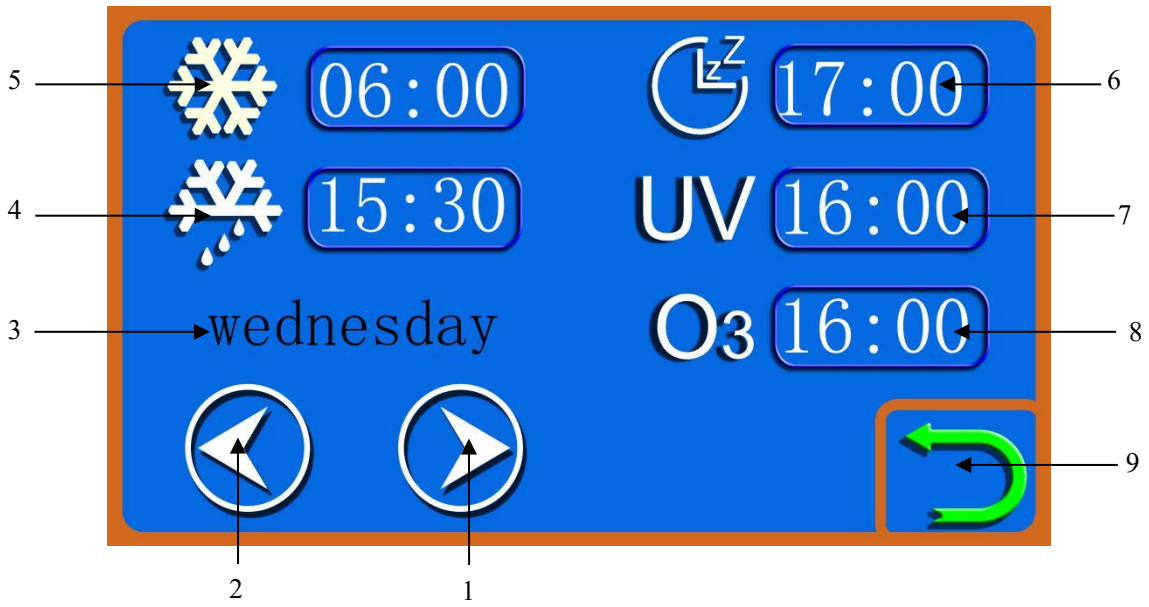
Press "M" to switch to automatic sectioning mode, then use the arrow keys to select from "Cont.", "1", "2", "3", "4", and "5" modes for the number of sections to cut. The device remembers the last mode selected if the arrows are not used to change it.

Speed adjusting knob

The knob adjusts speed of sectioning can only be activated during running, and the speed range is 75-230mm/s±10%.

4.2Time Setting

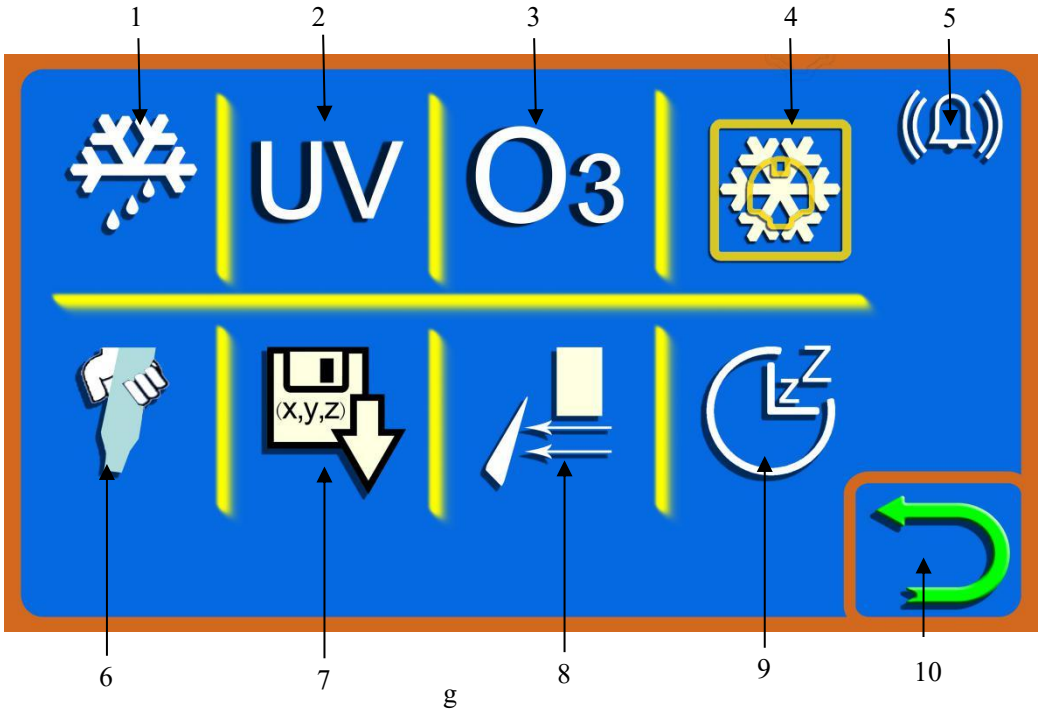
Touch the time icon on the upper left corner of the main screen; a submenu will pop up as shown below in Fig. 12.



1. Left Arrow	Use in conjunction with right arrow to select a day of the week and set working hours for each function. The illustration shows setting automatic operation times for each function on Wednesdays.
2. Right Arrow	Use with left arrow to choose a day of the week and set working hours for each function.
3. Selected Dates	After setting each function's time for the chosen date, use the arrow to move to the next date for further settings.
4. Automatic Defrosting Time	Set the device's automatic defrosting time for the selected date. Ensure samples are stored properly and debris bags are removed before defrosting.
5. Automatic Startup Time	Set the device's automatic startup time on the selected date.
6. Automatic Sterilization	Set the device's automatic UV sterilization time for the selected date; ensure the heated glass window is closed before starting sterilization.
7. Automatic Sleep Time	Set the device's automatic sleep time for entering sleep mode on the selected date.
8. Return key	After setting all parameters, press this button to return to the touchscreen's main interface.

4.3 Auxiliary Function

Touching the auxiliary function settings icon on the touchscreen's main interface opens the auxiliary function submenu, as shown in Fig. 13:



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1. Instant Defrost	Touch this key to immediately initiate the defrosting process.
2. Instant Sterilization	Touch this key to immediately initiate the sterilization process; ensure the heated glass window is closed before starting sterilization.
3. Instant Sleep	Touch this key to immediately put the device into sleep mode.
4. Sample Clamp Cooling Plate Switch	When the box temperature drops below -8°C, touch this icon to activate the sample clamp cooling plate; the cooling plate will automatically stop after running for 15 minutes.
5. Waste Removal	Prepare the necessary tools for waste removal, then touch this icon to automatically remove waste from the box.
6. Feed Position Memory	During sample-to-sample operation, memorize the position of the sample feed direction; used in conjunction with 7.
7. Automatic Feed	Used in conjunction with 6, touch this icon to automatically feed the sample to the memorized feed position.
8. Alarm information	Touch to view alarm information when the device has triggered an alarm.
9. Return Key	Touch this key to return to the touchscreen's main interface.

Notice: Before entering the instant defrosting state, be sure to remove samples and debris bags. Functions 6 and 7 are only suitable for samples with consistent thicknesses.

4.4 Cryo chamber temperature setting

Touch the chamber temperature display on the main interface to open the chamber temperature setting submenu, as depicted in Fig. 14:

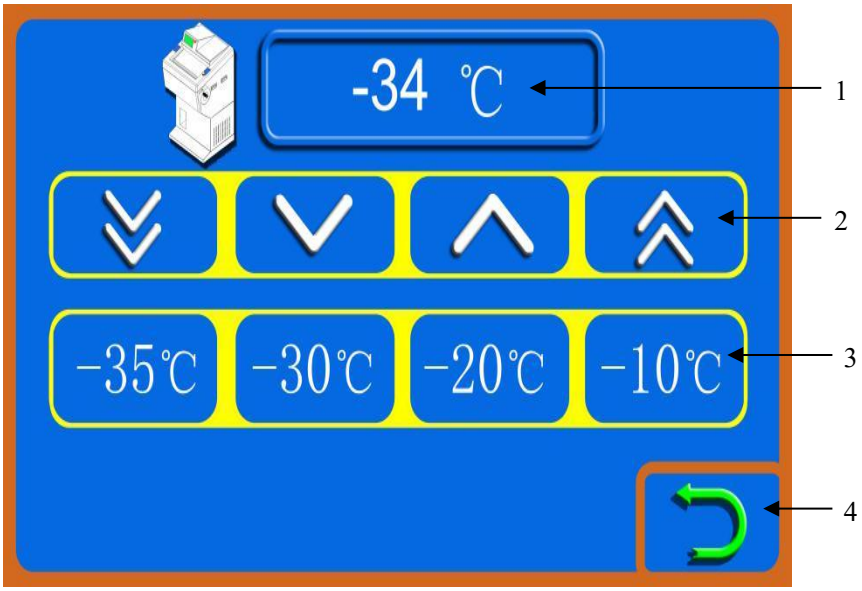
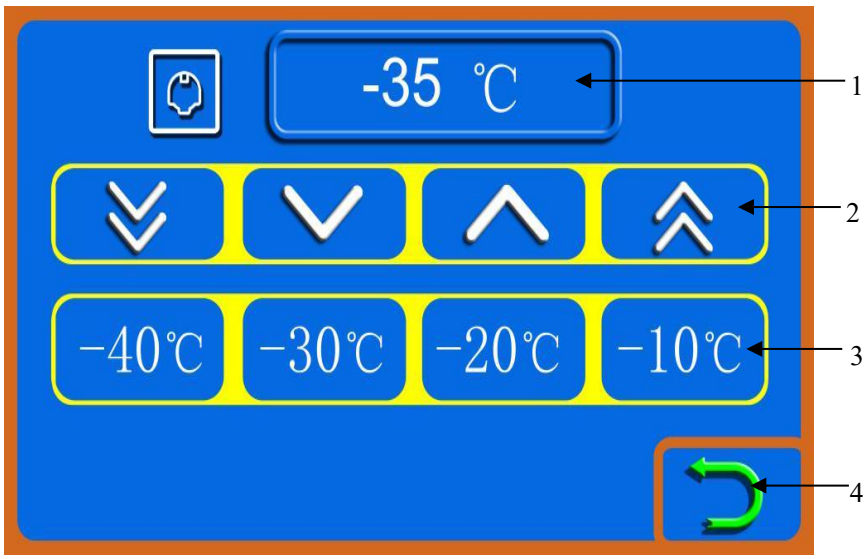


Fig. 14

1. Temperature Setting	Displays the current set temperature, which can be adjusted using 2 and 3.
2. Value Adjustment	Double arrows adjust by 5°C, single arrow adjusts by 1°C.
3. Quick Temperature Selection	Quickly select the desired temperature.
4. Return Key	Touch to return to the touchscreen's main interface.

4.5 Specimen clamp temperature setting

Touch the sample clamp temperature display on the main interface to open the sample clamp temperature setting submenu, as depicted in Fig. 15.



1. Temperature Setting	Displays the current set temperature, which can be adjusted using 2 and 3.
2. Value Adjustment	Double arrows adjust by 5°C, single arrow adjusts by 1°C.
3. Quick Temperature Selection	Quickly select the desired temperature.
4. Return Key	Touch to return to the touchscreen's main interface.

4.6 Section, Trimming and Retraction Setting

The options for sectioning, trimming, and retraction values are located on the right side of the touchscreen's main interface, as depicted in Fig. 16.

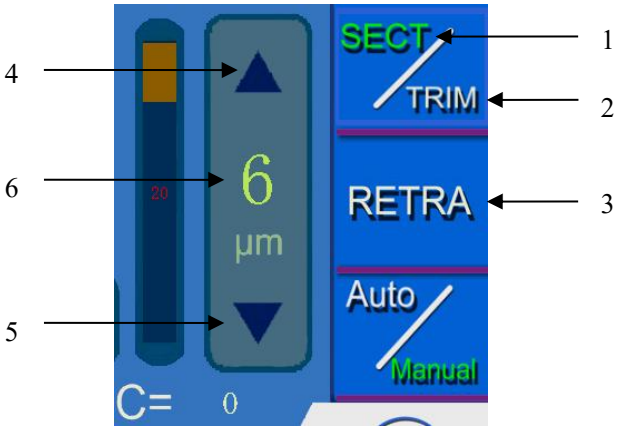


Fig. 16

1.Section Option	When the current state is not sectioning mode (SECT font displayed in white), touch the SECT icon to switch to sectioning mode, indicated by the SECT font turning green.
2.Trimming Option	When the current state is not trimming mode (TRIM font displayed in white), touch the TRIM icon to switch to trimming mode, indicated by the TRIM font turning green.
3.Retraction Option	When the current state is not retraction mode (RETRA font displayed in white), touch the RETRA icon. When the RETRA font turns green, the retraction value function is selected.
4. Upward Adjustment Arrow	Touch the arrow to increase the set value displayed in 6. Each touch adjusts the thickness increment based on the thickness increment specified in section 2.4 of the technical parameters.
5. Downward Adjustment Arrow	Touch the arrow to decrease the set value displayed in 6. Each touch adjusts the thickness decrement based on the thickness increment specified in section 2.4 of the technical parameters.
6. Thickness Display and Setting	Displays the thickness value corresponding to the option selected in 1, 2, or 3. Touch this thickness value to open a numerical keyboard. You can modify and set the displayed thickness value using this keyboard. The input value is limited by the thickness selection specified in section 2.4 of the technical parameters. For example, with a sectioning thickness range of 0 to 3µm and an increment of 0.5µm, if 2.8 is entered via the keyboard, the system defaults

	to and displays a sectioning thickness of 3μm.

4.7 Lock Screen Key & Auxiliary Function Display

The lock screen key and auxiliary function display is located in the bottom of the main interface as below Fig. 17.

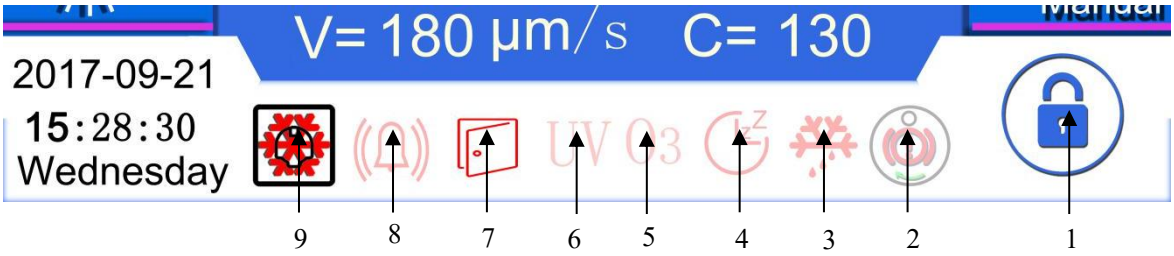


Fig. 17

1. Lock Screen Key	Red icon indicates touchscreen is locked; touch to unlock (icon turns blue). In locked state, only the lighting button responds to touch on the touchscreen.
2. Handwheel Lock	Highlighted icon indicates handwheel is locked; dimmed icon indicates unlocked. Illustration depicts locked handwheel.
3. Defrosting	Highlighted icon indicates device is in defrosting mode; dimmed icon indicates otherwise.
4. Sleep Mode	Highlighted icon indicates device is in sleep mode; dimmed icon indicates otherwise.
5&6. Sterilization	Highlighted icon indicates device is in sterilization mode (UV & Ozone); dimmed icon indicates otherwise.
7. Heating Glass Opened	Highlighted icon indicates heated glass window is open; dimmed icon indicates closed.
8. Alarm	Highlighted icon indicates device has alarm message; dimmed icon indicates no alarm message.
9. Cooling Plate Switch	Highlighted icon indicates sample clamp cooling plate is active; dimmed icon indicates inactive.

4.8 Emergency Stop Situation

n case of an emergency, to prevent harm to the operator or equipment, users can press the emergency stop button located in the upper right corner of the touchscreen, as depicted in Fig.

18. Upon pressing the emergency stop button, the device halts immediately, and the screen displays "STOP," as illustrated in Fig. 19 below:

Fig. 18

Fig. 19

After releasing the emergency stop, gently rotate the emergency stop button in the direction indicated by the arrow on the button until the button pops up. This action releases the device from emergency stop status, and the main touchscreen returns to displaying the main interface.

Note: The emergency stop function can only be used in emergency.

4.9 Blade Holder Installation

As shown in Fig.ure 20, the blade holder mainly consists of the following parts. When leaving the factory, the blade holder is already assembled, only needing to be installed onto the device.

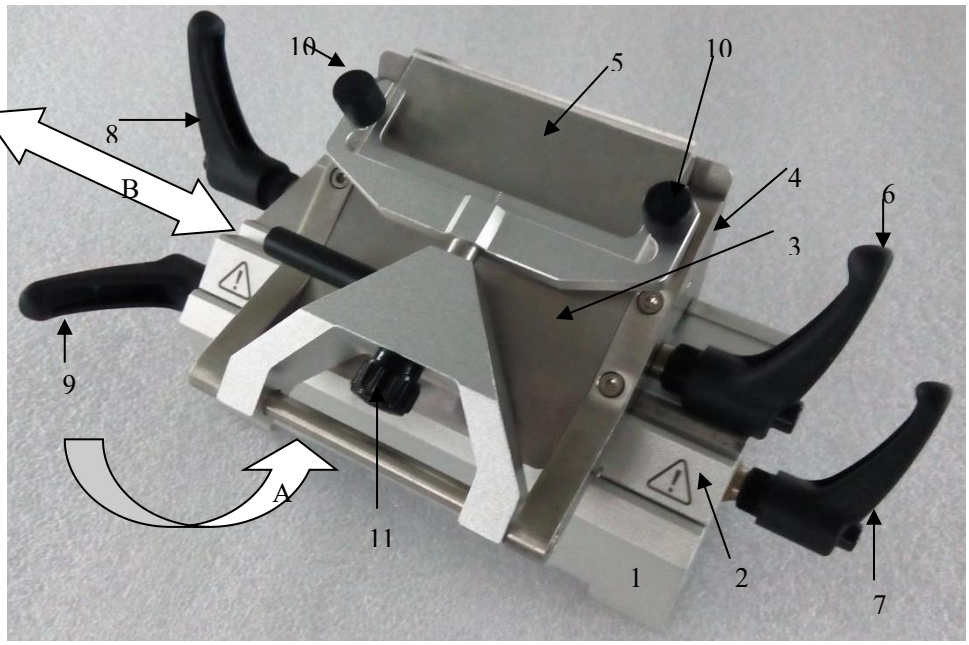


Fig. 20

1	Horizontal Slider	7	Fixed Lever 2
2	Rotating Slider	8	Fixed Lever 3
3	Movable Blade Clamp	9	Fixed Lever 4
4	Fixed Blade Clamp	10	Anti-Curling Plate Locking Knob
5	Anti-Curling Plate	11	Anti-Curling Plate Height Adjustment Knob
6	Fixed Lever 1		

⊙ Fixed lever 1: Secures the blade onto the blade holder.

⊙ Fixed lever 2: Locks the blade holder in position within the cryostat.

⊙ Fixed lever 3: Allows the fixed blade clamp to move along the horizontal slider in the direction indicated by arrow B (left-right direction). Once the fixed blade clamp is in the appropriate position, it is secured in place by Fixed lever 3.

⊙ Fixed lever 4: Secures the rotating slider after adjusting the angle of the blade holder along the horizontal slider.

⊙ Anti-curling Plate Height Adjustment Knob: Rotates to adjust the distance between the anti-curling plate and the blade for anti-curling during sectioning.

Installation of Blade Holder and Base

As shown in Fig.ure 17, the blade holder is installed on the track (1) inside the cryostat. During installation, with the blade holder's blade close to the sample clamp, follow these steps:

⊙ If there are blades installed on the blade holder, carefully remove them and place them aside.

⊙ Gently rotate Fixed Lever 2 (2) to move the locking block (3) at the bottom of the blade holder away from the bottom of the blade holder until it reaches the farthest position.

⊙ Align the locking block (3) at the bottom of the blade holder with the circular hole (4) on the track (1). Simultaneously, align the V-shaped groove (5) at the bottom of the blade holder with the V-shaped groove (6) on the track (1), then place the blade holder onto the track (1) and gently push it forward to the appropriate distance.

⊙ Gently rotate Fixed Lever 2 (2) to lock the blade holder onto the track and adjust the adjustable handle on Fixed Lever 2 (2) to the horizontal position.

▲**Attention:** Before moving the blade holder away from the instrument, remove the blades first, and when not in use, remove and store the blades in the blade box.

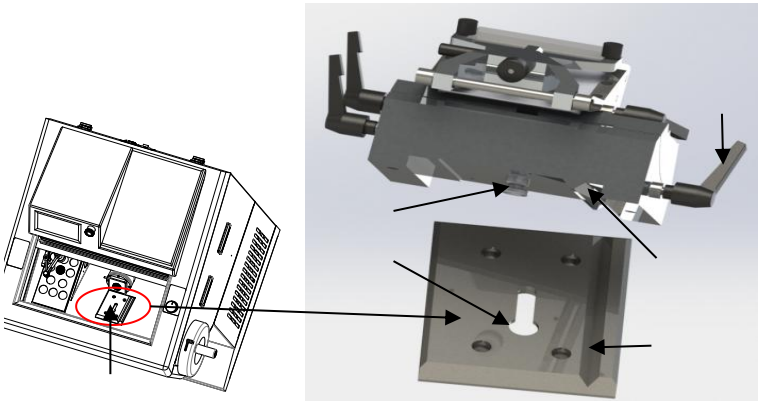


Fig. 21

Blade Holder Angle Adjustment

The rotating angle adjustment is shown in the left diagram, ranging from 0-10 degrees. Users can adjust the angle in this range according to requirement.

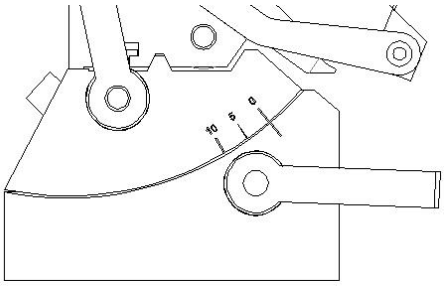


Fig. 22

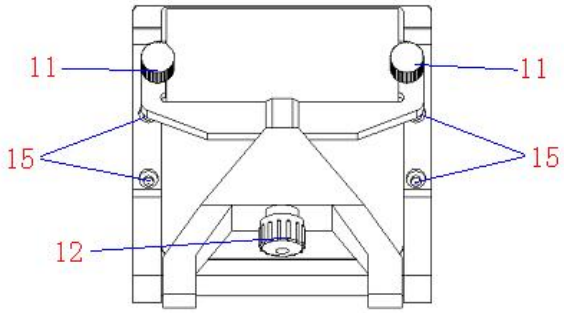


Fig. 23

Anti-Curling Plate Adjustment

As shown in Fig.ure 19, the anti-curling plate is a rectangular transparent acrylic glass, and the adjustment process includes:

⊙ Inserting the blade and rotating Fixed Lever 1 to vertically clamp the blade.

⊙ Locking the two anti-curling plate locking knobs (11).

⊙ Using a 3mm hex wrench to adjust the bolt (15) to make the blade parallel to the anti-curling plate. Tighten the bolt (15).

⊙ Adjusting the anti-curling plate height by turning the anti-curling plate height adjustment knob (12).

▲ **Attention:** Please handle the blade holder and blades with care and caution, as the blade edges are extremely sharp. Improper handling can easily lead to injury.

4.10 Clamping the Specimen and Inserting the Blade

Clamping the specimen

As shown in Fig.ure 24, lift the clamp lever (2) upward, place the sample (3) into the clamp (1), and then release the clamp lever (2).

● Always clamp the sample before inserting the blade to prevent unnecessary injury.

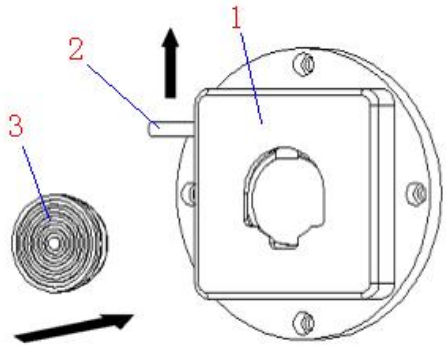


Fig. 24

Blade inserting

As shown in Fig. 25, first rotate and loosen the lever (5). Then, insert the blade (6) into the knife holder (4) following the indicated direction, and rotate the lever (5) vertically to secure the blade.

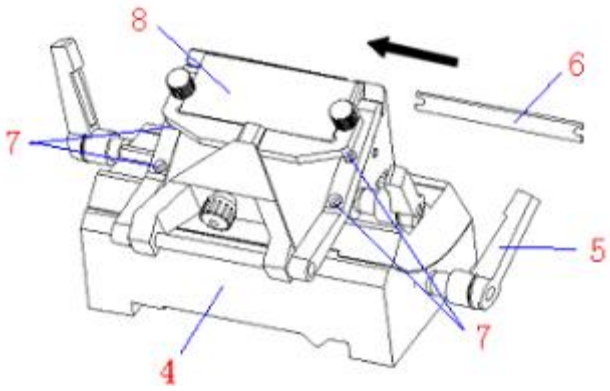


Fig. 25

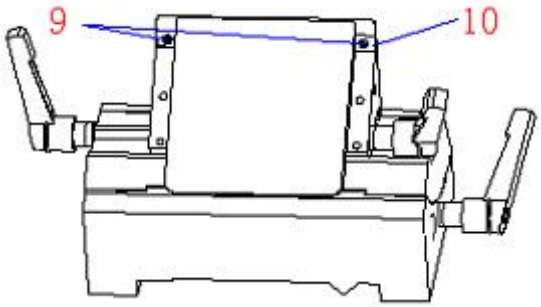


Fig. 26

Two types of disposable blades are available: low & high-profile.

For high-profile blade, use a 3mm hex wrench to remove the four bolts (7), detach the anti-curling plate (8), and then unscrew the two screws (9) on the spacer (10), remove the spacer (10). After inserting the blade, reattach the anti-curling plate (8), secure it with the four bolts (7).

● Take care when operating the blade holder and the blade. The cutting edge is extremely sharp and can cause serious injury.

4.11 Section Reference

1. When using the cryostat microtome, mastering the appropriate sectioning speed and correctly adjusting the anti-curling plate are the most crucial factors for cutting ideal tissue sections. The suitable sectioning speed is acquired through practical experience. The adjustment of the anti-curling plate involves multiple components that may interact with each other. It requires meticulous calibration and should not be randomly placed on the blade.

2. During cryo-sectioning of live tissues, the moisture within the tissue condenses into ice, causing the tissue to harden. The hardness varies with temperature; the lower the temperature, the harder the tissue becomes. To determine the optimal sectioning temperature for obtaining high-quality tissue sections, one needs to experiment and explore. For most tissues without fat and not fixed with formalin, the recommended sectioning temperature is between -13°C and -23°C.

3. To obtain high quality section, please pay attention to the following aspects:

1) Selecting the appropriate working temperature for the cryochamber.
2) Executing precise sectioning operations.
3) Fine-tuning the anti-curling plate.
4) Using a sharp sectioning knife with an appropriate cutting angle.
5) Ensuring the blade is securely clamped.
6) Ensuring the sample is properly secured.

Choosing the angle between the sectioning knife and the sample is crucial. A smaller angle results in less compression of the section. For harder samples, a larger angle is recommended. If the sectioning results are unsatisfactory, try gradually increasing the angle from 0°. There is currently no universal rule to determine the optimal angle for different samples. Experimenting to find the suitable angle for various samples is a method to achieve high-quality sections.

4. In contrast to normal paraffin sections, frozen sections do not cut along the long edge of the tissue; it is preferable to cut along the short edge, ensuring a shorter contact line between the tissue and the sectioning knife.

● After completing the sectioning process, place the sample clamping system at the top and secure it. Once the instrument is no longer in use, remove the blade and store it in the blade box.

5. Cleaning & Maintenance

5.1 Cleaning

⊙ Cleaning the instrument

Clean the instrument's exterior with a dry cloth, ensuring effective removal of dust. In areas that require more thorough cleaning, a damp cloth may be necessary, focusing on frequently touched components, such as the right-hand wheel handle.

⊙ Cleaning the clamp

As Fig. 27 shows. Position (1) which is often touched when operation, and position (2) which always contacts with the specimens. These two positions, especially position (2) is very easy to be polluted, so it need to be cleaned frequently to ensure normal operation.

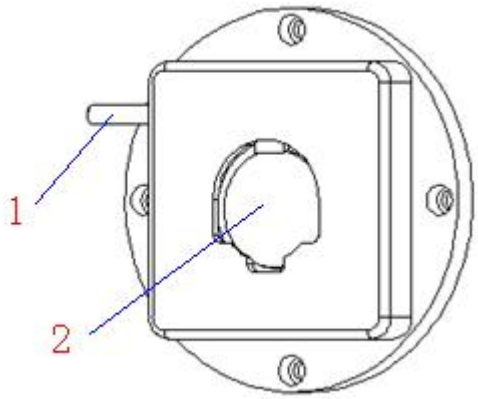


Fig. 27

Fig. 28

⊙ Cleaning the blade holder

Detach all the parts of blade holder as it is shown in Fig. 28 and clean all the parts separately, especially the following easily polluted parts: the sliding rail, lever, blade clamp and the joint of the parts. And remember to clean the blade clamp every time before installing a new blade to ensure good sectioning.

To obtain a high-quality section, it is important to keep the instrument’s cleanliness. Therefore, the user must clean the instrument periodically or irregularly according to the total sectioning quantity to obtain the best sectioning result.

- Only authorized and qualified service personnel may access the internal components of the instrument for cleaning and maintenance .
- Before cleaning and maintenance, turn off the instrument, pull out the plug and take down the

blade holder and then clean all the parts separately. The blade must be taken down before cleaning the blade holder.

- Lock the handwheel before cleaning .
- Open the glass after turning off the instrument to keep the chamber dry !
- Do not use any corrosive solvent for cleaning !
- Ensure no liquid enters the interior of the instrument during cleaning !
- Keep cleaning the cryo chamber frequently !
- Do not turn on the instrument before it is completely dry .

5.2 Cleaning the waste tissue

Section extraction is equipped to facilitate the removal of waste tissue generated during sectioning.

When preparing for suction scraps, please attach the scrap bag to the suction joint (Fig. 29), and securely fasten the white tie along the edge to ensure a firm fixation (Fig. 30).

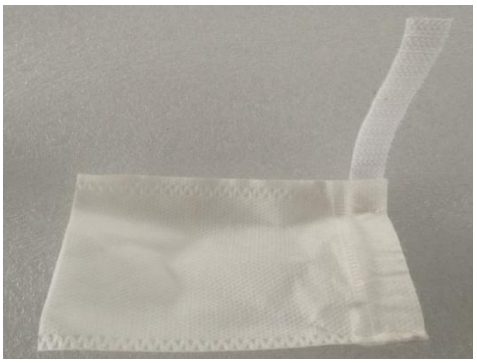


Fig. 29

Fig. 30

Remove the silica plug from the suction hole as shown in Fig. 31 and place it properly.

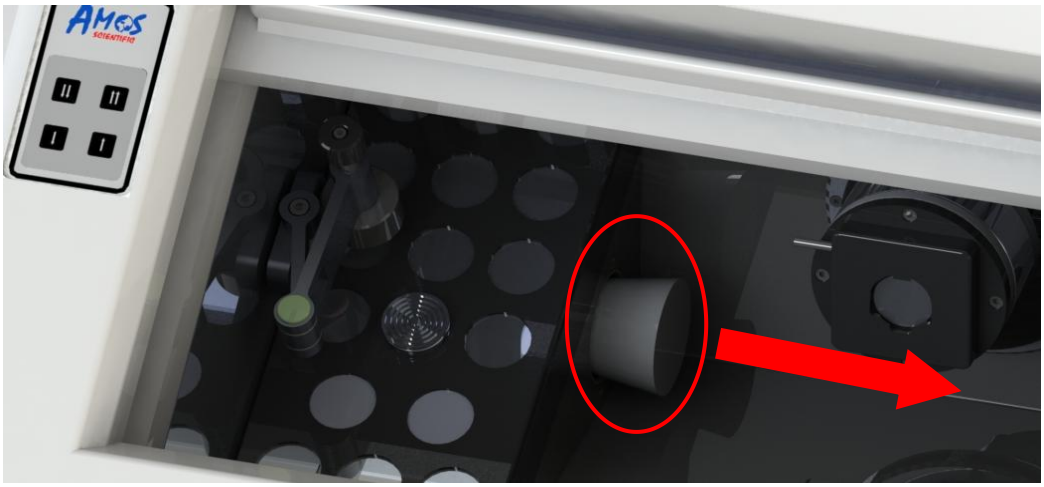


Fig. 31

Plug the adaptor with filter bag into the suction hole and keep the two scale line of adaptor (Fig.33) in same level and fasten it as counterclockwise direction rotation to the end as Fig. 32.

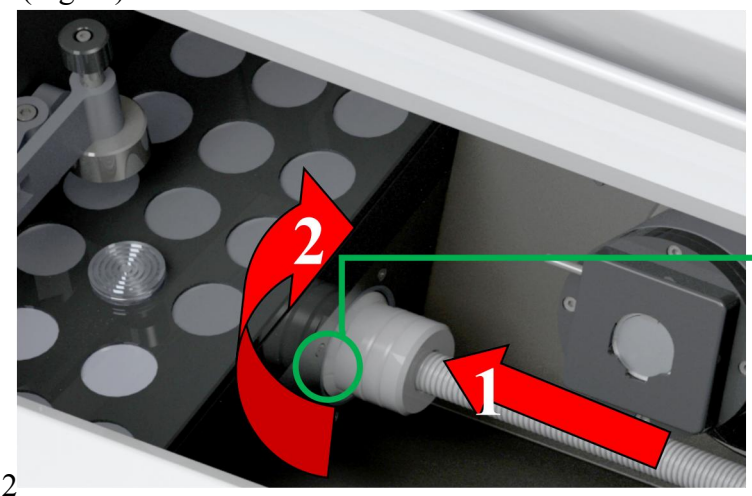


Fig. 32 Fig.33

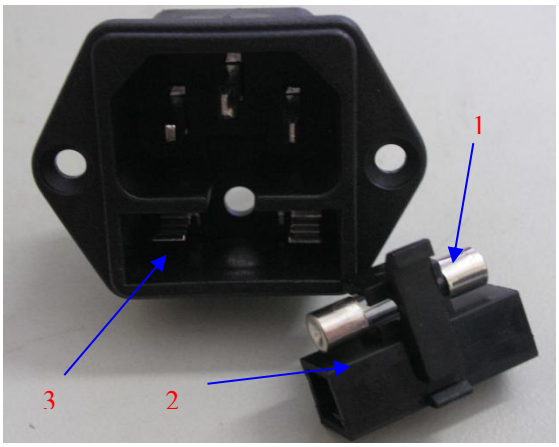
To initiate debris suction, select icon No. 5 on the interface shown in Fig. 11; the icon will turn green, indicating the start of debris suction. Position the handheld pipe near the debris, allowing it to be drawn into the scrap bag.

Once suction is complete, click on icon No. 5 again in the interface (Fig. 11); the color will change to gray, indicating the cessation of suction.

To conclude the suction process, rotate the suction joint clockwise until fully closed, then pull it horizontally to remove it. Seal the suction hole with the silica plug and remove the scrap bag for cleaning.

If suction power is insufficient during operation, pause suction, remove the scrap bag to clean or replace it, and resume work.

5.3 Maintenance



⊙Fuse replacement

● Put the fuse (1) in the installation part (2) and then insert the installation part into the socket (3) .

● Cut off the power supply and pull out the plug before changing the fuse .

Attention: Before changing the fuse, please

read the operation manual carefully. And make sure to use the specified fuse.

6. Trouble Shooting

Below you find a list of the problems that most frequently occur. And they are mostly caused by operation, so please read the operation manual carefully before using it.

Problem	Possible causes	Corrective action
• No display, no reaction to buttons pressed after the instrument is switched on	• The mains cable is not securely plugged in, or the mains cable is disconnected.	• Reconnected the main cable or replace it
	• The fuse is not installed or has blown.	• Replace the fuse.
	• The input voltage marked on the instrument does not correspond to the ambient voltage.	• Check the ambient voltage if it does not match, request a service professional.
• Touch screen no action	• Touch screen is locked	• Unlock the touch screen by lock key
• The section is uneven from the second section	• The sectioning angle of the blade is too small .	• With missed cut, undue pressure may be exerted on the specimen, resulting in thicker sections in subsequent cutting cycles. Optimal sectioning angles can be determined through experimental exploration of various angles.
	• The clamp is not steady	• Check if all the screw are
• Section curl	• The clamp is unstable.	• Adjust the anti-curl plate .

• Section soften	• The space between anti-curl plate and blade is too small or anti-curl plate is lower than the blade	•Extend the cooling time of blade or anti-curl plate .
•The section sticks to the blade or anti-curl plate	• The temperature of blade or anti-curl plate is too high • The blade or anti roll plate is polluted	• Clean the blade or anti-curl plate
• Section splinter	• Temperature too low for tissue cut	• Reduce the cooling time and adjust cryo chamber temperature
• Wavy sectioning surface	• Improper inclination of the sectioning blade.	• Readjust the tilting gradient.
• The section flies away and sticks to the microtome or other near objects	• It is effected by static.	• Increase the surrounding humidity to get rid of the static.
• Noise and sections are being scratched, displaying noticeable traces of vibration.	• Improper inclination of the sectioning blade.	•Reinstall the blade and adjust the gradient of the blade.

If other malfunctions persist or the above issues cannot be resolved, please contact the company for assistance.

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