MC5050

Cryostat User's Manual

CE

Applicable Model:

☼MC5050

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Foreword

Dear user,

Thank you for choosing our product!

In order to make you have an overall understanding of the Company's product to facilitate your use. We have specially configured this User Manual to the instrument, which includes the instrument's structural features, technical characteristics, instructions for use, simple troubleshooting, maintenance, etc. For your ease of use this instrument.

Before use, **be sure to** read the User Manual carefully and follow the instructions correctly to the user manual. In addition, if you have any questions during use, contact technical support, we will be glad at your service.

Important Statement

The information, data, and precautions etc. contained in this Manual only represent the scientific knowledge and advanced technologies that we currently possess through the institutes in this field. Histo-Line Laboratories s.r.l. reserves the right to make changes to the manufacturing process subject to regulatory requirements without prior notice. In this way we can continuously improve the technology and manufacturing techniques used in our products.

For the error descriptions, charts, technical illustrations, etc. contained in this Manual, organizations or personnel are encouraged to give us feedback for updating. It is also important to note that we shall not be liable for any direct or indirect economic loss or damage caused by **non-compliance** with statements or other information in this Manual.

For the instrument serial number and year of manufacture, check the nameplate on the back of the instrument.

Table of Contents

1. Information

1.1 Symbol and Meaning

Danger:
Indicating an urgent dangerous situation that, if not avoided, will result in death or serious injury.

Warning:
If you do not avoid this danger, it may result in death or serious injury.

Caution:
Indicating a potentially hazardous situation that, if not avoided, may result in death or serious injury.

Note:
Indicating information that is not related to risk but is very important.

Follow this User Manual.

Note that see the User Manual for relevant warning information.

IVD medical device

indicating separate collection for electrical and electronic equipment

Power on

Power off

Biohazard warning (black line on yellow background)

This warning symbol indicates the instrument surface that will be hot during operation.
Avoid direct contact to prevent burns.

Environmental protection sign of SJ/T 11364. The figure in the symbol refers to the product's number of years of "environment-friendly use".

Serial number

Manufacturing date

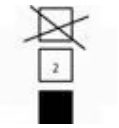
Manufacturer

Authorized representative in the European Community

Importer

Unique Device Identifier

No stacking



Limited height of 2 floors (accessory cases only)

Indicating the correct vertical position of the packing container.

Goods are fragile and must be handled with care.

The package must be stored in a dry environment.

Recycle in accordance with local laws and regulations.

The CE marking is the manufacturer's declaration that the medical product meets the requirements of the applicable EC directives and regulations.

Item indication number in the illustration.

The tilt indicator provides clear visual indication if a shipment has been transfered and stored vertically according to your requirements.In the case when the shipment is tilted for 60° or over, the blue quartz sands flow into the arrow-shape window and remain visible in the window permanently.

UKCA mark

Name and Address of UK responsible person

1.2 Instrument Use

The instrument consists of 3 major parts:

- Control parts: including related function buttons and display.
- Freezer sections: quickly obtaining low temperature and slicing.
- Refrigeration parts: including refrigeration compressor and semiconductor cooling fin.

The MC5050 Semi-automatic Cryostat Microtome is used for rapid freezing of pathological sections of human and animal body tissue. It can be widely used for preparing thin sections of samples of varying hardness for use in pathological diagnosis, analysis and research in hospitals, medical colleges by legal medical experts and propagation institutes.

It is used exclusively by pathology laboratories and is limited to the following tasks:

- Only operate the instrument as described in this Manual.

Any other ways of use are regarded as inappropriate!

1.3 Working principle

After the operator quickly freezes the fresh tissue hard, the frozen hard tissue is placed in a precision-controlled slicing system, and the tissue is sliced into thin slices of the required thickness with a blade.

1.4 Personnel Qualification

- Only trained laboratory staff can operate.
- Only operate the instrument as described in this Manual.

1.5 Instrument Model

As described in nameplate.

Product software version

Main control board:V03；

Industrial Control Board:V02；

Screen board:V03.

1.6 Contraindications

Not found yet.

2. Safety

Be sure to observe the safety instructions and warnings in this Chapter.
Even if you are already familiar with the operation and use of the product, be sure to read these instructions.

2.1 Safety Precautions

This User Manual contains important information related to operational safety and equipment maintenance.

As an important part of the product, the User Manual must be read carefully before installation and use, and always be placed near the instrument.

The product complies with the following safety and EMC test standards:

IEC61010-1 Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements.

IEC61010-2-101 Safety requirements for electrical equipment for measurement, control and laboratory - Part 2-101 Special requirements for in vitro diagnostic (IVD) medical devices.

IEC61326-1 Electrical equipment for measurement, control and laboratory use - Electromagnetic Compatibility (EMC) Requirements - Part 1: General requirements.

IEC61326-2-6 Electrical equipment for measurement, control and laboratory use of Electromagnetic Compatibility (EMC) - Part 2-6: Particular requirements - Laboratory diagnostic (IVD) medical equipment.

The performance indicators of the instrument are in line with Histo-Line's technical requirements of the cryostat.

In order to maintain this condition and ensure safe operation, the user must comply with all safety precautions and warnings in this User Manual.

- **Always observe the safety and precautions described in this Chapter.**
- **Even if you are already familiar with the operation and use of other Histo-Line products, be sure to read these instructions.**
- **Do not remove or modify the protective devices on the instrument and accessories. Only Histo-Line -certified qualified maintenance personnel can repair the instrument and dispose of the instrument's internal components.**
- **The instrument is designed and manufactured with advanced technology and complies with relevant safety technical standards and specifications. Improper instrument operation or handling can result in injury to the user or other personnel, damage to the instrument and other property damage. The instrument must be used for its intended use and only when all safety functions are in proper working condition. Faults that are detrimental to safety must be corrected immediately.**
- **Only original spare parts and allowed original accessories can be used.**

Do not remove or modify protective devices of the instrument and accessories. Only authorized maintenance personnel are allowed to repair the instrument and dispose of the instrument's internal components.

2.2 Warning

The safety device installed by the manufacturer on this instrument only constitutes the basis of accident prevention. The primary responsible party for the safe operation is the organization, followed by the personnel assigned by the organization to operate, maintain or repair the instrument. In order to ensure the smooth operation of the instrument, be sure to observe the following instructions and warnings.

2.2.1 Warning - Signs on the Instrument

The warning triangle is displayed on the instrument to ensure that correct operating instructions defined in this Manual must be observed during operation and replacement. Failure to follow these instructions may result in accidents, personal injuries, and damages to the instrument or accessories.

This warning label is used on the surface of the instrument that will be hot during operation.

2.2.2 Warning – Transport and Installation

The instrument must be kept upright after unpacking.
Do not grasp the handle of the handlewheel or the knob of setting the slice thickness to carry the instrument.
It is strictly forbidden to disassemble or modify the protective equipment on the instrument and accessories.

2.2.3 Warning - Operation

Be careful when handling the slicing knife, the blade is extremely sharp, and it is very serious once being injured! It is highly recommended to wear safety gloves.
Be sure to remove the blade before removing the knife holder from the instrument. When the blade is not in use, it should be put back into the knife box.
No matter where the blade is placed, the blade must never be upward. Never touching the falling blade!
Be sure to clamp the sample block first, then clamp the blade.
The handlebar must be locked and the blade must be guarded with the blade guard during operation or replacement of the blade and sample and during the rest periods!
Be sure to wear safety goggles when making fragile sample sections! Sample may be fragmented.
Make sure that liquid does not enter the inside of the instrument during operation!
Immediately picking up and removing the embedding agent that has fallen on the floor. It can cause slipping and there is a risk of injury!
Before slicing, check that the cartridge is firmly clamped on the sample - failure to follow this instruction may result in damage of the sample.

2.2.4 Warning - Cleaning and Maintenance

Before each maintenance or cleaning, the instrument shall be TURNED OFF and the main power supply shall be disconnected.
Only authorized qualified personnel can access the internal components of the instrument for maintenance and repair!

- **Do not touch falling accessories – there is a risk of injury!**
- **Lock the hand wheel before cleaning!**
- **Do not use any solvents containing acetone or xylene for cleaning!**
- **Ensure that liquid does not enter the instrument during the cleaning process!**

2.3 Equipment Placement Requirements

- Ground must be flat.
- No vibration on the ground.
- There are three-hole power sockets near the instrument placement position.
- No obstacles near the hand wheel.
- The ambient temperature range is 5 ℃ ~ 30 ℃, when the ambient temperature reaches 26 ℃ or above, the air conditioner should be open for cooling.
- Air humidity does not exceed 60%.
- No sunlight for placing.

Attention: Within 100mm of the machine, 300mm of the vent,no other items can be placed. The too high room temperature and the humidity will affect the cooling capacity of the cryostat.

2.4 Instrument Handling

- The machine is a movable floor-type device, with 4 casters on the bottom, 2 directional casters on the rear side, 2 universal casters on the front side, and 2 foot cups on the front side directional caster attachment. The foot cup can be adjusted by rotating.
- When the whole machine needs to be fixedly placed, raise the foot cup so that the front side directional casters are suspended and the whole machine is in a fixed state. When the whole machine needs to move, lower the foot cup so that the front side directional caster touches the ground, and the machine can be pushed at this time.
- After unloading the transport package, adjust the front side directional caster to the ground position and move to the place where it is placed. After it is in place, adjust the height of the foot cup, adjust the front side directional caster to the suspended state, and stabilize the machine horizontally.

2.5 Precautions for Use of the Instrument

- The machine must be allowed to stand for two hours after installation in the designated location.
- Before starting the equipment, please check the voltage and frequency of the input power to ensure that it conforms to the specification requirements on the instrument nameplate (refer to figure 1).
- After confirming that the power supply has a grounding wire (three-hole socket), connect the unit and the power socket with the supplied power cord, and turn on the power switch on the right of the machine to enter the working state.
- Keep the hand wheel in the locked position if the machine is shutdown.
- After the machine is stopped, the glass door should be opened to allow the water vapor to evaporate as soon as possible to keep the cooling chamber dry.
- After the UV lamp is damaged, it needs to be replaced as it is the same brand,

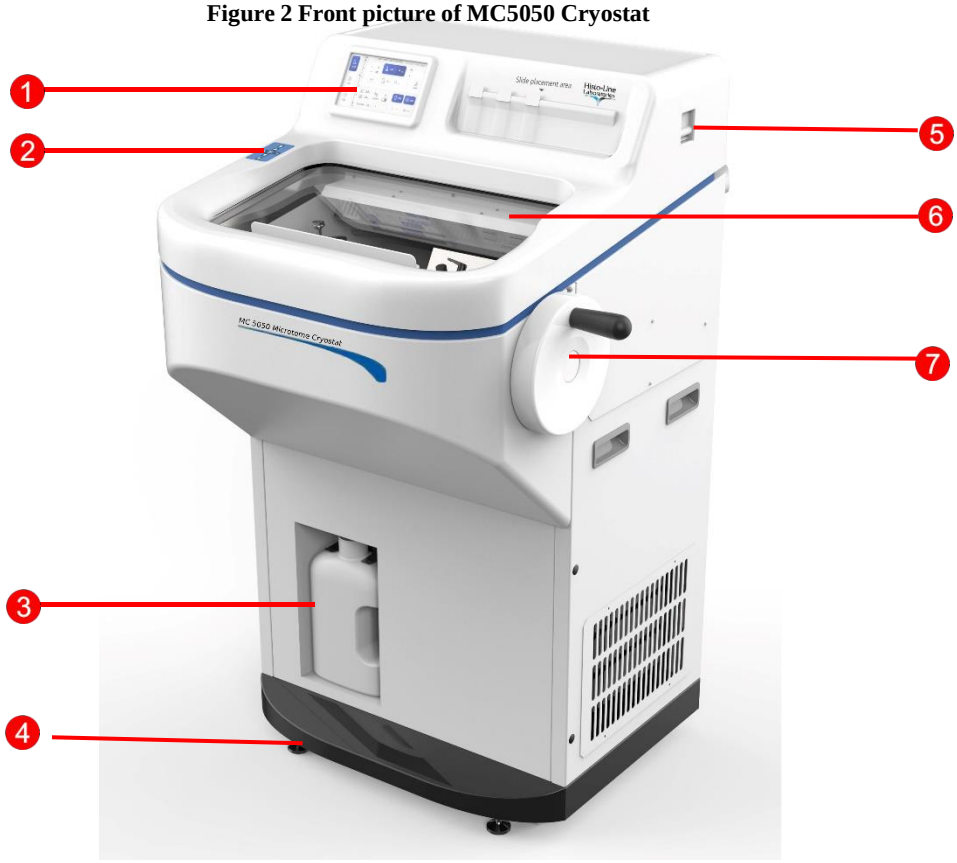
model and specification. Pay attention to safe conditions when replacing.

- The components of the electrical system, such as the control panel, electric control box, etc., must be maintained by professionals, not other personnel.
- The refrigeration system is mainly composed of a compressor, a condenser, a filter, an evaporator, etc., wherein the condenser (with a fan) adsorbs dust after long-term use, affecting the cooling effect, and needs to open the ventilation plate on the right side of the fuselage, Brush the dust on the condenser fins or blow it with high pressure compressed air. (If the air filter on the right side is equipped with a dustproof net, it must be cleaned regularly with a brush to ensure that the mesh is unblocked, and the mesh blockage will reduce the cooling effect of the equipment)
- The cooling chamber should be cleaned frequently and kept clean, but especially pay attention that not to be scratched by the blade.
- Never use rapid freeze spray in the cryochamber.

3. Instrument Components and Specifications

3.1 Overview

Figure 2 Front picture of MC5050 Cryostat



1 Display 2 Keyboard 3 Waste barrel 4 Foot cup
5 Power switch 6 Glass door 7 Hand wheel

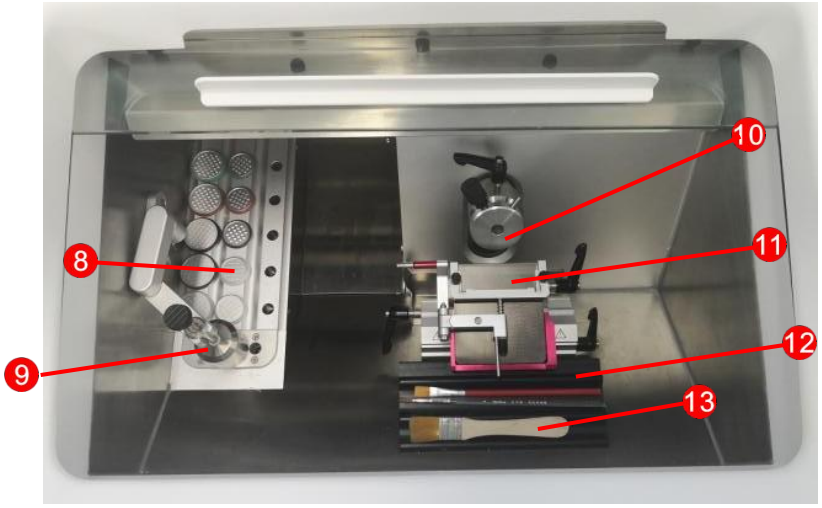


Figure 3 The picture of **cooling chamber**

8 Sample disk 9 Hammer 10 Specimen clamp 11 Tool holder
12 Front brush holder 13Brush

3.2 Technical Parameters

All relevant temperature indexes are only valid if the ambient temperature is between 5°C and 30°C and the relative humidity does not exceed 60%.

Convention	Parameter
Supply voltage and frequency	220-240VAC,50Hz
	220-240VAC,60Hz
	110-127VAC,60Hz
Main fuse	4A
Power consumption	220-240VAC,1400VA;
	110-127VAC,1200VA;
Operating temperature range	+5°C to +30°C
Transport and storage temperature	+5°C to +55°C
Relative humidity for transport and storage	Maximum 60 %, non-condensing
IEC 61010-1 classification	Pollution level 2
	Over-voltage category II
Atmospheric pressure	700 hPa ~ 1060hPa
A weighted noise level	≤ 70 dB (A)
Altitude	≤2000 m
Size and weight	**Parameter**
Size, without packaging (width × depth × height), unit: mm **(Excluding hand wheel)**	650 × 700 × 1280mm, ±5%
Size, without packaging (width × depth × height), unit: mm **(Including hand wheel)**	780×700×1280 mm, ±5%
Empty weight, without packaging	Approx. 120kg
Weight with packaging	208±10kg

Section	Parameter
Section thickness range	1μm～100μm
Section step amount	1μm～20μm, with a step of 1μm
	20μm～50μm, with a step of 2μm
	50μm～100μm, with a step of 5μm
Section thickness deviation	±20%
Trimming thickness range	1μm～600μm
Trimming step amount	1μm～50μm, with a step of 5μm
	50μm～100μm, with a step of 10μm
	100μm～600μm, with a step of 50μm

Sample retraction	0~200μm adjustable, with a step of 5μm
Sample horizontal stroke	25mm±1㎜
Sample vertical stroke	59mm±0.5㎜
Maximum sample size	55mm×55mm
Maximum sample chuck adjustment angle	12° for X&Y axis, 360° for Z axis
Sample slow forward and rewind speed	300μm/s
Sample fast forward and rewind speed	900μm/s

Cooling	Parameter
Freezing chamber's operating temperature	-35℃ ~40℃ adjustable
Freezing shelf's operating temperature	-40℃ ~40℃
Defrost	Manual defrosting; automatic defrosting
Minimum reaching temperature of semiconductor rapid cooling area	-60℃（+5℃）
Number of common freezing points	18
Number of semiconductor fast cooling points	2
Refrigerant	R449A/400g±5g
Cooling capacity	690W

Refrigerant and compressor oil should only be replaced by qualified authorized service personnel!

4. First Installation

4.1 Installation Requirements

- Room temperature is always between +5°C and +35°C.
- Relative humidity is up to 60% without condensation.
- The instrument is for indoor use only.
- There shall be enough space around the hand wheel for easy operation.
- For smooth operation, make sure that there are no other instruments that can cause vibration near the microtome.
- When placing the instrument, it must be fixed with the feet so as to avoid instability of the instrument to affect the quality of the sections.
- Avoid vibration, direct sunlight, and sudden temperature changes.
- The installation site must be well ventilated, and no fire source is allowed.

Always wear protective gloves for installation and removal to avoid cuts.

Before unpacking, check whether the fasteners on the packing container are complete, and whether the appearance is damaged or deformed. If the above situation occurs, mark it on the delivery documents and check whether the goods are damaged.

4.2 Unpacking Tools

Figure 4 Tools for unpacking

1. Electric screwdriver 2. Adjustable wrench 3. Utility knife 4. Allen wrench

4.3 Unpacking

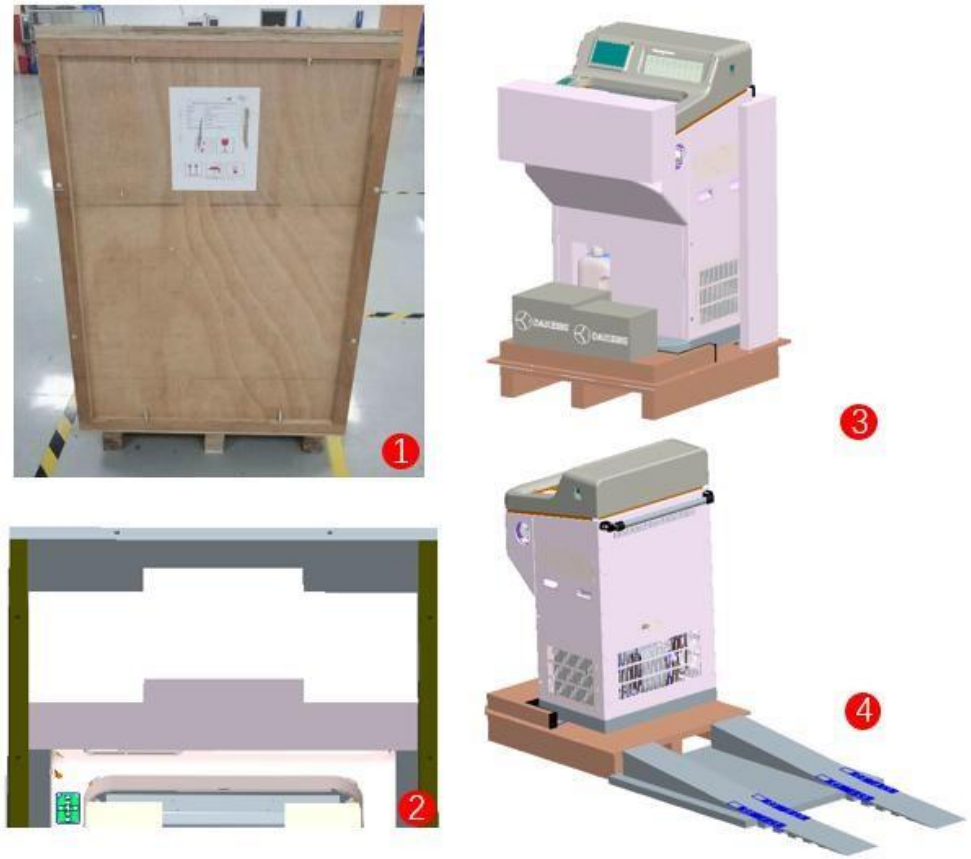


Figure 5 The procedure of unpacking

1. Wooden box: The front and direction indicator of the packing container is on the box (Figure 5-1).
2. Remove the upper board and the top foam: When disassembling, Use the M8 open-end wrench or the movable open-end wrench to unscrew the 8 screws on the top of the wooden box, then to remove the upper board and remove the top foam (Figure 5-2).
3. Remove four side planks and surrounding foam: Use the M8 open-end wrench or the movable open-end wrench to unscrew the remaining screws of the wooden box, remove the four side planks and the surrounding foam, and remove the wrapped packaging film to move the carton with the accessories to the ground. Place it smoothly (Figure 5-3).
4. Placing it on the ground, then rotate the left and right foot cups counterclockwise, and push the device (roller rolling) to the installation position.

The wooden box can be reused. Do not throw away it after unpacking and keep it in a safe place.

Check the received parts according to the attached packing list to confirm whether the delivery is complete! If any discrepancies are found, contact Histo-Line or your local distributor immediately. To prevent damage to the instrument or samples, only accessories and spare parts authorized by Histo-Line can be used.

4.4 Accessory Installation

4.4.1 Hand Wheel Installation

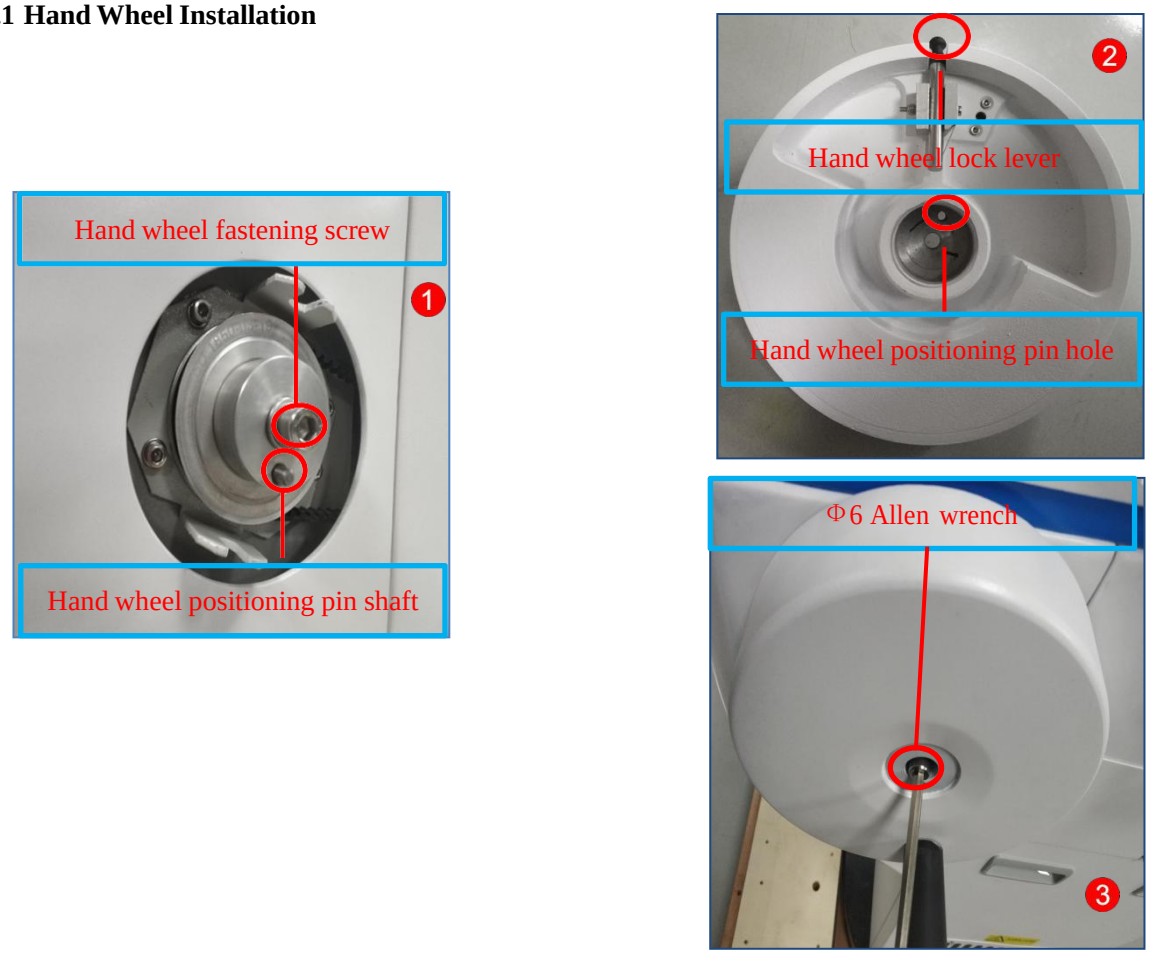


Figure 6 The procedure of hand wheel installation

- Use the 6mm Allen wrench to loosen the fastening screw that comes with the hand wheel fixed pin (Figure 6-1).
- Insert the hand wheel in alignment with the fixed pin: The positioning pin shaft shall correspond to the pin hole of the hand wheel (Figure 6-1).
- Then use the Φ6 Allen wrench to lock the fastening screw (Figure 6-3).
- After tightening, rotate the hand wheel in the direction of the arrow to observe that the universal specimen clamp in the freezing chamber shall move along with it.
- Place the hand wheel handle at the highest position, push the hand wheel lock lever into the bottom of the hand wheel groove. If it is not locked, turn the hand wheel slightly until the locking mechanism engages. The hand wheel can only be locked at the highest and lowest position and the rest of the position cannot be locked.
- Hand wheel unlock: reversely push the hand wheel lock lever.

4.4.2 Hand Wheel Block Installation

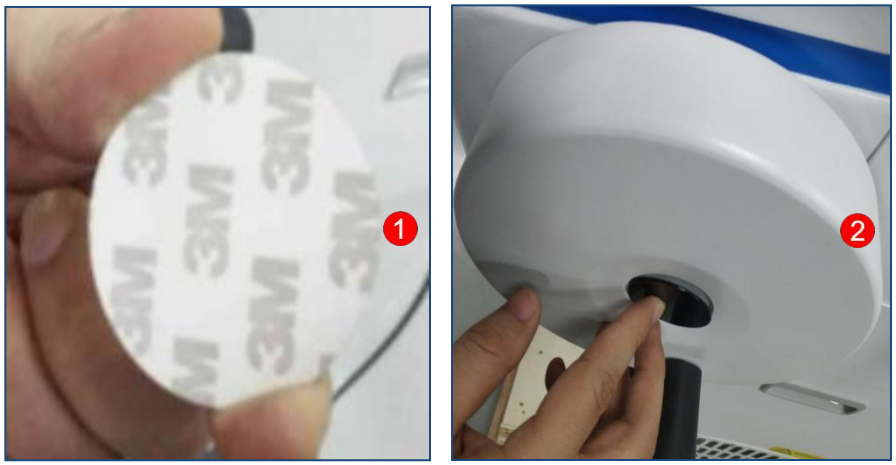


Figure 7 The procedure of hand wheel block installation

- Take the hand wheel block out of the accessory box.
- Remove the 3M back adhesive layer of the block by hand (Figure 7-1).
- Fit the block into the fastening screw hole on the hand wheel (Figure 7-2).

4.4.3 Unlock the Instrument Cover

Figure 8 The picture of upper cover fixing screw position

- The cover should be locked and cannot be opened when the instrument is shipped and in normal operation.
- Use the M5 Allen key to loosen the two top cover fixing screws (Figure 8-1).
- After the screw is completely loose, flip up the top cover to unlock.

The top cover can be opened by loosening the screw for 5~8 cycles, and the screw does not have to be taken out. When the top cover is locked, it is also tightened for 5~8 cycles. Make sure that the screw can support the top cover properly. Continue to tighten the screw, which will cause the top cover to deform or even rupture.

4.4.4 Fixed Card Core

Figure 9 The picture of card core fixing

In order to prevent the bumpy transportation from affecting the accuracy of the slicer, the chuck core is supported by the pearl cotton block. After the whole machine is placed in place, lock the handwheel at the highest position, buckle the bottom of the supporting EVA cotton, and take out the EVA cotton. The chuck core can move up and down normally.

4.4.5 Waste Trough Installation

Figure 10 The picture of waste trough

Place the waste trough in the body of the universal specimen clamp in the direction of the illustration (Figure 10)

4.4.6 Blade Holder Installation

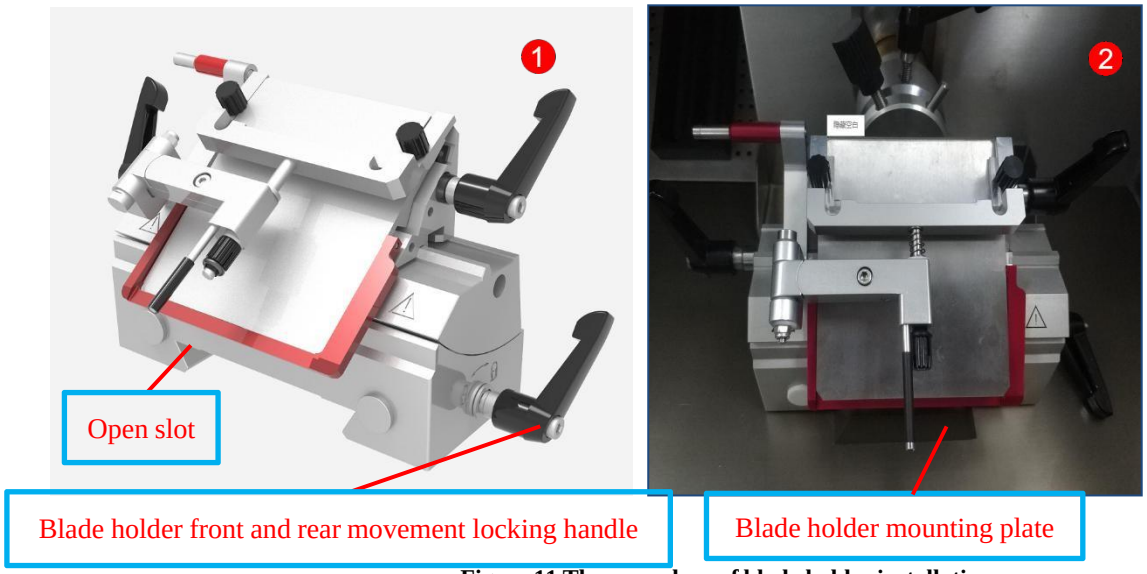


Figure 11 The procedure of blade holder installation

- As shown in the figure, insert it into the rail on the bottom plate of the freezing chamber compartment's blade holder in the direction of the blade holder's open dovetail slot (Figure 11-2)
- Slide to the appropriate position, then rotate the handle to lock the blade holder.

4.4.7 Glass Door Installation

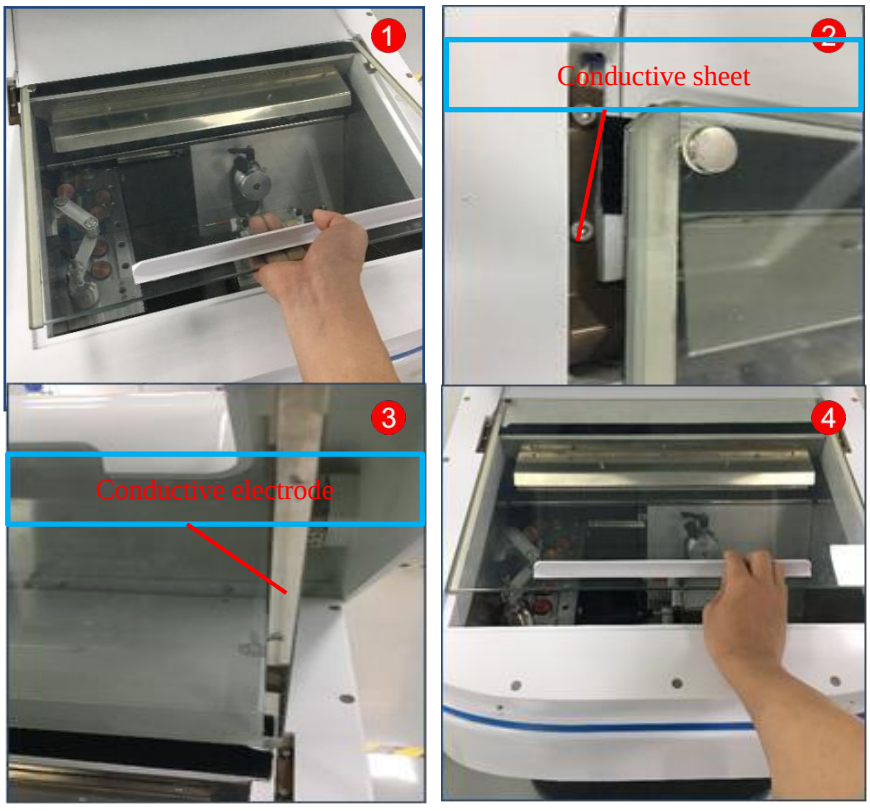


Figure 12 The procedure of glass door installation

- Referring to Fig. 8, after unlocking the top cover, hold both sides of the top cover and rotate upward to open it.
- Place the glass door in the freezer compartment slot, with the handle facing up in the direction of the illustration (Figure 12).
- After completion, check whether the conductive strips on the left and right sides are in full contact with the conductive electrodes of the glass door.
- Finally, pull the glass door handle up and down to slide the glass door. When themachine works normally, close the upper cover and lock it.

4.4.8 Power Supply Cable Connection

This unit comes with a power cord that connects the unit to a power outlet.

Precautions:

The voltage supplied by the power socket must match the voltage indicated on the slicer's nameplate.

4.5 Boot Preparation

- After transporting and moving, the machine must be stand for more than 2 hours before starting up for the first time.
- Check that the local grid voltage matches the voltage on the machine nameplate.
- Check that the tool holder is installed in place and locked on the tool holder mounting plate of the freezer compartment.
- Put the waste slot, brush, No. 4 hook pen, front brush holder, blade and other utensils into the freezer compartment for pre-cooling.
- Close the glass door.

5. Operation

5.1 Section Function Setting

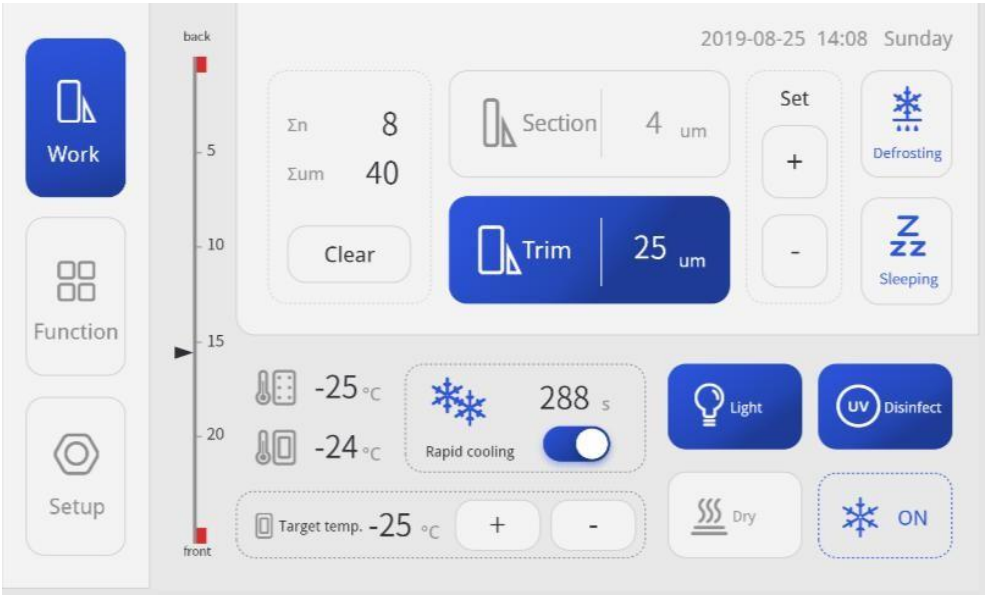


Figure 13 The picture of working interface

After booting up, the screen enters the working interface.

5.1.1 Cooling Temperature Setting

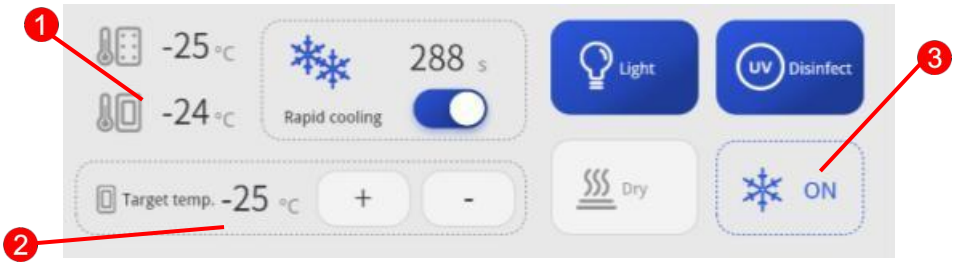


Figure 14 The picture of cabinet temperature

1. Actual temperature of the box 2. Setting temperature of the box

3. Compressor work instruction

The “+” and “-” buttons are used to set the temperature adjustment. The setting range is -35°C to 40°C.

(When the compressor stops for less than 3 minutes and receives the signal to start the compressor again, the compressor will not start immediately, it will be delayed until the stop time reaches 3 minutes before starting).

5.1.2 Slice and Retouch Setting

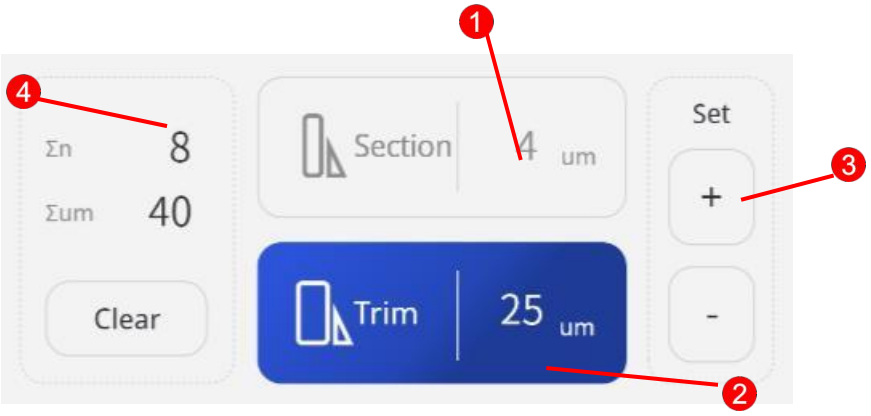


Figure 15 The picture of slice and retouch

1. The background color is on, which means the slice state, indicating that the current slice thickness is 4um.
2. The background color is on, which means the Trim state, indicating that the current retouching thickness is 25um.
3. Indication 3 is slice, trim thickness value +/- adjustment key.
4. "Indication 4" is the cumulative value of the number of slices and slice thickness. Touch "Reset" to clear the data.

Attention:

1. The instrument can display maximum 5 digits of section times and section thickness. The displayed value will no longer change when the actual value exceeds 99999.

5.1.3 Cold Stage Temperature Setting / Semiconductor Cooling Function

Figure 16 The picture of cold stage temperature setting / semiconductor cooling function interface

1. The current temperature of the cold station.
2. The Semiconductor cooling countdown time
3. It is semiconductor cooling. After the touch icon  , the semiconductor cooling is turned on, the turn-on time is 600s, and the countdown is automatic. When the value is 0, the semiconductor cooling is automatically turned off  , and the icon is touched before turn-off, and the semiconductor cooling function is closed.

The following condition must be met before the Peltier elements are activated:

1. The temperature of the freezing shelf is lower than -10℃.

If the above two conditions are not met, the semiconductor refrigeration time will be fixed at 600S, and the countdown will not start, it will automatically turn on when the startup conditions are met.

5.1.4 Lighting and UV Lamp

Touch this icon, the light will turn on and off cyclically, the light is on while the background color is turned on, and the light is off while background color is turned off;

Touch this icon, the UV lamp will cycle on and off, the UV light is on while background color is turned on, and the UV light is off while background color is turned off;

Precautions:

1: UV disinfection can only be opened after the glass door is closed, and the UV lamp cannot be operated when the glass door is open.

2: When the UV lamp is on, open the glass door and the UV lamp will automatically go out. Close the glass door again and the UV lamp will automatically turn on. Every time you turn on the UV lamp manually, the system defaults to turn on the UV lamp for 35 minutes, and it will automatically turn off when the time is up.

5.1.5 Drying Button

Figure 17 The picture of drying button interface

1. Indication 1 is the Drying off state, only the function interface is displayed.
2. Indication 2 is the Drying open state, which is displayed on both the main interface and the function interface.

Open the glass door and double-click the "drying" icon to turn on the drying function. When the drying is turned on, it will run for 3.5 hours. After the time is up, the compressor and the heating element will stop working, waiting for the operator to close the glass door or click the "drying" icon to end the "drying" mode and enter the normal cooling state.

Precautions:

1: The "drying" function can only be turned on when the glass door is open. When the glass door is closed when the "drying" function is running, the program will automatically end the drying mode and return to normal cooling mode;

2: Before "drying" is turned on, all samples in the freezer must be emptied;

3: "Drying" is only suitable for a large amount of frosting and condensed water in the equipment, and it is used when the water in the equipment needs to be eliminated as soon as possible (it takes more than 24 hours to dry the water in the box after turning it off). It takes about 6 hours to restart the “drying” function to the working temperature of -20° C. During this period, the equipment cannot be used for frozen sectioning. Please select a suitable time to enable the secondary function.

4: In order to avoid accidentally closing the glass door to enter the cooling state during the "drying" process, it is recommended to set the target box temperature to 40 ° C when opening the "drying" to prevent the equipment from entering the cooling state after the glass door is accidentally closed.

5.1.6 Fault report

A red error icon will appear in the upper left corner of the interface when the service time of UV disinfection lamp reaches 6000 hours. Click the icon to see error detailsas shown in Figure 18.

In the case when disinfection is interrupted (excluding the situation when the window is open manually), a red error icon will appear in the upper left corner of the interface. Click the icon to see the error reporting details page in Figure 18.

In the case when chamber drying is interrupted due to accidental opening of the window, a red error icon will appear in the upper left corner of the interface. Click the icon to see the error reporting details page in Figure 18.

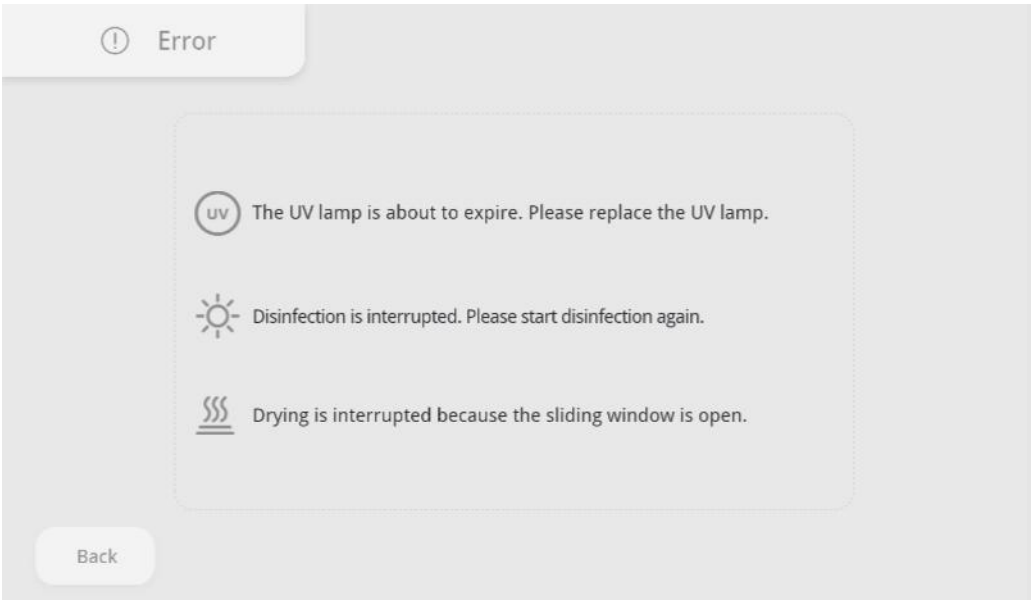


Figure 18 Fault detail interface

Attention:

1. Click the back button on the fault detail interface to return to function interface and the red error icon will disappear.

5. 2 Button Panel

-  The chuck core moves back slowly, and the position icon moves slowly in the "Back" direction;
-  The chuck core advances slowly, and the position icon moves slowly to the "Front" direction;
-  Press this key to switch the sectioning/retouching mode cyclically;
-  Thickness value adjustment.
-  The chuck core moves back quickly, and the position icon moves quickly in the "Back" direction
-  The card head core moves forward quickly, and the position icon moves quickly to the "Front" direction

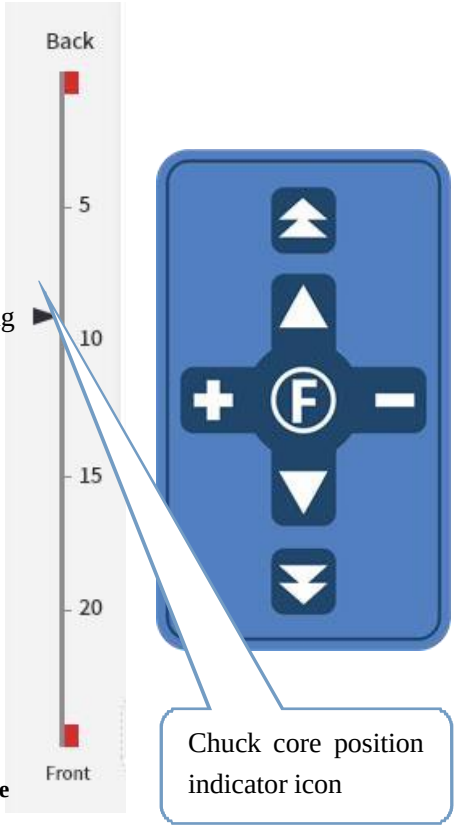


Figure 19 The picture of keyboard interface

5. 3 Function Setting and Introduction

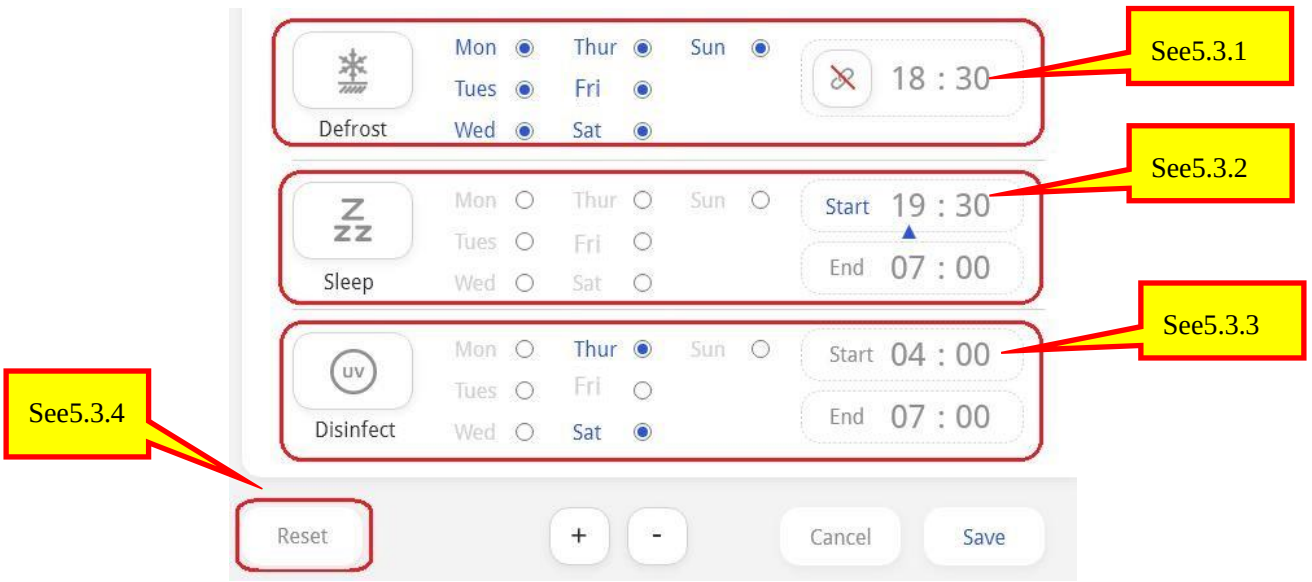


Figure 20 The picture of functional interface

During operational process, the screen enters the function setting interface.

5.3.1 Defrost Setting

Figure 21 The picture of defrost interface

The surface of the evaporator and freezer will accumulate more and more frost as the working time is extended, resulting in a decrease in the cooling capacity and the need to remove overmuch frost. During defrosting, the high temperature medium enters the evaporator and freezer to melt the frost into water. The melted water flows to the waste tank.

1. Indication 1 is the manual defrost. When the defrost switch is turned on, the icon lights up and the defrost icon is displayed on the lower right of the work interface.
2. Indication 2 is the automatic defrost date setting. From Sunday to Saturday. when clicking the icon ◉ at the back of the date, it means to be valid. But when the icon ○ is turned up, it means to be invalid. After the selection is valid, the device will automatically turns on the defrosting function when the system time reach the set date.
3. Indication 3 is starting defrost time. Click the time black box to display . Choosing the hour and minute. Press the number on the bottom right + - to increase and decrease the time. Press the “Save” button Save to save the settings

and press “Cancel” button

to abandon the settings.

Precautions:

1: Each defrost time is 15 minutes by default, or the box temperature rises to -5° C during the defrosting process, the defrosting will end in advance;

2: After finishing defrosting, it will automatically return to the cooling state.

3: Always remove all samples from the freezer before starting the defrosting (automatic or manual), or it will damage the samples.

4: The automatic defrosting start time should not be set within the sleep time period, otherwise the defrosting will not be effective; the defrosting start time can be optionally associated with the sleep time. After the association, the defrost time cannot be set separately, it will automatically change to half an hour before sleep, and the associated icon:  will be displayed before the time. The defrost time is not associated with the sleep time, and the unlink icon:  is displayed before the time.

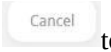
(After setting the time, press the "Save" button to save, otherwise the setting is invalid.)

5.3.2 Hibernation Setting

Figure 22 The picture of hibernation interface

1. Indication 1 is the manual hibernation. When the sleep is turned on, the icon lights up, and the sleep icon is displayed on the right of the work interface (the cabinet keeps running at -5°C~-15°C while sleeping), and the display backlight is darkened.
2. Indication 2 is the automatic defrost date setting. From Sunday to Saturday. when clicking the icon  at back of the date, it means to be valid. But when the icon  is turned up, it means to be invalid. After the selection is valid, the device automatically turns on the defrosting function when the defrosting start time reaches the set time.
3. Indication 3 is starting defrost time. Click the time black box to display choosing the hour and minute. Press the number on the bottom right 

to increase and decrease the time. Press the “Save” button

to save the settings and press “Cancel” button 

to abandon the settings.

Precautions:

1: When the sleeping time ends, the device enters the normal working state, the device automatically starts the compressor, and cools to the specified box temperature and station

temperature.

2:The time between the start time and end time of scheduled sleeping must be at least than 1 minute.

(After setting the time, press the "Save" button to save, otherwise the setting is invalid.)

5.3.3 Disinfection Setting

Figure 23 The picture of disinfection interface

1. Indication 1 is the manual disinfection. When the disinfection is turned on, the icon lights up. The disinfection icon on the lower left of the main interface also lights up, it will automatically turn off in 35 minutes, and the icon will be darkened.
2. Indication 2 is the automatic disinfection date setting. From Sunday to Saturday. when click the icon at back of the date, it means to be valid. But when the icon is turned up, it means to be invalid. After the selection is valid, the device automatically turns on the disinfection function when the disinfection time reaches the set time.
3. Indication 3 is starting disinfection time. Click the time black box to display. Choosing the hour and minute. Press the number on the bottom right + - to increase and decrease the time. Press the “Save” button Save to save the settings and press “Cancel” button Cancel to abandon the settings.

Precautions:

1: When the UV lamp is turned on, opening the glass door system will temporarily turn off the UV lamp, then close the glass door again, and the UV lamp will automatically turn on;

2: During the timed start of disinfection, the disinfection can be turned off manually. If the manual end time is not reached, the disinfection will be turned off.

3: If the timed automatic disinfection is also performed during the manual opening of the disinfection, it will not stopped after 35 minutes, but will stopped at the end of the timed automatic disinfection.

4: The time between the start time and end time of scheduled disinfection must be between 0.5 hour and 3.5 hours.

(After setting the time, press the "Save" button to save, otherwise the setting is invalid.)

5.3.4 Time reset in the function interface

Double-click the icon "Reset" Reset in the lower left corner of the function interface, and the date and time settings of the entire function interface will be automatically restored to the factory

default settings. One-click setting is convenient and quick.

5. 4 Compressor Overheat Protection Function

This is the compressor protection function in the system by default, and there is no corresponding display prompt; when the compressor continues to run for more than 4 hours, it will stop for 3 minutes and then turn on again (if the glass door is opened or the semiconductor refrigeration is on at this time, Time will be postponed).

5. 5 System Setting

5.5.1 System Time Setting

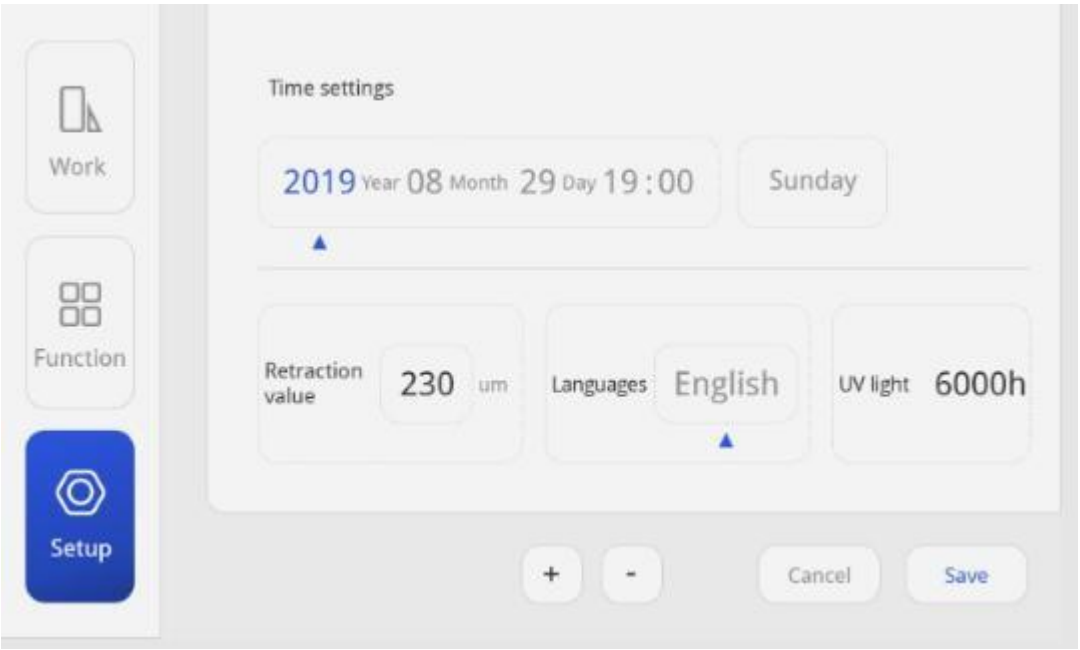


Figure 24 The picture of system setting interface

1. The day of the week is generated by comparison with the system date. If the system date is changed, the week will follow the change.
2. Click the time setting and press the "+" and "-" icons to adjust the value (the first two "20" of the year cannot be modified);
3. Press the "Save" button to save the set time, and the system time on the working interface will be changed synchronously.

5.5.2 Slice Retraction Value Setting

Press the button“+” and “-” to increase or decrease the retraction stroke. The retraction stroke range is 0--100um. Please click "Save" to save retraction value changes. The specimen head feed

will move according to the updated retraction value.

5.5.3 System language setting

Click "+" and "-" to select system language from Chinese, English, Russian, Spanish and Portuguese. Please click "Save" to save the changes. The interface will change accordingly.

5.5.4 UV lamp service time display

Displays the actual service life of the UV lamp. The user will be prompted to replace the UV lamp when the service life of the UV lamp exceeds 6000 hours.

5.6 Blade Holder Module

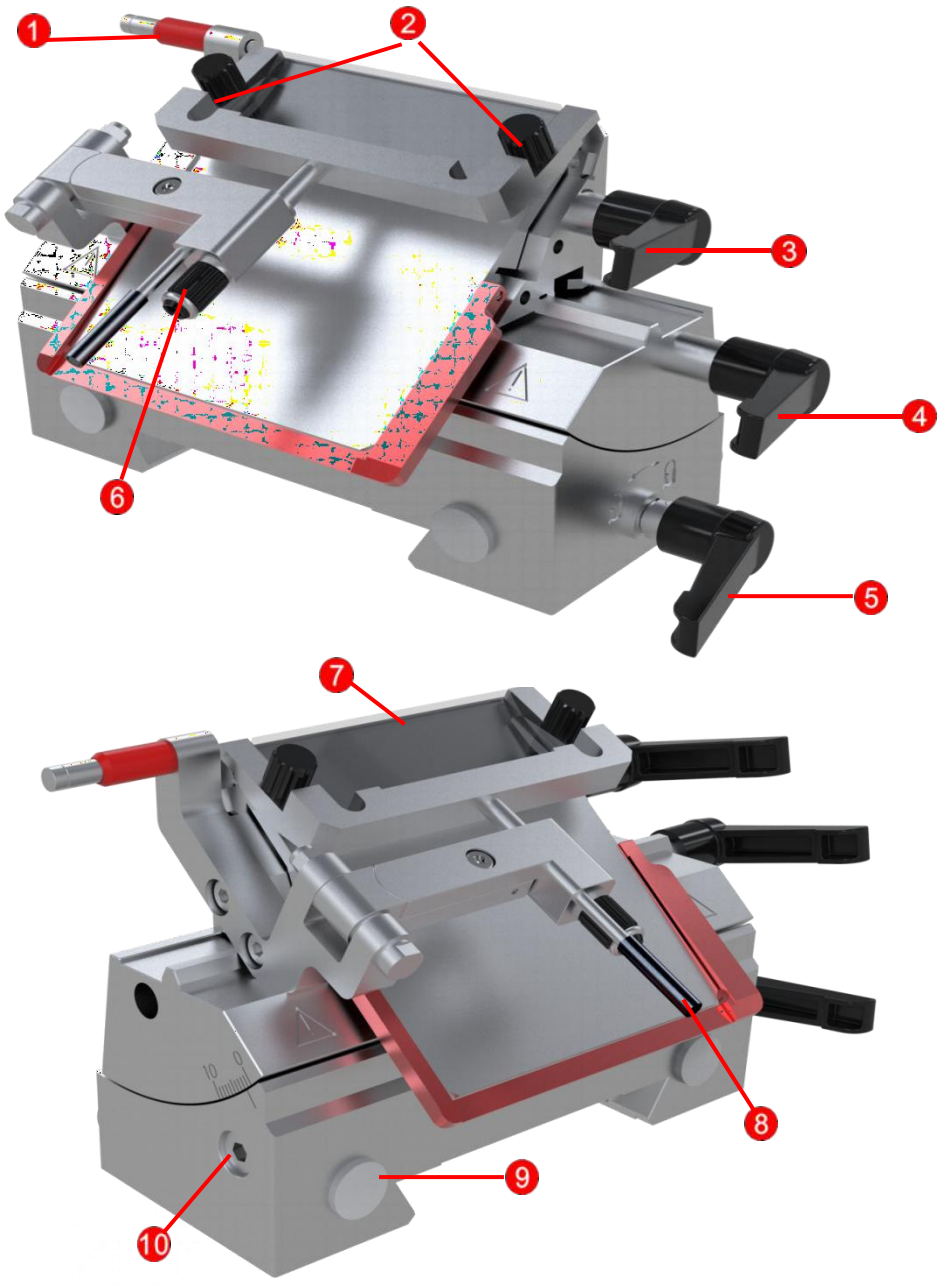


Figure 25 The picture of blade holder description

1. Blade withdrawal pusher
2. Anti-roll plate locking knob
3. Blade clamping handle
4. Holder locking handle for left-and-right movement
5. Holder locking handle for back-and-forth movement
6. Anti-rolling plate's height regulating knob
7. Blade pressing plate
8. Anti-roll plate's flip handle
9. Anti-freeze hand rubber stopper
10. Blade slicing angle locking screw

5.6.1 Blade Holder Front and Rear Position Adjustment

Loosen (counterclockwise rotation) the blade holder locking handle for back-and-forth movement (Figure 39-4). Push back and forth with hands. Lock the handle at the selected position. When moving to the destination near the operator's direction, the entire blade holder can be removed.

5.6.2 Blade Holder Left and Right Position Adjustment

Loosen (counterclockwise rotation) the blade holder handle for left-and-right movement on the right. Push the blade holder left and right with hands. Lock at the selected position.

After adjustment, make sure that the blade holder is in locked state.

If it is in a frozen state, please do not touch the knife holder directly with your hand. Push the rubber anti-freeze rubber stopper and gloves to avoid frostbite.

5.6.3 Blade Installation or Replacement

Loosen (counterclockwise rotation) the blade clamping handle to widen the gap of the blade pressing plate. Push the blade withdrawal pusher to take out the blade. Then insert a new blade from right to left, turn the blade locking handle to allow the blade to be fixed by pressing plate, and the blade replacement is completed.

The microtome blade is extremely sharp! Handle with care!
Do not catch the falling blade!

5.6.4 Anti-roll Plate Adjustment

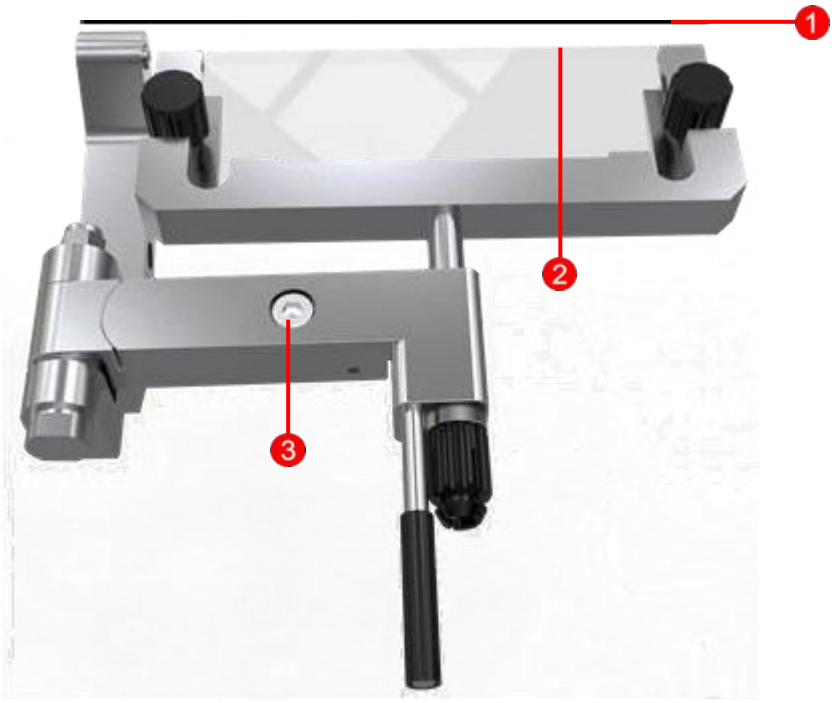


Figure 26 The picture of anti-roll plate description

1. Microtome knife blade 2. Anti-roll plate edge
3. Blade and anti-roll plate parallel adjustment screw

- Insert the blade and lock the blade locking handle.
- Lock both anti-roll plate locking knobs.
- Use a hex wrench to loosen the parallel adjustment screw for blade and anti-roll plate.
- Adjust the parallel between the blade edge and the anti-roll plate edge.
- Relock and tighten the blade and anti-roll plate parallel adjustment screw.

Precautions:

1: Protect the area where the anti-roll plate is in contact with the tissue piece without any damage.

2: When you feel that the quality of the cut tissue is not high, you should check the blade and the anti-roll plate for any tissue fragments, grease and other foreign matter.

3: Avoid touching the edge of the anti-roll plate with your hand or other hot objects, otherwise the tissue pieces will stick as the temperature rises.

5.6.5 Microtome Blade Angle Adjustment

Use a hex wrench to loosen (counterclockwise rotation) the blade slicing angle locking screw, then manually push the blade holder edge along the arc angle of the blade holder to adjust the angle. The adjustable angle range is 0-10°, then fix the blade slicing angle locking screw. If the slicing effect is not good, the angle can be tested by 1° until it is adjusted well, but the angle cannot be changed more than 10°.

5.7 Sample disk Installation

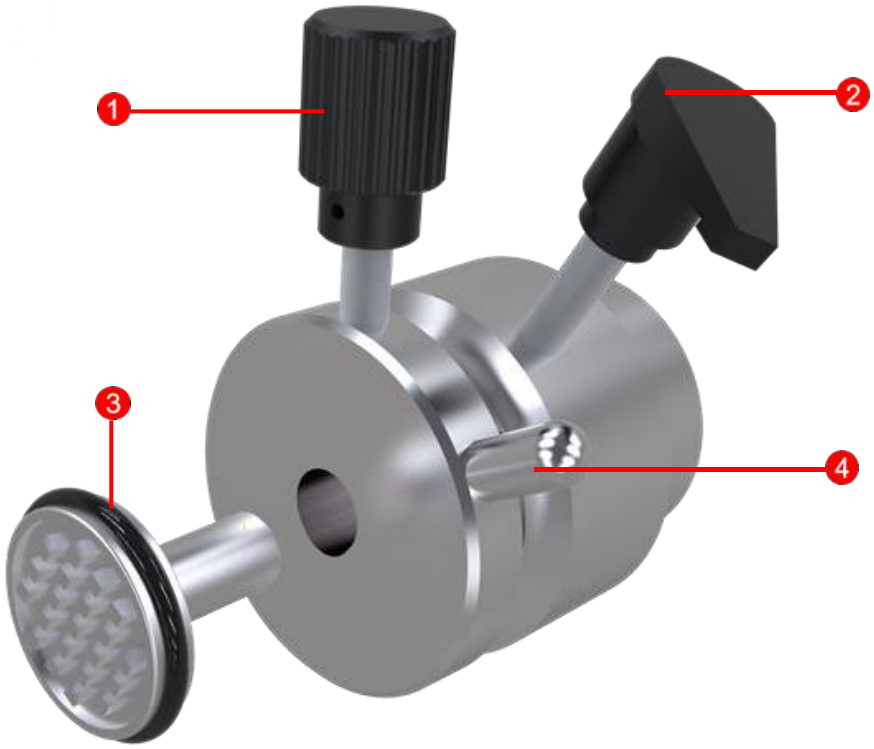


Figure 27 The picture of card core description

1. Sample disk locking screw
2. Clamp head locking screw
3. Sample disk
4. Card head adjustment handle

- Place the handle of the hand wheel at the highest position, push the hand wheel lock lever into the bottom of the hand wheel groove to fix the hand wheel and lock the card core to the highest position.
- After the tissue on the carrier head is frozen, the shaft of the carrier head is inserted into the hole in the center of the chuck core, so that the rear surface of the carrier head is in close contact with the front surface of the chuck core, and the rotation of the carrier head set screw will be It is locked to the front of the card core.
- Loosen the head adjustment lock screw on the core of the chuck, and move the head adjustment handle to adjust the direction of the surface of the specimen, tighten it after selection.

5.8 Specimen Cryoforming

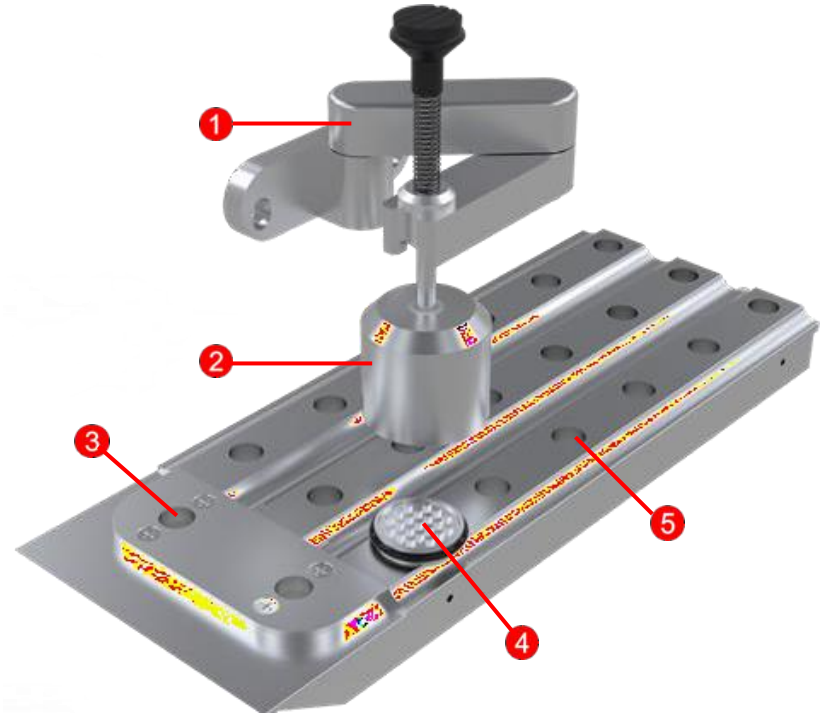


Figure 28 The picture of freezing shelf

1. Hammer bracket 2. Hammer 3. Semiconductor fast cooling hole
4. Sample disk 5. Ordinary cooling hole

The specimen freezer is fixed on the left side of the freezer compartment, and there are 20 holes in which the carrier head is placed, two of which are semiconductor rapid cooling holes and 18 are ordinary cooling holes. The temperature of the freezer is always lower than the temperature in the freezer.

- At normal temperature, cut the specimen into the appropriate size and place it on the carrier head and position it with the embedding agent.
- Insert the Sample disk with sample into the hole of the freezer and freeze it at low temperature.
- During specimen freezing, a heavy hammer can be placed on the specimen surface to accelerate the freezing of the specimen surface and flatten the specimen surface;
- After the specimen is frozen, insert the carrier into the core of the chuck. Once it is tightened, start slicing.

6. Sectioning Operation

6.1 Starting the Instrument

The circuit breaker is also used as a power switch. The switch must be on the top when switched on, and must be on the bottom when switched off. There must be no obstacles near the switch.

Figure 29 The picture of power switch

The instrument must be turned on at least 3 hours before use!
Otherwise the operating temperature may not be reached!

6.2 Preparing Sectioning Tools, Specimen Disc and Auxiliary Preparation Tools

The processing materials, such as blade cartridges or microtome knifes (loaded in the cartridges), brushes, tweezers, etc. are placed in the freezing chamber, also including specimen discs as needed.

6.3 Retouching Slice

Retouching is a preliminary stage of slicing, pay attention to the following operations:

- Put the pre-cooled blade into the tool holder and lock it, adjust the anti-roll plate.
- Appropriately adjust the slice angle of the tool holder, about 4 ° ~ 6°.(The slicing angle has been adjusted, generally no need to adjust)
- Adjust the relative position of the blade holder and the specimen to leave room for the infeed stroke.
- Open the anti-roll plate.
- Open the hand wheel lock lever.
- Adjust to the trimming mode, press the fast forward and slow forward keys to move the specimen closer to the blade, and turn the handwheel to trim. The thickness of the trimming is recommended to be 20 ~ 30 μ m;

- Close the anti-roll plate and to slice.

6.4 Sectioning

Turn the hand wheel (clockwise or counterclockwise) for one circle, and then slice once, the slice thickness is the setting slice thickness value.

Precautions:

- Install the blade after fixing the specimen first.
- Use the lock function of the hand wheel in time.
- Correctly use the protective function of the anti-roll glass plate and the knife guard;
- Do not leave the blade on the blade holder after the operation.

6.5 Sectioning Reference

1. When using a cryostat, mastering the appropriate sectioning speed and properly adjusting the anti-roll plate is the most important factor in cutting out the ideal tissue piece. The suitable sectioning speed is mastered by practical experience, and it is realized by skillfully operating the hand wheel. Adjust more parts of the anti-rolling plate, some of which affect each other, and need to be carefully debugged, they cannot be placed on the blade.
2. When living tissue is frozen, the water condenses into ice, the tissue becomes hard, and its hardness changes with temperature. The lower the temperature, the harder the tissue, whichever tissue, at whatever temperature, whether they can obtain good quality slice, need to be explored through practice, most of the sections without fat and without formalin fixed tissue temperature, preferably between -13 ° C ~ -23 ° C.
3. In order to obtain high-quality tissue films, you must pay attention to the following aspects:

- Suitable freezer working temperature selection.
- Correct slicing operation.
- Elaborate anti-roll plate adjustment.
- Sharp slicing blade, suitable cutting angle.

4. The frozen section is opposite to the general paraffin section. The frozen section does not cut the long side of the tissue. It is best to cut the short side of the tissue, that is, the contact line between the tissue and the slicing blade is shorter.

7. Cleaning and Maintenance

7.1 Daily finishing work

- Lock hand wheel.
- Remove the blade from the blade holder and put it back into the blade box.
- Clear slicing waste.
- Close sliding glass door.
- Turn off the interior light.
- Do not turn off the main switch, do not stop the refrigeration system.
- Cleaning up the blade holder and brush holder.

7.2 Long-term Suspension of Finishing Work

- Turn off the machine's main power switch.
- Open the sliding glass door to dry the freezer.
- Remove all the cartridges from the freezer.
- Lock hand wheel.
- Remove the blade on the blade holder.
- Use a brush to remove all slicing waste.
- Remove the waste tray, the front brush holder and blade holder for cleaning and disinfection.

Precautions:

Before the instrument is restarted, it must be checked whether all parts of the sliced movement in the freezer are completely dry.

7.3 Cleaning Instrument

Generally, alcohol or alcohol-containing conventional disinfectants can be used for cleaning. It is strictly forbidden to use acetone, xylene or other corrosive solvents to clean and disinfect

7.3.1 Before each cleanup, perform the following steps first

- Raise the specimen clamp to the top position, then lock the hand wheel.
- Loosen the loader locking screw and unplug the Sample disk.
- Remove the blade from the blade holder, then put it back to the cartridge.
- Remove the blade holder to clean up.
- Remove the specimen from the specimen clamp. Use a dry brush to remove the section waste.

7.3.2 Cleaning the Instrument Enclosure

The equipment shell is sprayed. Only soft cloth dampened with household cleaners, soapy water, alcohol or alcohol-containing conventional disinfectants can be used for cleaning. Do not use acetone, xylene or other corrosive solvents for cleaning and disinfection.

7.3.3 Cleaning the Blade Holder

- Check if there is a blade, take the blade out first;
- Loosen the right "blade lock handle" and pull it out, and then remove the knife plate;
- Clean the surface of the pressure plate and the knife holder seat, focusing on cleaning the surfaces where they are in contact with the blade;
- Loosen the left "knife holder seat locking handle" and take out the entire knife holder seat from the right;
- Clean the tool holder seat and the rotating tool seat, focusing on cleaning the contact surface between the two;
- After cleaning, dry the parts and apply low-temperature lubricating oil on the contact surface of the tool holder seat and the rotating tool seat;
- Install and restore in order;

7.4 General Maintenance

- Clean the inside of the machine freezer every day;
- Lubricate the specimen feeding mechanism every week: press the fast forward button to move the specimen chuck to the frontmost position, drop a drop of low-temperature lubricating oil on the copper guide sleeve, and then press the fast reverse button to return to the last position;
- Lubricate the decorative board as needed;
- Turn the handwheel, when the specimen chuck is at the highest position and the lowest position, drop a few drops of low-temperature lubricant on the decorative guard, and then turn the handwheel to make the lubricant evenly distributed;
- Clean the condenser as needed
- Open the condenser sealing baffle on the right side of the fuselage, and use a brush to clean the dust on the condenser fins, or spray with high-pressure airflow.

7.5 Take the Slicing Core from the Freezer

The core of the microtome is designed to be detachable and, if necessary, the movement can be removed from the freezer for maintenance and repair

Precautions:

The core is the key component and the removal of the slicing core must be carried out by a professional.

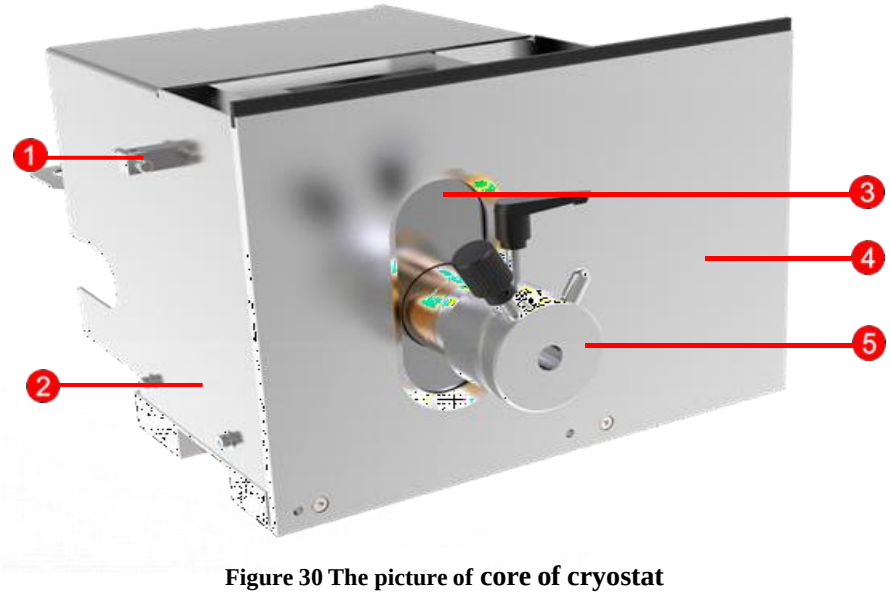


Figure 30 The picture of core of cryostat

1. Temperature Sensor 2. Hood 3. Decorative plate
4. Front panel 5. Card core

- Turn off the power switch and unplug the power outlet.
- Remove the glass door.
- Turn the hand wheel to keep the core of the chuck at the lowest position, avoiding the sliding parts falling quickly and hurting anyone.
- Remove accessories: knife holder, waste sheet tweezers, front brush holder, cold table decoration plate and Sample disk.
- Remove the relevant parts: carrier chuck, front panel, decorative panel, temperature sensor, hood.
- Remove four screws (M8X25) with a hex wrench. Loosen the locking screw of the coupling with a 3mm hexagon wrench
- Lift the core with two hands, pull it out from the positioning pin, and then move it slightly to the left to disengage the coupling axially. Finally, carefully lift the movement out of the freezer compartment.

Precautions:

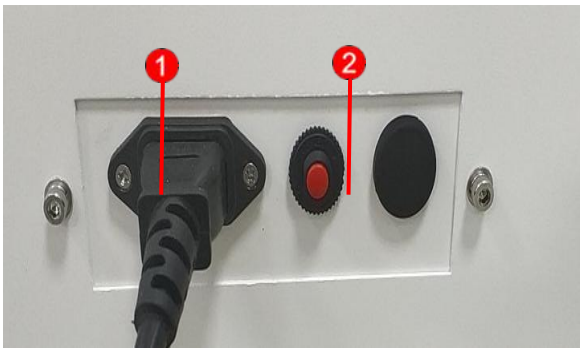
- Wear gloves to prevent frostbite when removing the cryostatic slicing core from the freezer compartment.
- When reinstalling the slicer movement, the inside of the movement must be completely dry. Otherwise, the moisture inside the movement will freeze at low temperatures, which will damage the body.
- Any items taken from the freezer must be thoroughly dried before being put back.

- It is strictly forbidden to use an external heater to dry the freezer, otherwise it will cause damage to the refrigeration system.

7.6 Replacing Component

7.6.1 Replacing the Fuse

When you need to replace the fuse, open the back cover of the machine, pull out the electric control box, open the upper cover of the electric control box, take out the damaged fuse from the drive board, and insert a new fuse of the same specification into the fuse holder, And then restore the machine to its original condition.



1. Power supply cable socket.
2. Compressor overload protection.

Figure 31 The picture of UV lamp ballast

Precautions:

- Before replacing the fuse, the main switch of the machine must be switched off and the power plug must be unplugged.
- The insurance specification is 4A, the size is 5*20mm, only the fuse of the same specification can be used. Otherwise, it may cause serious damage to the equipment.

7.6.2 Replacing the UV Lamp

There is a light tube in the freezing room, and the ultraviolet germicidal lamp tube. When replacing the lamp, the lamp can be rotated 90° and then pulled out from the lamp holder. The new tube of the same specification can be installed in the reverse order.

Precautions:

- Before replacing the UV lamp, the main switch of the machine must be switched off and the power plug must be unplugged.
- If the UV lamp is broken, it must be replaced by a professional.

7.7 Use of Waste Tank

The waste liquid tank is used to collect defrosting and defrosting liquid, tissue thawing liquid,

rinsing liquid and waste. In order to avoid the harm of waste water to people and the environment, 200 ml of 10% formalin solution or other disinfection should be pre-installed in the barrel. The discharge of wastewater waste should be conformed to the relevant regulations of the hospital. Pull the bucket plate up to remove the waste container and the connected water pipe can be removed.

Precautions:

- Often observe the liquid level and pour out the waste liquid tank in time.
- Waste must be treated in a correct and efficient manner and must comply with relevant wastewater treatment regulations.

8. FAQ and Handling

The table below is the most common list of questions that may arise when using the instrument. The table lists possible causes and solutions to these problems.

Fault	Cause	Solution
Tissue blocks fall off	Inadequate freezing embedding agent	Increase the amount of embedding agent
	The trimming feed is too large	Use the trimming mode of the device to trim and set the trimming thickness to 20~40um.
Section softening/melting	Temperature of specimen, blade, anti-roll plate and blade holder is not low enough	Set a lower temperature
	The glass door is opened too much during sectioning, and the operator breathes hot air to progress the knife holder area	Adjust the appropriate opening angle of the glass door, and the operator should pay attention to adjusting the slice posture
Uneven section	Insufficient sample freezing	Set a lower temperature
	Foreign matter attached to the blade or anti-roll plate	Clean and remove foreign objects
	The cutting edge is damaged	Switch blade cutting edge position or change blade
The section has chatter lines, the section is incomplete and breaks	Blade is not fully locked	Lock the "blade lock handle";
	Foreign matter is attached to the blade installation groove,	Clean the knife surface of the knife plate and the knife

midway	which prevents the blade from being fully clamped	surface of the tool holder seat
	Tool holder seat is not stable	Lock the "knife holder seat locking handle"
There is a rubbing sound when slicing	The anti-roll plate is adjusted too far forward, and the tissue is scratched to the anti-roll plate	Fine-tuning anti-roll plate
	The section angle is too small, and the tissue rubs against the side of the rotating knife holder	Adjust the rotating knife seat to appropriately increase the slice angle
The slice thickness is uneven, even the knife skips during the slicing process	The sample holder is not fixed	Tighten the "sample tray locking screw"
	The trimming blade is too large, the tissue is loose on the sample, and the freezing is not firm	Refreeze tissue with embedding agent
	The blade is loosen	Lock the "blade lock handle";
	The blade holder is loosen	Lock the "blade holder seat locking handle"
	Damaged blade edge	Switch blade cutting edge position or change blade
	The material of the specimen is uneven and too hard	The sample holder rotates 90 ° and slices in another direction
	Slice angle too small	Adjust the rotating knife seat to appropriately increase the slice angle
Tissue pieces stick or collapse on the anti-roll board	Anti-roll plate temperature is too high or the position is incorrect	Lower the temperature and continue to adjust the position of the anti-roll plate
	Anti-roll plate with static electricity	Remove static electricity
	Foreign matter on the edge of the anti-roll plate	Clean the anti-roll plate and remove foreign objects
When opening the anti-roll plate, the slice is curled	Cutting angle is too small	Adjust the angle of blade a little larger

	Inappropriate slice temperature	Set the appropriate temperature
The tissue piece is stuck or disintegrated on the anti-roll plate	Anti-roll plate temperature is too high or the position is incorrect	Reduce the temperature and continue to adjust the position of the anti-roll plate
	Anti-roll plate with static electricity	Remove static electricity
	Debris on Anti-rolling plate	Remove debris
	The blade is rusty	Remove rust
Section curling when opening the anti-roll plate	Electrostatic or airflow effects	Remove static electricity
	Anti-roll plate temperature is too high	Lower the temperature
The sample holder is frozen and glued on the cold table	Before freezing, there is moisture at the bottom of the sample holder	Remove the heavy hammer and hit the sample holder.
The cold table temperature is also low, and the speed of freezing the tissue becomes slower	There is foreign matter between the sample holder and the cold surface, and the poor contact causes the cold transfer to be unsmooth	Before freezing the sample holder, wipe and clean the bottom of the sample holder and the surface of the cold table.
More ice crystals in the slice	Too much water in the tissue	Before freezing the tissue, use absorbent paper to absorb as much water as possible from the tissue
	Tissue freezing is too slow	1. Use semiconductor refrigeration points to freeze tissues; 2. Use heavy hammer correctly to speed up tissue freezing;

9. Section Tissue Temperature Selection Table

Tissue	Chamber temperature
Adipose tissue	-30℃~-35℃

Brain	-15℃~-25℃
nose	-15℃~-25℃
Breast fat	-30℃~-35℃
Cervix	-15℃~-25℃
intestinal	-15℃~-25℃
Heart	-15℃~-25℃
kidney	-15℃~-25℃
Lips	-15℃~-25℃
liver	-15℃~-25℃
lung	-25℃~-35℃
Lymph nodes	-15℃~-25℃
muscle	-15℃~-25℃
bladder	-15℃~-25℃
Ovaries	-15℃~-25℃
pancreas	-15℃~-25℃
prostate	-15℃~-25℃
skin	-15℃~-25℃
Skin + fat	-30℃~-35℃
spleen	-15℃~-25℃
tongue	-15℃~-25℃
thyroid	-15℃~-20℃
Uterine scraping	-10℃~-15℃
Cartilage	-10℃~-15℃

Caution: The temperature given in the above table is a summary of long-term experience, but these are only approximate values, because specific adjustments may be required for actual organizations. 

10. Warranty and Service

10.1 Warranty

Histo-Line guarantees that the delivered contract product adopts a comprehensive quality control program based on Histo-Line's internal testing standards and that the product is intact and meets all technical specifications.

The scope of the warranty is based on the content of the agreement. For special warranty services, contact your local sales representative or the dealer who sells the instrument.

10.2 Technical Service Information

If you need technical services or component replacement, contact your local Histo-Line's sales representative or dealer who sells the instrument.

Please provide the following information:

- Model, name, and serial number of the instrument.
- Instrument location and contact name.
- Reasons for the service request.
- Delivery date.

10.3 Scrapping and Disposal

The instrument or its components must be disposed of in accordance with local regulations.

11 Electromagnetic Compatibility Indicators

Note:

[MC5050] [Cryostat microtome] shall meet the emission and immunity requirements specified in IEC61326-2-6, as shown in the table below.

The user shall be responsible for ensuring the electromagnetic compatibility of the environment for the equipment to work normally.

It is recommended to evaluate the electromagnetic environment before the equipment is used.

Warning:

[MC5050] [Cryostat microtome] is designed and tested according to Class A equipment in CISPR 11. In the home environment, the equipment may cause radio interference, so that protective measures should be taken.

It is prohibited to use the equipment next to an intense radiation source (such as an unshielded RF source), otherwise the normal operation of the equipment will be affected.

Table I: Electromagnetic emission

Electromagnetic emission	
Emission test	**Compliance**
CISPR 11 conducted emission	Group 1, Class A
CISPR 11 radiated emission	
IEC61000-3-2 harmonic emission	N/A
IEC61000-3-3 voltage fluctuation/scintillation emission	N/A

Table II: Electromagnetic immunity

Electromagnetic immunity			
Immunity test items	Basic standards	Test values	Performance criteria
Electrostatic discharge (ESD)	IEC61000-4-2	±4 kV contact ±2 kV, ±4 kV, ±8 kV air	B
Radio frequency electromagnetic field	IEC61000-4-3	3V/m (80 MHz-6 GHz)	A
Pulse cluster	IEC61000-4-4	±1 kV (5 kHz or 100 kHz)	B
Surge	IEC61000-4-5	Line to ground: ±1 kV Line to line: ±0.5 kV	B
Radio frequency transmission	IEC61000-4-6	3V (150 kHz to 80 MHz)	A
Power frequency magnetic field	IEC61000-4-8	3A/m (50,60Hz)	A
Voltage sag and interruption	IEC61000-4-11	0.5 cycle, 0% 1 cycle, 0%; 25/30 cycle, 70%; 250/300 cycle, 0%	B B C C
Performance criteria: A. In the test, the performance is normal within the specified limit. B. In the test, the function or performance is degraded or lost temporarily, but can restore automatically. C. In the test, the function or performance is degraded or lost temporarily, and cannot restore until reference or system operation by the operator			

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