



Cryostat Microtome

LB-11CS

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1. Safety Measures

- When the instrument is stopped the user should make the handwheel in the locked position.
- After downtime glass door should be open, let moisture evaporate as soon as possible, and keep indoor dry work.
- Damage needs to change as are lighting tubes (220 v 15 w), replacement, and pay attention to safety.
- Electrical system components, such as control panel, electric cabinet, etc., a professional must be maintained, so other people do not touch.
- The refrigeration system is mainly composed of a compressor, condenser, filters, and other components of the evaporator, the condenser (with fan) after long-term use can absorb dust, influence the refrigeration effect, need to open the vent on the right side of the fuselage board, brush with wool cleaning the dust on the condenser heat sink, or use the high-pressure air injection.
- The constant cold chamber should often be cleaned, but need to pay special attention to, not slicing the blade cut.

2. Introduction

Cryostat Microtome LB-11CS precisely slices specimens into thicknesses, ranging from 0.5µm to 100µm. It operates between -60°C and 10°C, with a sealed design for easy cleaning and effective cold retention. It holds up to 36 specimens on a quick-freeze shelf and includes manual and timed defrost settings. Our microtome features dual compressors for reliable cooling and a clear LCD for easy monitoring.

3. Features

1. Waste tray & storage rack for easy cleanup
2. UV sterilization for hygiene
3. Bright, low-power LED for visibility
4. 16-position hand wheel for precise control

4. Specifications

Model No	LB-11CS
Section Thickness Range	0.5µm to 100µm adjustable
Section Thickness Increment Range	0.5µm to 5µm, in 0.5µm increment 5µm to 20µm, in 1µm increments 20µm to 50µm, in 2µm increments 50µm to 100µm, in 5µm increments
Trimming Thickness Range	1µm to 600µm adjustable
Trimming Thickness Increment Range	0µm to 50µm, in 5µm increments 50µm to 100µm, in 10µm increments 100µm to 600µm, in 50µm increments
Tissue Retraction Function	0µm to 100µm adjustable in 2µm increment
Freezing Chamber Temperature Range	10 °C to -60 °C
Peltier Cooling Working Time	15 min
Speed of Fast-forward and Back-forward	0.9 mm/s, 0.45 mm/s
Specimen Head Minimum Temperature Range	0 °C to -60 °C
Maximum Specimen Size	55 × 80 mm
Freeze Shelf Minimum Temperature	0 °C to -55 °C
Specimen Vertical Stroke	≥65 mm
Lowest Temperature of Peltier units on Freezing Shelf	-60 °C
Specimen Horizontal Stroke	≥ 22 mm
Disinfection Method	UV
Noise	50 dB
Power Consumption	500 W
Power	AC 220V+10%, 50Hz (Standard) 110V+10%, 60Hz
Dimension	700 × 760 × 1160 mm
Weight	180 Kg

5. Applications

Cryostat Microtome LB-11CS is used for precise tissue sectioning in histology, pathology, and research and is used in hospitals, laboratories, and universities.

6. Instrument Introduction

- 1) This machine is divided into upper microcomputer control and panel operations, temperature display, and work status display.
- 2) The middle section of the low-temperature freezer, for biopsy, was frozen, slicing the operation part.
- 3) The lower part for the compressor refrigeration parts.
- 4) The motor drive part is in the back of the mechanical drive.

7. Installation

7.1 Adjustment of working conditions and before use

- The machine is movable floor type, with four casters at the bottom, and two knobs on the front base to adjust the height, only when it needs to move to make the front wheel work. After removing the transport package, adjust the front wheel to the ground and move it to the setting place. When it is in place, adjust the front caster to the failure state.
- When the machine is installed for the first time, the machine can be started only after two hours.
- After confirming that the power supply has a ground cable (three-hole socket), connect the machine to the power socket with the power cable delivered to the machine, and turn on the power switch on the back of the machine to enter the working state.
- Do not place debris on both sides of the machine and leave it at least 300mm away for ventilation and heat dissipation.
- The machine uses a single-phase AC power supply, the voltage is $220V \pm 22V$, if it does not meet the requirements, it needs to relate to a 2000-3000VA AC regulator.
- This machine is used at the ambient temperature of $+5^{\circ}\text{C} \sim +26^{\circ}\text{C}$, when the temperature is higher than 26°C , it is recommended to be equipped with air conditioning, to facilitate the refrigeration effect and extend the life of the refrigeration compressor.
- Environment relative humidity is not greater than 80%.

7.2 Mechanical Description

7.2.1 Tool Rest Position Adjustment

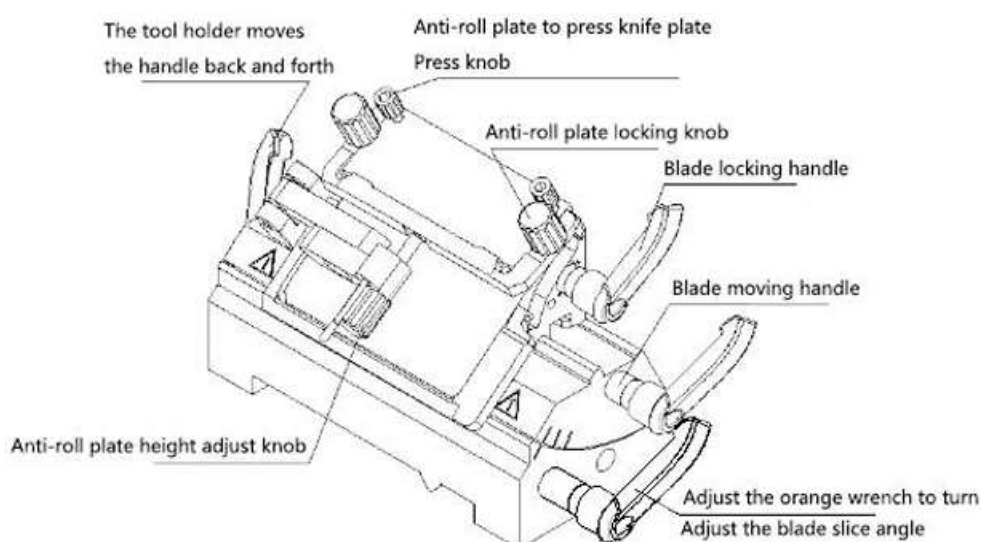


Figure-1 Tool rest component description

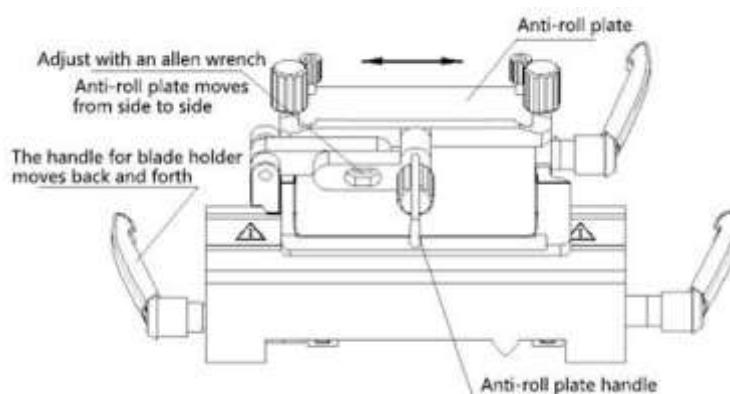


Figure-2 Tool rest components

Loosen (rotate counterclockwise) the handle (**Figures 1 and 2**), and the tool rest can be moved forward and back by hand and locked in the selected position. When moved to the end of the operator's direction, the entire tool holder can be removed. The process is reversed when you put it back. Loosen (rotate counterclockwise) the tool holder on the right side moves the handle left and right, and the tool holder can move left and right and lock in the selected position.

Note: Remember to lock the tool holder after moving.

7.2.2 Replacing a blade

Loosen the blade locking handle on the upper right of the tool rest to widen the gap of the press plate, insert the blade from left to right, and then lock the handle (**Figure 1**).

Note: Sharp blade, careful of scratches.

7.2.3 Blade angle adjustment

Use an Allen wrench to loosen or lock the rotating body. Loosen lock handle two knife blocks (**Figures 1 and 2**), two fixed knife buttons (**Figure 8**), cutter holder can turn, in the selected location can be set. When the knife needs to be changed in the middle of the section, the knife holder locking button on the right side should be locked first to prevent the Angle of the knife from changing.

7.2.4 Anti-Coil Plate Adjustment

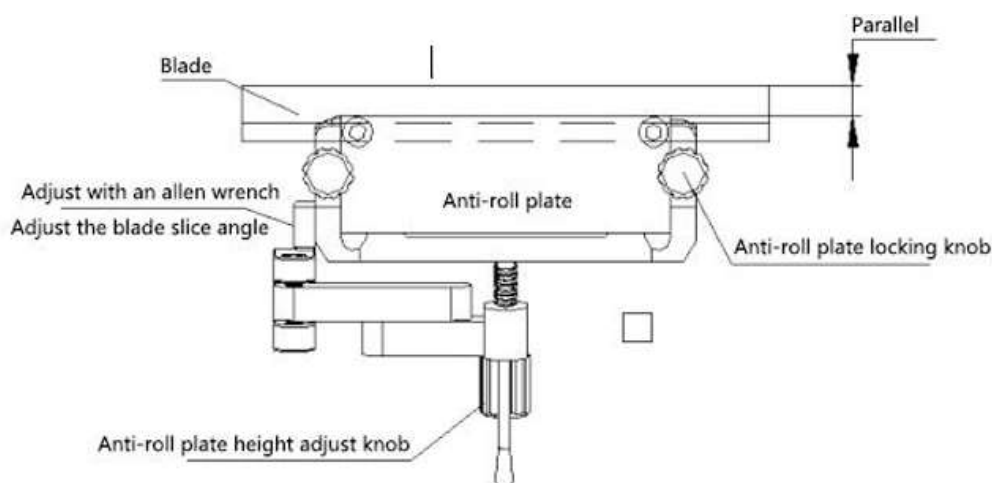


Figure-3 Adjusting the anti-coil plate and blade parallel method

Rectangular coils for the transparent organic glass plate, adjust the content.

1) Coil Setup and Adjustment Process

- Calibration plate edges parallel to slice blade. (**Figure 3**).
- Insert the blade and the lock handle.
- Lock two anti-roll plate lock handles using Allen wrench to adjust the blade and the rolled plate between the parallel.
- Locking hexagonal screw.
- Twist anti-roll plate height adjustment knob to adjust the height.

2) Adjust the Angle between the anti-coil plate and the slicing knife. (**Figure 4**)

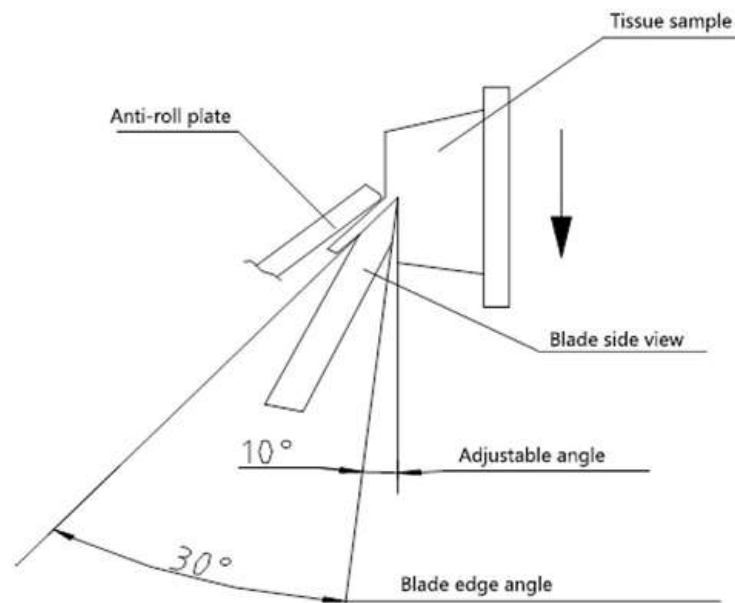


Figure-4



The Angle must not be greater than 10°.

3) Align the edge of the anti-coil plate with the cutting edge of the slice. (**Figure 5**).

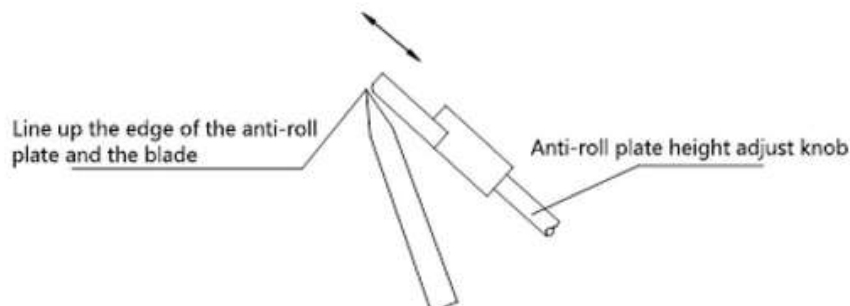


Figure-5

Note

- The protection against the volume board along with the organization of the contact area, there cannot be any damage.
- When feeling the organization cutting quality is not high, check the blade, whether organized fragments on coil plate, grease, and other foreign material.
- Avoid hand over rolled plate front, due to its temperature rise will adhere tissue slice.

7.2.5 Slice Reference

- 1) The use of temperature temperature-constant cooling slicer, mastering the appropriate slicing speed, and the correct adjustment of the anti-coil plate are the most important factors for cutting the ideal tissue sheet, the appropriate slicing speed is mastered through practical experience, through skilled operation of the hand wheel to achieve. There are many parts to adjust the anti-coil plate, and some affect each other, which needs to be carefully adjusted and cannot be casually placed on the blade.
- 2) When the tissue is frozen, the water in it condenses into ice, the tissue becomes hard, and the hardness changes with the temperature, the lower the temperature, the harder the tissue is, and the section temperature of most tissues that do not contain fat and do not fix formalin is best chosen between -13°C and -26°C. The section temperature of the tissue containing fat without formalin fixation is best chosen between 25°C and -40°C. (Tip) Which tissue, at what temperature, can obtain high-quality tissue sections, need to have a professional slicing technician operation.
- 3) If you want to get high-quality tissue slices, must pay attention to the following aspects:
 - Appropriate constant cold chamber working temperature choice.
 - The right section operation.
 - Fine rolled plate adjustment.
 - Sharp slicer, suitable for cutting Angle.
- 4) Contrary to the general paraffin section, the frozen section does not cut the long side of the tissue, and it is best to cut the short side of the tissue, that is, the contact line between the tissue and the slicing knife is shorter.

7.2.6 Hand Wheel Lock

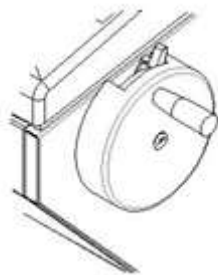


Figure-6 Hand Wheel Locking

The handwheel can be locked 360° at any point

8. Operations

8.1 Main Control Panel

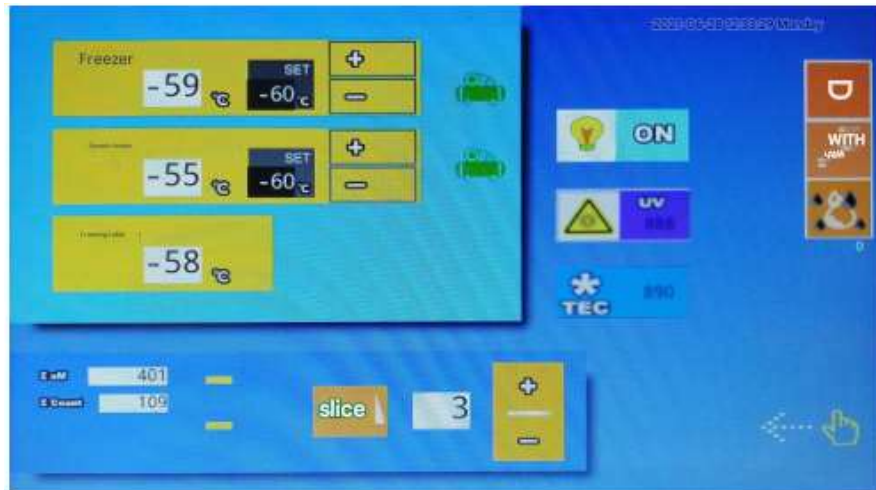


Figure-7



Figure-8

8.2 Starting the system

First, connect the power cord on the back of the machine, and then turn on the power switch, the machine will enter the working state  and the refrigeration compressor will start (if the power switch is operated twice within 3 minutes, the refrigeration compressor will wait for 3 minutes), and the freezer starts to cool down. There are two green signs on the touch screen , which indicate the working status of the compressor.

The top is the working status of the primary compressor the bottom is the working status of the secondary compressor, the green is the working status, the blue is the standby state, and the black is the stopped state. The main panel is divided into two pages, the first page is for instant defrosting Settings, cut/repair mode Settings, semiconductor module control and sleep control, and temperature control, and the second page, timing defrosting Settings, time display, and setting area, the left small operation panel is used for sample head fast movement control, lighting and UV disinfection lamp control.

8.3 Introduction

8.3.1 Instant Defrost



This button enables or disables the instant defrost function. Press this button, and the machine will enter the instant defrosting state, the indicator on the right will light up, and the machine will enter the defrosting state, each defrosting time of 60 minutes. Press this key during defrosting , will immediately stop the defrosting, light is put out. Cooling will resume in 25 seconds.

Note: The machine in the process of defrosting, frozen indoors melts, will produce a small amount of water droplets, suggest wiping clean, avoiding refrigeration formation of ice crystals again.

8.3.2 Semiconductor Refrigeration (sleep mode is invalid)



This button controls the semiconductor refrigeration (On/Off). Pressing the button will turn on the indicator light and activate the semiconductor refrigeration on the cold table. The module platform will cool down, and the semiconductor refrigeration will operate for 15 minutes. As time progresses, the operating time of the semiconductor will gradually decrease until it stops working, and the indicator light will turn off. You can also press the button to stop the semiconductor refrigeration during its operation.

Additionally, if the cold table temperature exceeds 15°C while the semiconductor refrigeration is working, the refrigeration will automatically shut off. Similarly, if the cold table temperature is higher than 15°C, the semiconductor refrigeration cannot be activated.

8.3.3 Sleep Mode



We keep the temperature of the freezer between 5 and 15°C, which is called the "hibernation" state. Currently, the working time of the compressor is much less than the stop time, and the average power consumption of the compression is reduced, which greatly extends the service life of the compression and reduces the energy consumption. Therefore, when the machine is not used for slicing for a long time, the machine can enter the "sleep" state. The key for the job/dormancy a key, press the button, can awaken the dormant state system, enter the normal work mode, or the system work mode, into sleep mode).

8.3.4 Slice (Trim) Adjustment

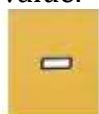
After the machine is turned on, the slice mode and slice value are displayed on the right side of the information at the bottom of the touch screen, the Left return knife value, and the total section thickness value.



This key is the key for selecting the slice mode. Press this key to select the slice mode or repair mode.



This key is the increase key. Pressing this key will increase the slice (or trim) value.



This key is reduced. Pressing this key will reduce the slice (or trim) value.

8.3.5 Temperature Adjustment

After the machine is turned on, it automatically runs in the current time state. This mode after we power on the machine and reset is called the initial mode. On the right side of the top of the screen are the current time and the current week; On the left are the temperature of the freezer, the temperature of the sample head, and the temperature of the cold table. The actual temperature value is displayed on the screen, and the number in the yellow box is the set temperature value. Temperature can be adjusted by +/- behind the temperature.

8.3.6 Time Setting



Click the icon at the bottom right of the screen and swipe to the left to go to the second page, Time, Auto Sleep, and Auto Defrost Settings.

Set the time and date, as shown in the picture below. Click the date or time, pop up the keypad, adjust the date and time, and press Enter to save.

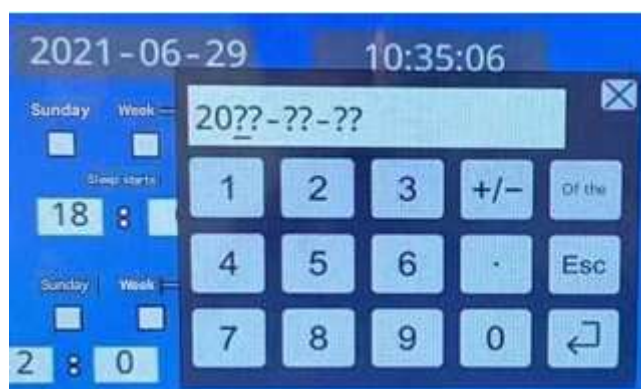


Figure-9

Set the hibernation time, as shown in the following figure, click Week, and then set the hibernation time, the first is the hibernation start time, and the second is the hibernation release time. If the hibernation release time is the second day, you should select the hibernation start day and the hibernation release day, click OK, and set it according to the actual application.



Automatic defrosting

Settings, as shown in the picture below, click to select Week, then select Defrosting time, and click Save.



8.4 How to use the small control

The small control panel (left) is shown in the figure



8.4.1 Ultraviolet Disinfection Function



This button is the on/off button of the ultraviolet disinfection lamp. Press this button, the machine enters the ultraviolet disinfection state, and the ultraviolet lamp in the freezer starts to work. After the UV disinfection lamp is turned on, the work will be automatically timed, and it will be automatically turned off after 15 minutes. The user can also press this key again to stop the working UV lamp at any time.

Strongly recommended: The quartz lamp wall to keep clean is the key to disinfection and sterilization, it is recommended that users often clean the lamp wall dirt, to ensure disinfection and sterilization capacity. Since UV disinfection is not suitable for use at low temperatures, it is recommended that the UV disinfection lampwork in the dormant state of the system.

8.4.2 Lighting Function



This button is the light on/off button, press the key, and the light is on. To stop, press this button again and the light goes off.

8.4.3 Slow motion of the sample head



This button moves the sample head forward at a slow speed.

8.4.4 Fast sample head movement function



These two keys can quickly move the sample head, press either of the two keys, and the sample head quickly moves, if the back key is pressed, it will produce a return to the end of the operation, if you do not want the sample head to return to the end, you need to touch the fast forward key, you can stop the sample head in motion.

9. Maintenance

9.1 Cleaning Instruments

9.1.1 Before each cleanup, perform the following previous steps:

- Lift the specimen clamp up to the top position and lock the handwheel.
- Loosen the specimen clamp and pull it off.
- Remove the blade from the knife holder and place it back in the knife box.
- Remove the tool holder base and tool holder to clean.
- Remove the specimen from the specimen clamp. Remove slicing waste with a dry brush.
- Remove the specimen forceps and clean up separately.

9.1.2 Instruments and External Surfaces



If necessary, the painted outer surface can be cleaned with a light commercial household cleaner or soapy water and dried with a damp cloth.

9.1.3 Blade Holder

To remove the blade holder and clean it, proceed as follows.

- Flip the blade guard down.
- Turn the eccentric lever handle on the side of the rotary body and pull it out from the side.
- Push the blade clamp base with the press plate to remove it from the rotating body.
- Turn the eccentric lever handle on the side of the blade clamp and pull it out from the side.
- Remove the blade plate.
- Clean all parts of the blade holder.



Do not use xylene or liquids containing ethanol (for example, glass cleaners).

- Dry the tool holder and assemble it.
- After cleaning the removed parts, apply a thin layer of lubricating oil.
- When installing the press plate, ensure that its upper edge is parallel to the rear edge of the blade clamp base.

9.2 Lubrication Instruments



Once a month, lubricating oil lubricates the following parts (1-2 drops are sufficient).

9.2.1 Instruments and specimen racks

- The gripper armature in the clamping head.
- The "T" shaped blade holder base locking iron on the base plate of the microtome.
- Blade holder guide rail on the base plate of the microtome.

9.2.2 Blade Holder

- The "T" shaped rotary body on the base of the blade holder locks the iron.
- The lever of the eccentric lever handle controls the lateral movement of the blade clamp.
- The "T" shaped blade clamp on the rotating body locks the iron and the blade holder on its side to move the rail.
- The grip control lever of the blade.

10. Troubleshooting

Malfunction	The solution/the reason
Tissue rupture	• Select some thin tissue. • The freezing speed is not fast enough.
Tissue detachment	• Add more embedding agents. • Cut the tissue gently. • The freezer head temperature is low.
Tissue advancing but not slicing	• Make sure the blade is secured. • Make sure the specimen clamp is secured. • Make sure the freezer head is firmly stuck in the specimen clamp. • Increase the knife Angle.
Tissue slice crimping	• Check the clearance between the anti-roll plate and the blade. • Raise the height of the anti-roll plate. • Check the Angle between the anti-roll plate and the blade.
The tissue slice softens during slicing	• Extend the freezing time of blades and anti-roll plates.
Tissue slice pasted with anti-roll plate	• Clean the anti-roll plate with a short brush • Extended freezing time.
Tissue slice folding	• Clean the blade with a brush. • The gap between the blade and the anti-roll plate is small.
The tissue slices split vertically	• The edge of the blade has a small gap, which needs sharpening. • There's a small foreign object on the blade.
The tissue slices narrowed	• Adjust the evenness of the gap between the anti-roll plate and the blade.
The tissue pieces are fragmented	• The temperature of the cut tissue is too low, the freezing time is too long, and the tissue is affected.
Vibration occurs when slicing	• The blade is not fixed properly. • The angle of the blade is too large or too small. • The freezer head is not secured. • Slicing speed too fast.
Uneven tissue thickness	• Blade is too dull. • The angle of the blade is too small. • The freezer head is not secured.

11. Accessories

Standard Accessories

Serial No	Accessories
1.	30 mm Six specimen stages
2.	118 mL Cryostat oil
3.	118 mL Freezing medium
4.	Section waste tray
5.	Debris brush
6.	Sectioning brush
7.	Tools



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