AST 560

Semi-automatic Cryostat Microtome

Operation Manual

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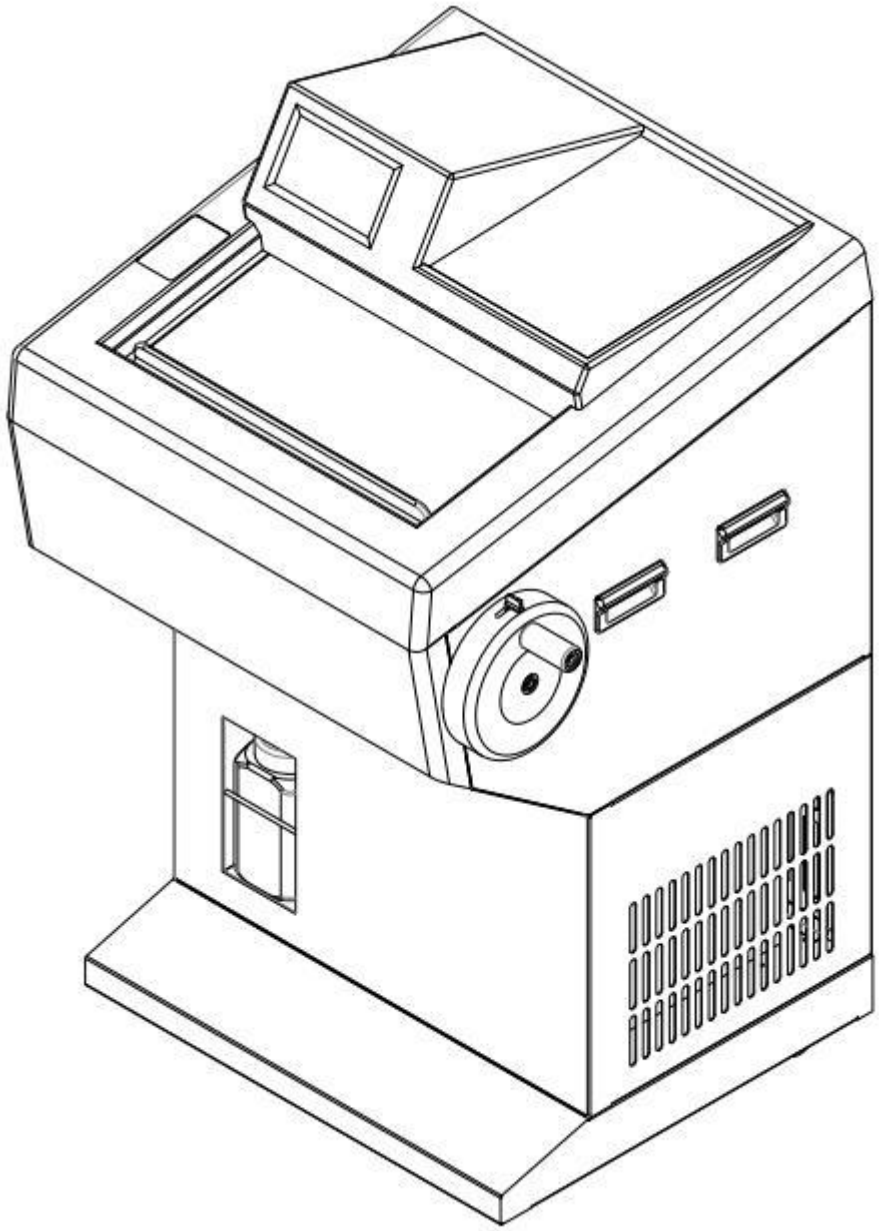

Presented in this Operation manual are the structure, functions and using notice. Reading carefully prior to operating the instrument.

Foreword

AST560 Cryostat Microtome is a Semi- automatic microtome whose design concept comes from customers all over the world; it can meet different requirements for tissue section.

To ensure the instrument works properly, safely and perform durably, it is necessary to read the operation manual carefully.

Our companies are not only responsible for the repair, but also train distributors' ability of repairing. To repair the product smoothly in time, please contact your local distributor. Notice: With the development of technology and constantly updating of products, this manual will make the corresponding changes. Please forgive us not to notify the improvement of technical data and structure.

CONTENTS

1、Safety Notes

1.1Overview

The Operator Manual contains important safety instructions and information. In order to operate the instrument safely, the operator must read carefully prior to starting up the instrument. It is very important to ensure safety and avoid instrument damage. Please keep the manual close to the instrument to read easily at any time.

▲ **Note:** The safety marks and protective device on both instrument and accessories may neither be removed nor modified , so as not to injure human body or instrument .

1.2 Safety Warning

Every principle person should read carefully and carry out strictly according to the following safety notes relating to transport, installation, calibration, operation, maintenance, cleaning and all aspects of the instrument.

1.2.1 Warning during transport and installation

- The instrument may only be transported or moved in an upright position and the tilt angle should not exceed 45 ° .
- Prior to removing the microtome , remove the blade holder .
- The input voltage has been preset at the factory , please check this setting complies with your local power requirement before connecting to the main power
- Please use the power cord provided . If need to replace it, please use the power cord with earth wire.
- Do not operate this instrument in the room with the danger of explosion .
- Don't remove or modify the protective device on both instrument and accessories , in order to avoid injury to instrument or human body !

1.2.2 Warning of Operation

- Take care when handling microtome knives and disposable blades . The cutting edge is extremely sharp and might cause serious injury.
- Remove the knife/blade before detaching the blade holder from the instrument , and put the blade back into the blade box when not in use
- Never place the blade with the cutting edge facing upwards and never take out the blade with your hands.
- Please clamp the specimen block before clamping the blade .
- Prior to replacing the specimen and blade , please lock the handwheel and cover the blade guard on the cutting edge .
- Rotate the handwheel clockwise, otherwise it would affect section .
- Don't rotate the handwheel clockwise and counterclockwise frequently at top and bottom , it might lead to deviation of section thickness .
- Ensure no liquid enters into interior of instrument during working .

1.2.3 Warning during cleaning and Maintenance

- Only authorized person may do the service and repair .
- Before cleaning and maintenance of each part, please cut off the power , unplug the power plug , remove the blade holder and blade .
- Lock the handwheel before cleaning.
- Don't clean the instrument with corrosive liquid .
- Ensure no liquid enters into interior of instrument during clearing .
- After cleaning , don't turn on the instrument before it is completely dry .
- Turn the instrument off and unplug the power cord before changing the fuse . Please use the fuse according to the requirement and specification in operation manual.

1.3 Safety Device

Handwheel locking mechanism

As showed in Fig1, it is the lock lever. Clockwise push the lever (1) until it locks the handwheel at the upright position. To unlock the handwheel, rotate counterclockwise the lever (1).

As showed in Fig1, the handwheel is locked. The "Lock" indicator light will be lit on display panel as fig 2..

- Don't lock the handwheel when the handwheel is rotating , otherwise it will damage the instrument

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

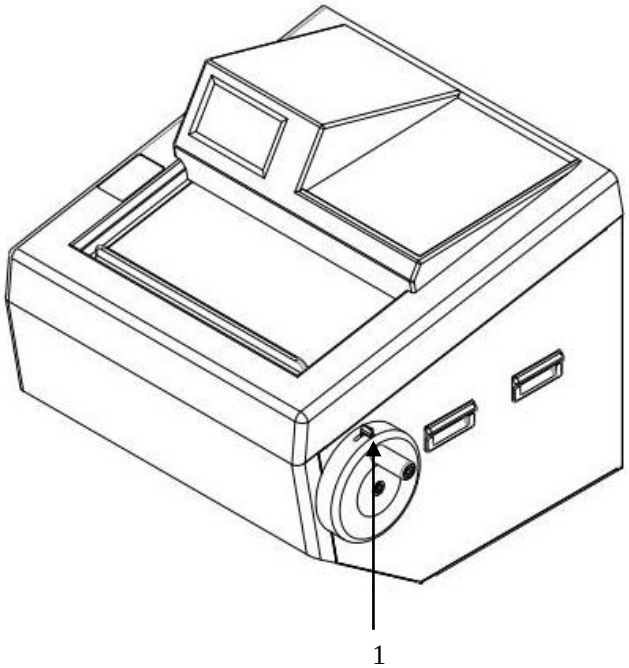

Fig 1

The lock indicator is highlighted, indicating the handwheel is locked.

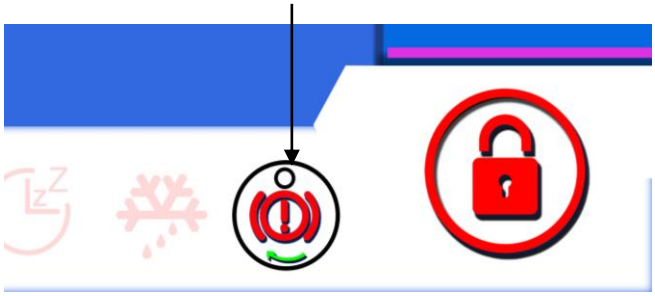

Fig 2

2、Performance & Parameters

2.1 Product description & intended use

Cryostat Microtome are usually composed of control systems , mechanical systems , drive systems , blade holder , blade , housing etc , which is for the pathological analysis of tissue samples .

2.2 Overview-Instrument Components

The main structure of cryostat microtome is shown in Figure 3 as below:

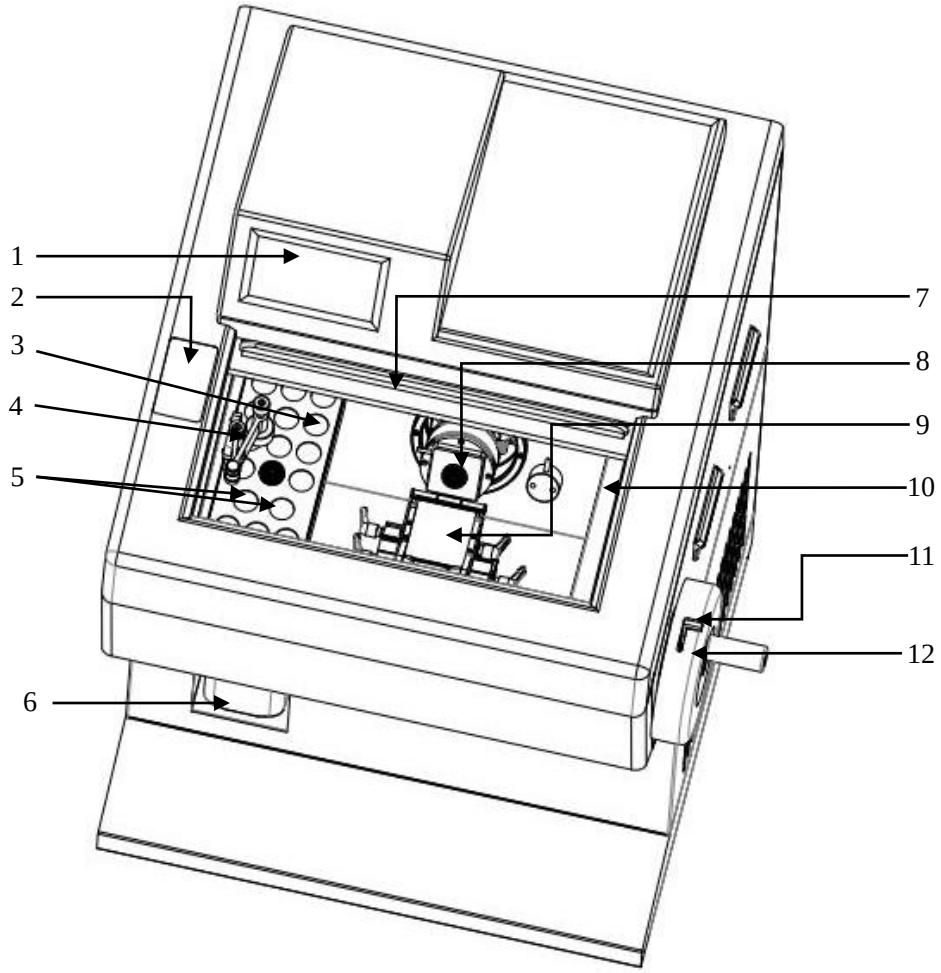

Fig 3

1	Touch Panel		7	Heating glass
2	Left control panel		8	Specimen Clamp
3	Freeze Shelf		9	Blade holder
4	Stationary heat extractor		10	Tool Shelf
5	Peltier on freeze shelf freezing area		11	Lock lever
6	Waste container		12	Handwheel

2.3 Performance Index

AST 560 is a Semi-automatic cryostat microtome whose specimen forward and backward movement is controlled by motor. So it can get high quality section and easily operated. The following is its performance:

⊙The whole instrument follows human engineering theory as well as artistic appearance, made by numerical control machine.
⊙Artificial intelligence interface touch panel is easy to learn and operate.
⊙The retraction function can prevent the specimen from touching the blade sharp during lift.
⊙It equips counter which is able to show total quantity of slice.
⊙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
⊙Sterilization at fixed time or manually
⊙Sleep at fixed time or manually
⊙Large freezing shelf could load 17 samples simultaneously.
⊙Quickly feeding function.
⊙Waste section suction function.
⊙Alarm information query.

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

3.1 Installation site requirement

⊙ The floor stand instrument fixed 4 wheels and 2 fixed support feet . The front only be used during movement. Remove the package and move the instrument to the installation site, then adjust the two fixed support feet and make the front wheels disabled.

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

⊙ Ensure no other goods around the instrument . At least 300mm distance must be kept for ventilation and heat dissipation.

⊙ Ensure the working temperature and humidity must be in accord with the specification in manual .

⊙ Ensure leaving enough running space for rotating the handwheel .

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

3.2 Standard Delivery

AST560 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

● Please check the supply carefully with the packing list after opening the carton . If you have any doubt, contact the seller immediately .If you have any special requirement, please illuminate it before the order.

3.3 Installation

3.3.1 Unpacking

As showed in the fig 4, the following is the instrument accessories:

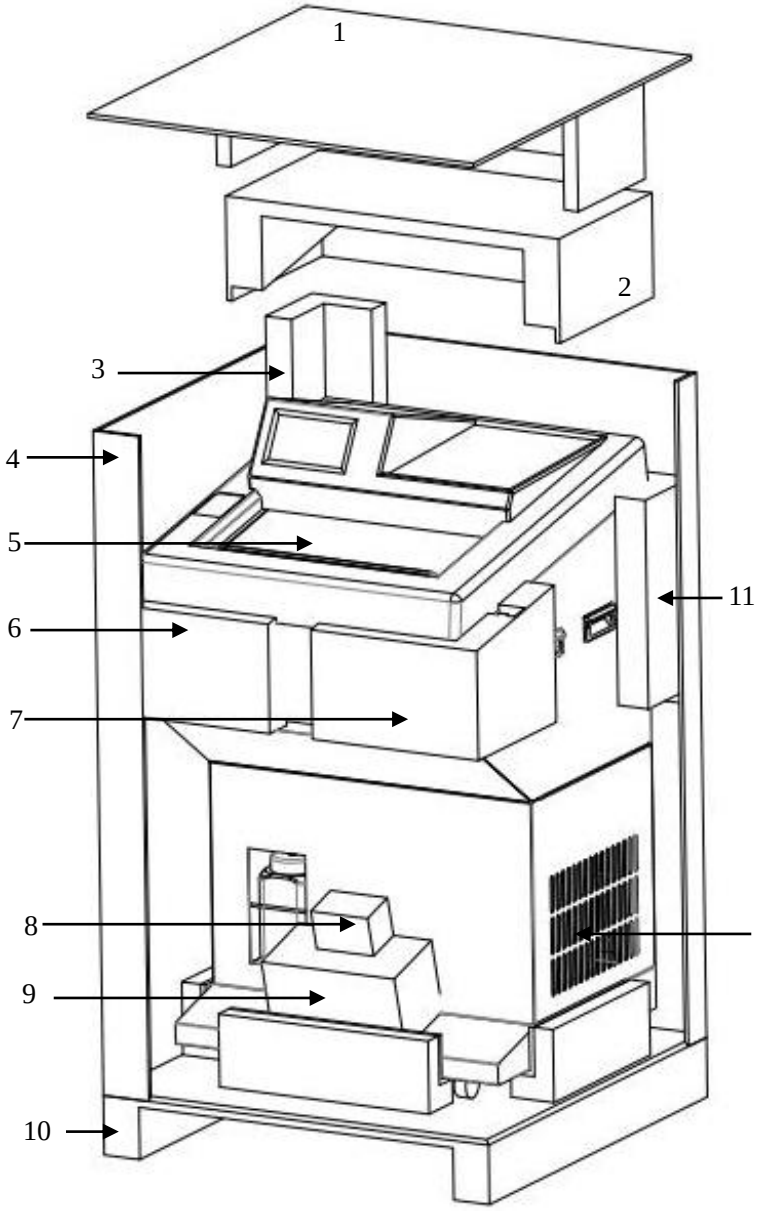

Fig 4

Remove the cover (1) and carton body (4), then take 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).

Then take out other accessories in the inner box package to install the instrument.

1	Carton Cover		7	Corner Support 3
2	Upholder		8	Handwheel
3	Corner Support1		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

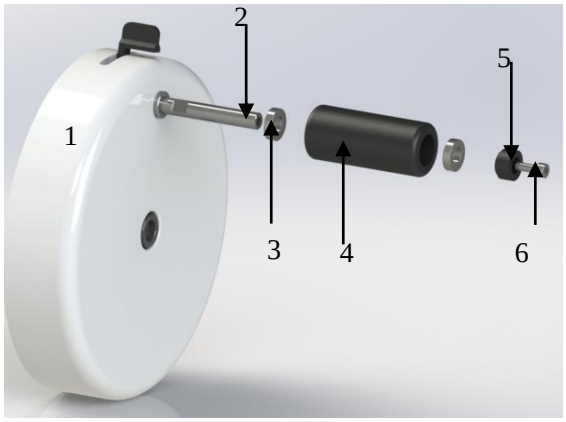

Fig 5

- Take out the handwheel accessories from handwheel box .
- Tighten the handwheel lever (2) into handwheel (1) with 7mm wrench .
- Insert bearing(3) , handwheel cover (4) ,bearing (3) and handwheel washer (5) in order .
- Tighten them with M5×16 hexagon socket screw(6) .

1	Handwheel		4	Handwheel Cover
2	Handwheel lever		5	Handweel washer
3	Bearing		6	M5×16 hexagon Socket Screw

3.4 Electrical Connection

- The voltage has been preset at the factory . Before connecting the instrument to the power, please check that this setting complies with the local power requirements.
- Connect the instrument to a ground power socket to avoid accident .
- Please use the power cord provided . If need to replace it, please use the power cord with earth wire.
- Insert the fuse(1) into the fuse socket (2)as it showed in the fig6 and insert the whole fuse socket into the socket(3) as fig 6.
- Attention: Before changing the fuse , please cut off the power supply and pull the plug . Use the fuse according to the specification in operation manual.

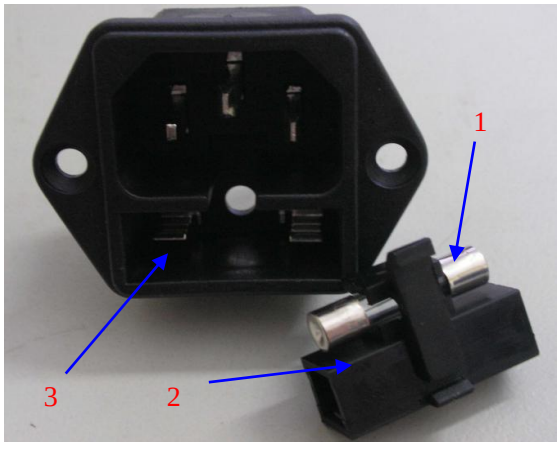

Fig6

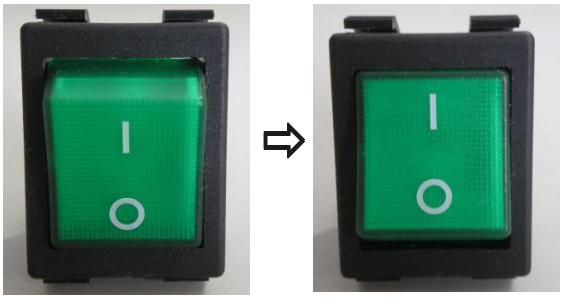

Fig7

- As fig7 shows power switch . Turn off as the left fig and turn on as right fig.
- After turning on the power , display panel light and the specimen block will be back to the original base position automatically with a beep .

4、Operation

4.1 Operation 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:

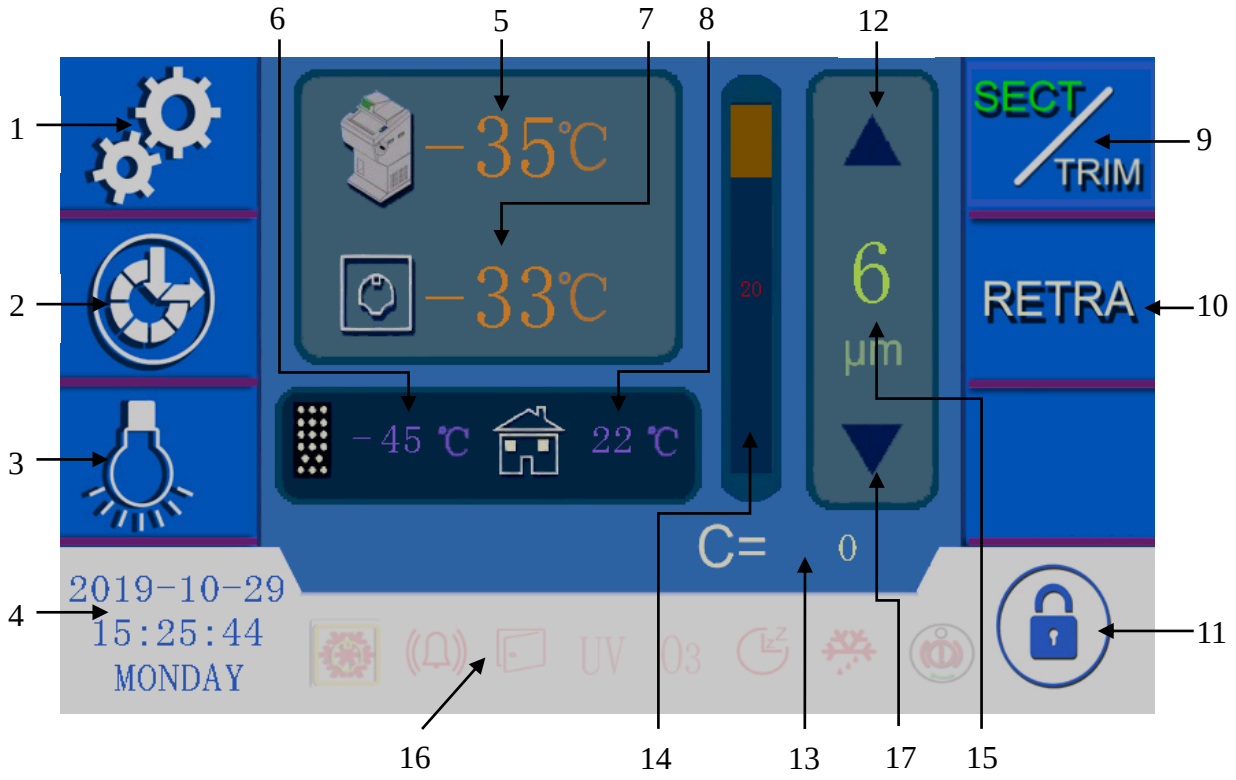

Fig 8

1. Timing Set	Click the icon, pop-up sub-interface, set timing parameters for each function
2. Auxiliary Function	Click the icon ,pop up sub-interface , select the auxiliary function
3. Lamp	Click the icon ,turn on/off the lamp
4. Time display and set	Display current date and time .Click the icon ,set the date and time
5. Cryo chamber temperature set and display	Display the actual cryo chamber temperature ; Click the icon , pop up sub-interface , set the cryo chamber temperature
6. Freeze shelf temperature	Display the freeze shelf temperature
7. Specimen clamp temperature	Display specimen clamp temperature ; Click the icon , pop up sub-interface, set its temperature
8. Environment temperature	Display the environment temperature

9SECT/TRIM :alternative select key	Click the icon, it switches between sections and trimming modes, the current selected mode will turn to green. The corresponding item shows the thickness value, and click this value, it pops up a numeric keypad where can input the required value. The thickness range refers to section 2.4-Technical parameters. For example, when the thickness range is 0~3μm, the increment is 0.5μm. When you set 2.8μm, the default thickness is 3μm.
10Retra: Retraction key	Click the icon, "Retra" changes to green, the corresponding thickness value shows on item 15. Click it, it pops up a numeric keypad which is for modifying the retraction value. The value range refers to Section 2.4
11 .Lock key	Click the icon to lock the screen or unlock the screen. The lamp key is not controlled by this key
12.Value increasing arrow	Click this key to increase the value on item 15
13Section number sum	Section number sum , when exchange between slicing and trimming, the value will return to zero automatically.
14.Progress display	Display the sample clamp progress
15.Section thickness set	According to the selection of item 9 , 10 and 11, it shows the setting value of section, trimming and retraction. It can modify the value by up and down arrow. Or click the value and it will pop up a keypad where you could input the required value directly. The range refers to the section 2.4.
16.Auxiliary function status	When the auxiliary function is activated , the corresponding icon is highlighted
17.Value decreasing arrow	Click this key to decrease the value on item 15

4.1.2 Left control panel

The left control panel is used to control the specimen forward to backward moving from blade holder as fig 9 ：

Fast forward/fast backward (two arrows)

Adjust the specimen position rapidly; the speed could reach900±30μm/s

Slow forward/slow backward (single arrow)

Adjust the specimen position slowly; the speed could reach300±30μm/s

Fig 9

● Specimen feed distance is 24mm. Once exceeding this distance, the buzzer will beep and the specimen movement stops.

4.2 Timing Set

Click the timing icon on the upper left corner of the main screen; it pops up a sub-interface as shown below fig 10.

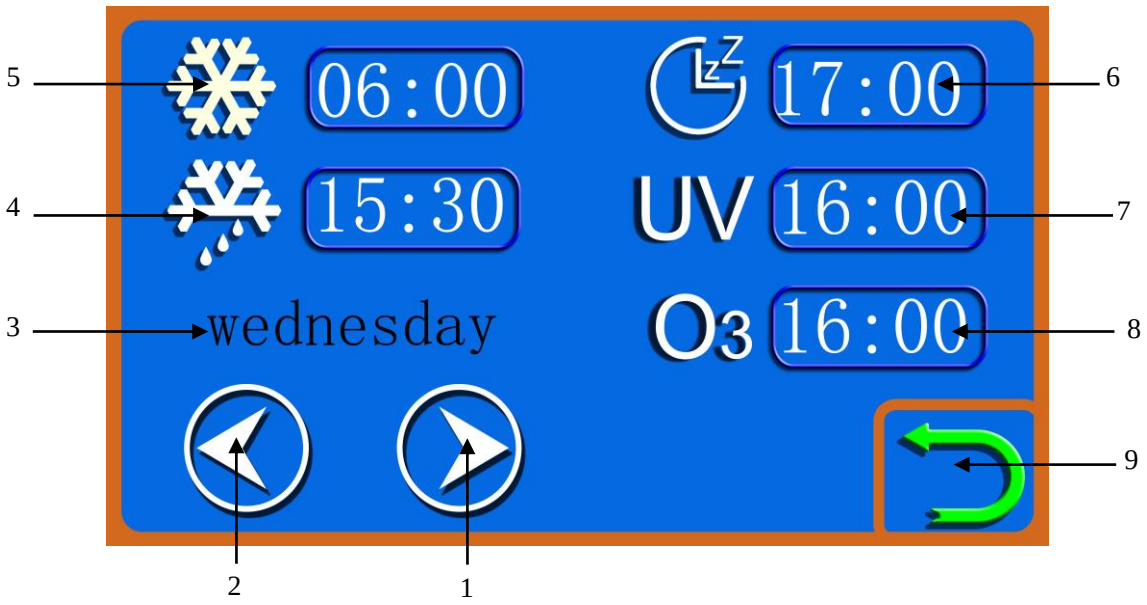

Fig 10

1 Left arrow	Use cooperatively with right arrow 3, select one date and set its working time for each function. As fig10 , it shows each function's working time on Wednesday
2 Selected date	The selected date; Within setting of the function in this date, press the arrow to select the next date to continue setting
3 Right arrow	Use cooperatively with left arrow 1 , select one date and set its working time for each function
4 Automatic defrosting time	Set the selected date and set the automatic defrosting time; Please note to save the sample and remove the waste before defrosting
5 Automatic start time	Set the selected date and set the automatic start time
6 Automatic disinfection time	Set the selected date and set UV disinfection time. Please note it disinfects only when the heating window closed
7Sleep time	Set the automatic sleep time
8Back	Press the key to return to the main interface after setting the parameters

4.3 Auxiliary Function

Click the auxiliary function setting icon on the left side of the main screen to pop up the auxiliary function sub-interface as below fig 11.

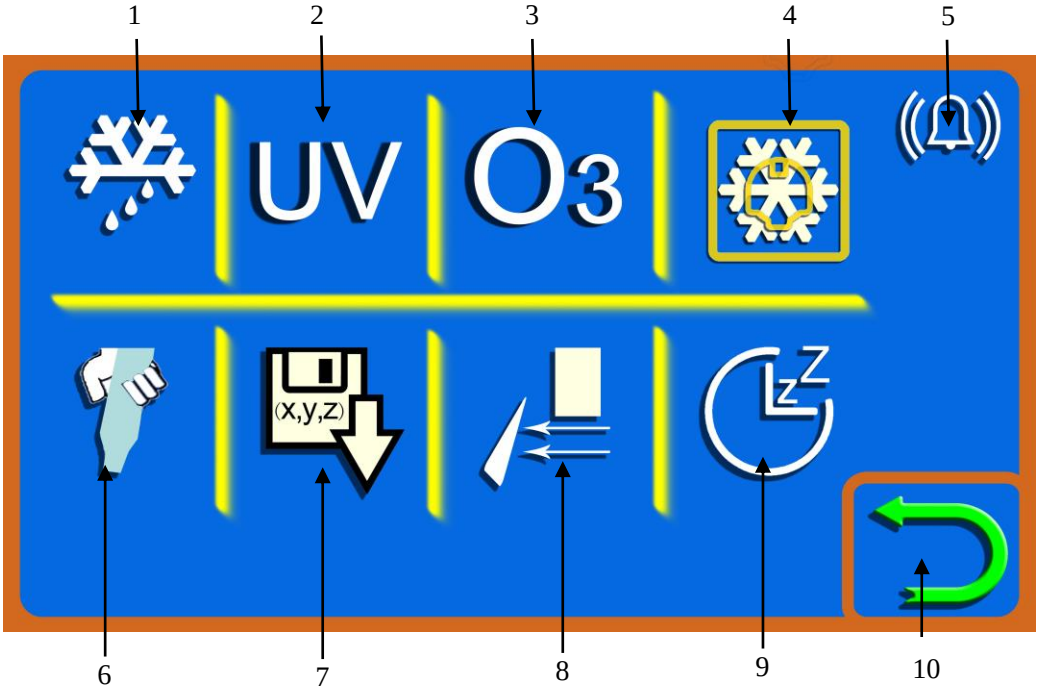

Fig 11

1Real-time defrosting	Click this key to enter defrosting status immediately
2Real-time disinfection	Click this key to enter disinfection status immediately. Please note it disinfects only when the heating window closed
3Real-time sleep	Click this key to enter sleep status immediately
4Specimen clamp peltier switch	When the specimen clamp temperature is lower than -8℃, click this icon to activate this function. It will work for 15 minutes and stop.
5Pump waste sweeps	Prepare the related tools, click on this icon, the device automatically pump cutting waste sweeps
6 Feed to memory position	When the sample feeding, memory the current position and use cooperatively with item 7.
7Automatic feeding	Click this icon, it feeds to memory position automatically.
8Alarm information	When the device alarms, click it to check the alarm information.
9 Back	After setting the parameters, click it back to the main interface.

Notice: Be sure to take out the samples and waste bags etc before entering into defrosting status. The item 6 and 7 is only suitable for samples with similar thickness.

4.4 Cryo chamber temperature setting

Click the value beside the cryo chamber icon on main interface; it pops up sub-interface temperature setting as below fig 12:

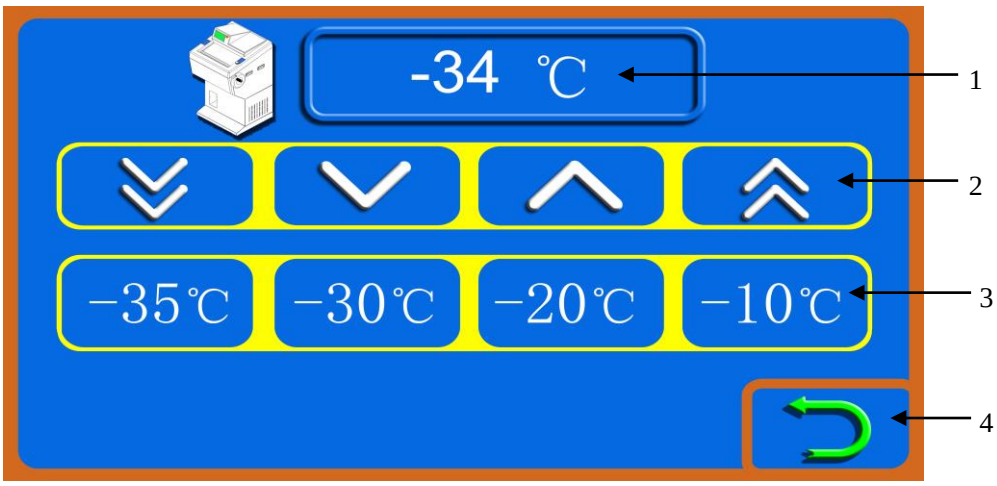

Fig 12

1Temperature setting	It shows current set temperature. The value can be modified by item 2 and 3.
2Value adjustment	Double arrows can be adjusted once 5 ℃, single arrow can be adjusted 1 ℃
3Quick value selection	Select temperature value quickly.
4Back	After setting the parameters, click it back to the main interface.

4.5 Specimen clamp temperature setting

Click the value beside the specimen clamp icon on main interface. It pops up a sub-interface temperature setting:

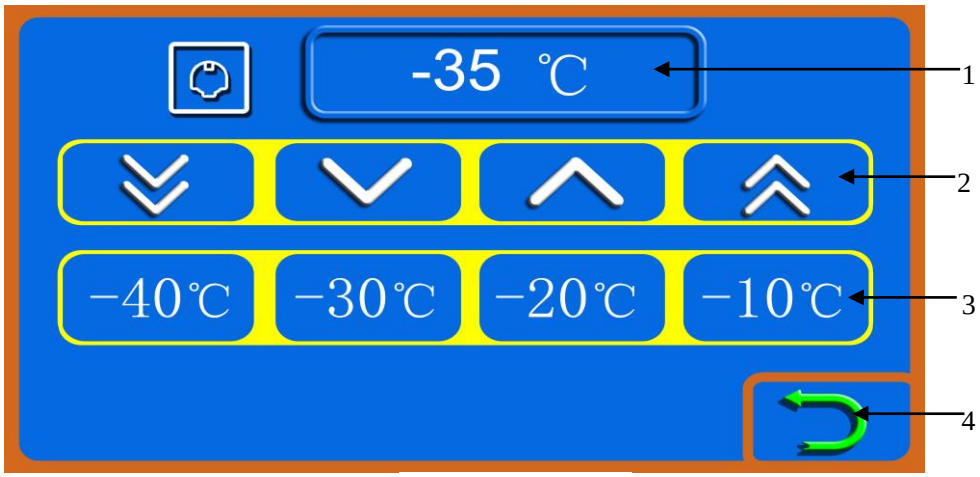

Fig 13

1 Temperature setting	It shows current he value can be modified by item 2 and 3.

2Value adjustment	Double arrows can be adjusted once 5 ℃, single arrow can be adjusted 1 ℃
3Quick value selection	Select temperature value quickly.
4Back	After setting the parameters, click it back to the main interface.

4.6 Section, Trimming and Retraction setting

The section, trimming and traction options are located on the right side of the main interface as below fig 14：

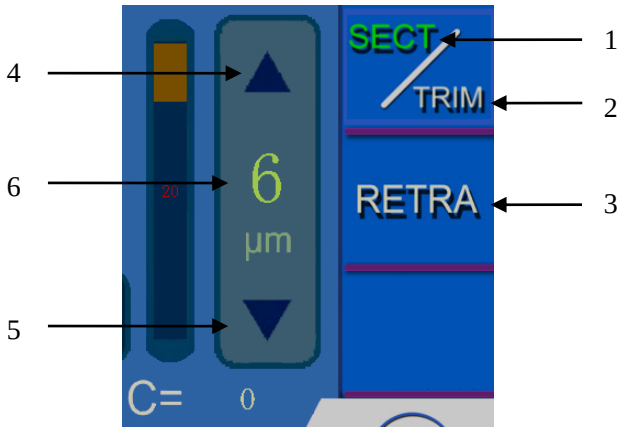

Fig 14

1.Section Option	When the current mode is trimming (TRIM is green), click SECT/TRIM icon once, it turns to section mode, while SECT turns to green. When the current mode is retraction (RETRA is green), click RETRA icon once, it turns to white, while SECT turns to green which means the current mode is section.
2.Trimming Option	When the current mode is section (SECT is green), click SECT/TRIM icon once, it turns to retraction mode, while TRIM turns to green. When the current mode is retraction (RETRA is green) ,click RETRA icon once , it turns to white ,while SECT turns to green which means the current mode is section .And then click SECT/TRIM once to turn to trimming mode .
3.Retraction Option	Click RETRA icon once, RETRA turns to green, it means the retraction mode is selected.
4.Up arrow	Click the up arrow icon, increase the value for item 6. The increments refers to section 2.4 –technical parameters.
5.Down arrow	Click the down arrow icon, decrease the value for item 6. The increments refers to section 2.4 –technical parameters.
6.Thickness and Setting	It shows corresponding item thickness value, and click this value, it pops up a numeric keypad where can input the required value. The thickness range refers to section 2.4-Technical parameters. For example, when the thickness range is 0~3µm, the increment is 0.5µm. When you set 2.8µm, the default thickness is 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 15：

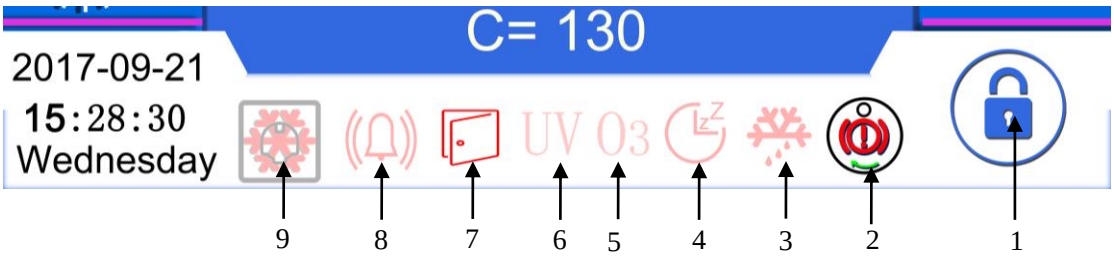

Fig15

1.Lock screen key	The red icon indicates touch screen is locked .Click it to unlock the screen, while the icon turns to blue. In the locked status, all the keys are useless except lamp key.
2.Handwheel lock	When the hand wheel is locked, the icon is highlighted, or the icon is dark. The fig 17 shows the handwheel is locked.
3.Defrosting	When it is defrosting, the icon is highlighted, or it is dark.
4.Sleep	When it is in sleep status, the icon is highlighted, or it is dark.
5.Disinfection	When it is in disinfection status, the icon is highlighted, or it is dark.
6.Heating glass opened	When the heating glass is open, the icon is highlighted, or it is dark.
7.Alarm	When the device has alarm information, the icon is highlighted, or it is dark.
8.Peltier status	When activate the specimen clamp peltier , the icon is highlighted , or it is dark

4.8 Blade Holder Installation

As shown in fig 16 below, the blade holder is mainly consist of the following parts;

1	Longitudinal movable jaw		7	Fixed lever 2
2	Rotating movable jaw		8	Fixed lever 3
3	Movable blade clamp		9	Fixed lever 4
4	Fixed blade clamp		10	Anti-roll plate lock knob
5	Anti-roll plate		11	Anti-roll plate height adjusting knob
6	Fixed lever 1			

⊙Fixed lever 1: It is used to fix the blade in the blade holder.

⊙Fixed lever 2: It is used to fix the blade holder into the cryo chamber.

⊙Fixed lever 3: Fixed blade clamp can be moved in the direction of arrow B, when it moves to

correct position and fix it by fixed lever 3.

⊙Fixed lever 4: Rotating movable jaw can be moved in the direction of arrow A on longitudinal movable jaw to adjust the holder angle. When it reaches to correct angle, fix it by lever 4

⊙Anti-roll plate height adjusting knob: Turn the adjusting knob to adjust the relative distance between the anti-roll plate and the blade, to adjust the anti-roll affection.

The blade holder has been already assembled when leaves factory, it only needs to be installed in the equipment.

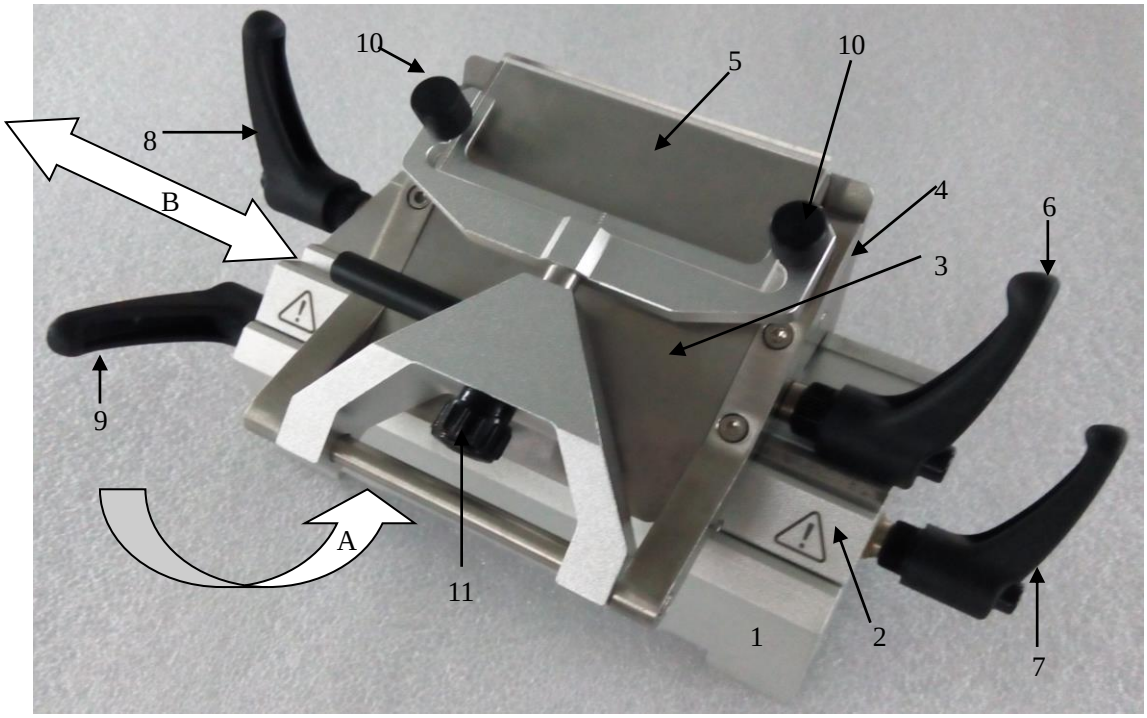

Fig 16

Installation of blade holder and base

As showed in fig 17, slide the blade holder along the track in cryo chamber, turn the fixed lever 2 to horizon position to lock the blade holder. The blade is close to specimen clamp, please do as the steps:

⊙If there is bladed installed, please take care to remove the blade and place it properly.

⊙Turn the fixed lever 2 (2) slowly until the locking block (3) at the bottom of the blade holder moves to the farthest position away from the blade holder.

⊙Aligning the locking block (3) at the bottom with the circular hole (4) of the rail(1) ; Meanwhile , align the V-shaped groove (5) at the bottom of the blade holder with the V-shaped groove (6) on rail (1) , and then place the blade holder on the rail (1) gently and push it forward a reasonable

distance .

⊙Turn the fixed lever 2(2) slowly to lock the blade holder in the rail and turn fixed lever 2(2) to horizon position.

▲**Attention:** Before moving the instrument, take out the blade and put it into box when not in use.

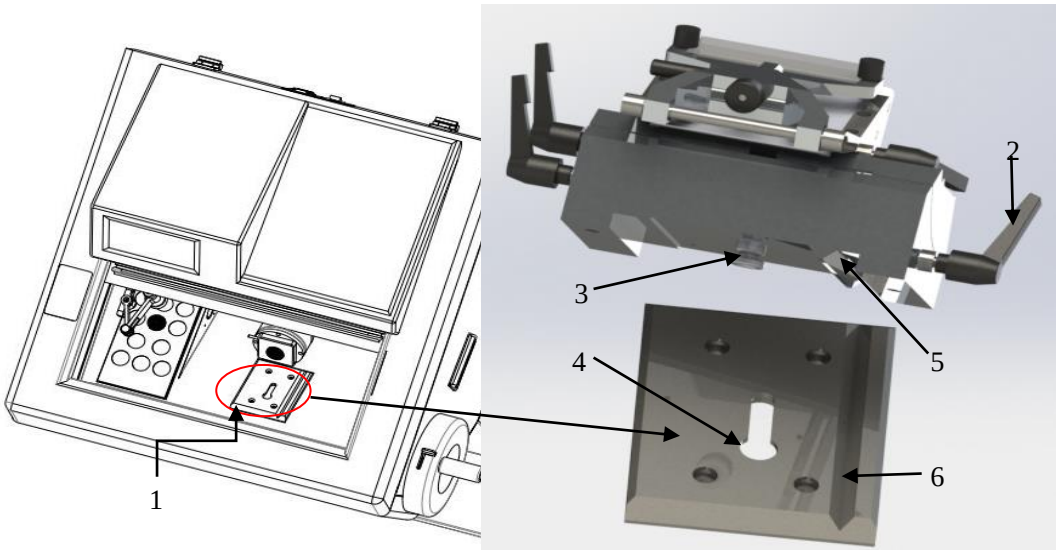

Fig 17

Adjust the angle

As showed on fig 18, the rotating angle is from 0 to 10 degree, the user can adjust the angle in this range according to requirement.

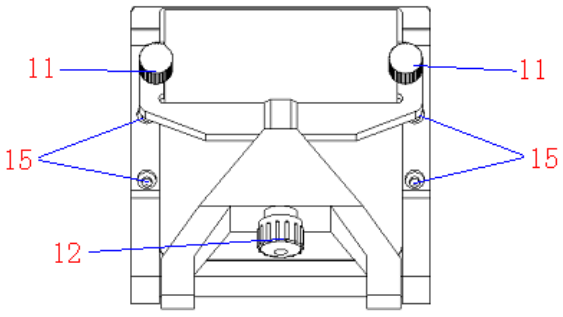

Fig18

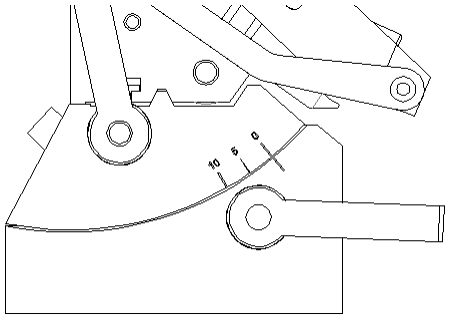

Fig 19

Antiroll plate adjustment

As fig 19， anti roll plate is rectangular organic glass ,do as follows:

⊙Insert the blade, and rotate the fixed pole (6) to vertical position for tightening it.

⊙Lock the two anti roll plate knobs (11)

⊙Adjust the bolts(15) with 3 mm allen key to make blade parallel with anti roll plate , then tighten the bolts(15).

⊙Turn the knob (12) to adjust the height of anti roll plate.

▲ **Attention:** Take care to operate the blade holder and the blade; it is very sharp and easy to cause serious injury.

4.9 Clamping the specimen and inserting the blade

Clamping the specimen

As showed in the fig 20 , rotate the clamp lever (2) , and insert the specimen(3) into clamp (1), then loosen the clamp lever (2) .

● Always clamp the specimen before installing the blade to avoid injury.

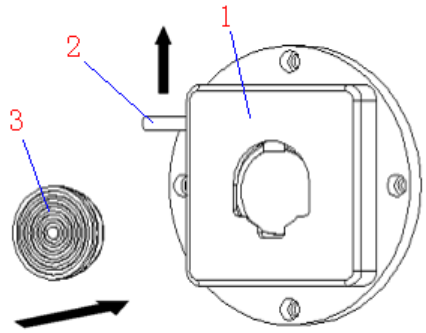

Fig 20

Blade inserting

As showed in fig 21, loosen the fixed lever (5) and push the blade (6) into blade holder (4), then rotate the lever (5) to clamp the blade.

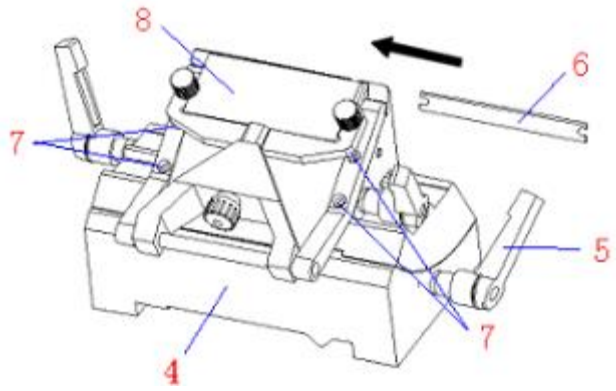

Fig 21

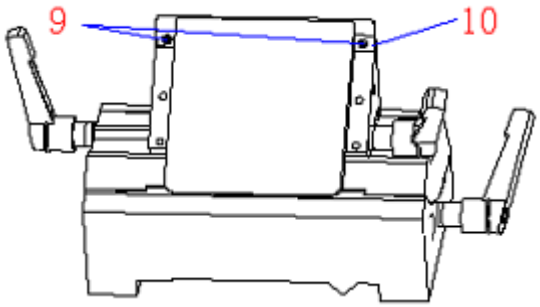

Fig 22

It uses disposable blade in picture. Blade can be divided into two types: low & high profile. If the high profile blade is needed, twist the four screws (7) out with 3mm Allen key, then take out anti roll plate module (8), twist out the two screws (9) on base plate (10). As showed in fig 22.After inserting the blade, refix the anti-roll plate module (8) 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.

4.10 Section Reference

1、When using cryostat microtome , please note that proper sectioning speed and correct anti-roll plate adjustment are important factors to obtain good quality section . The proper section speed is acquired through practical experience. The positions of anti roll plate adjustment is various, some of them are mutual influence, so they need to be adjusted carefully. The anti roll plate could not put on the cutting edge.

2、When the tissue is freezing , the water in the tissue is frozen , the tissue get harder . The hardness changes with temperature, the lower the temperature is, the harder the tissue will be. It needs work through practice to identify appropriate temperature for better quality section. The sectioning temperature range of most fat-free without formalin fixed is best between -13℃ and -23℃ .

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

（1）Proper cryo chamber temperature selection .

（2）Correct section operation .

（3）careful anti-roll plate adjustment .

（4）Sharp blade and appropriate sectioning angle

（5）The blade is clamped tightly .

（6）The specimen is clamped tightly .

（7）Select a proper angle of the sectioning and specimen. The smaller the angle, the lower the section compressed. The harder the specimen, the larger the angle. If the section is still not good, please try to increase the angel from 0o.

Now there is no general rule to identify proper angle for different specimens, so try to find an appropriate angle of different specimens for good section.

4、The frozen section is in contrary with paraffin section . It doesn't section long side of tissue but short side in frozen section. Try to make contact line of tissue and blade shorter.

● After sectioning , place the specimen clamping system on the upper position and lock it . Detach the blade and put in the box when it is not in use .

5、Cleaning & Maintenance

5.1 Cleaning

⊙ Cleaning the instrument

Use the wet cloth to clean the areas always polluted during operation, for example the handle

and the base holder locking lever and the storage area on the crust. Use the dry cloth to clean other appearance.

⊙ Cleaning the clamp

As showed in fig 23.Specimen clamp position (1) which is often touched when operation, and position (2) which always contacts with the specimens. These two positions, especially position (2), are very easy to be polluted, so need to be cleaned frequently to ensure normal operation.

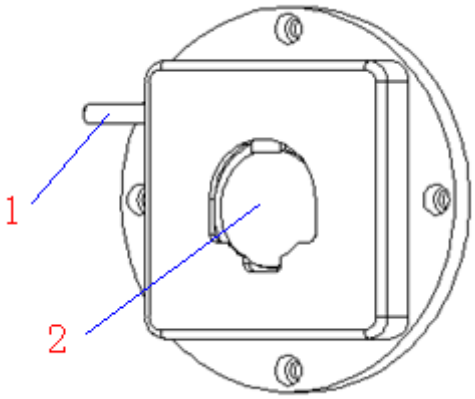

Fig 23

Fig 24

⊙ Cleaning the blade holder

Take down all the parts of blade holder as it is showed in the picture and then clean all the parts separately, especially the following easily polluted parts: the sliding guide, fixed pole, blade clamp and the joint of the parts. And remember to clean the blade clamp every time before installing the blade to ensure good section.

To obtain a high quality section, it is important to keep cleaning the instrument. So the user must clean the instrument periodically or irregularly according to the total sectioning quantity to obtain the best section.

- 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 of instrument 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 which can conveniently remove the waste tissue produced by

slicing.

When prepare suction scraps, please fixed the scrap bag on the sucking joint (Fig 25), and fasten the white tie tightly along the edge to fix firmly. (Fig 26)

Fig 25

Fig 26

Pull off the silica plug of sucking hole as the Fig 27 and properly placed.

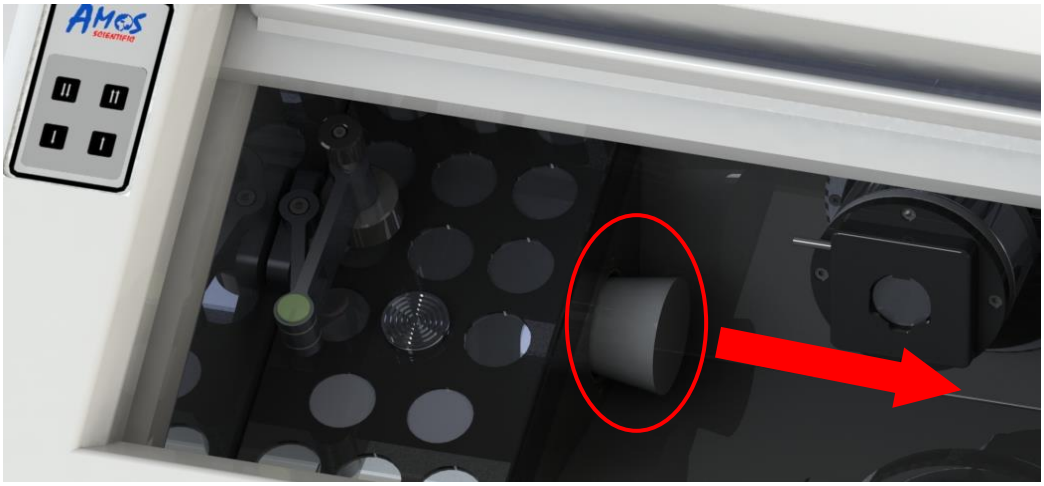

Fig 27

Plug the adaptor with filter bag into the suction hole and keep the two scale line of adaptor (Fig 29) in same level, and fasten it as counterclockwise direction rotation to the end as Fig 28

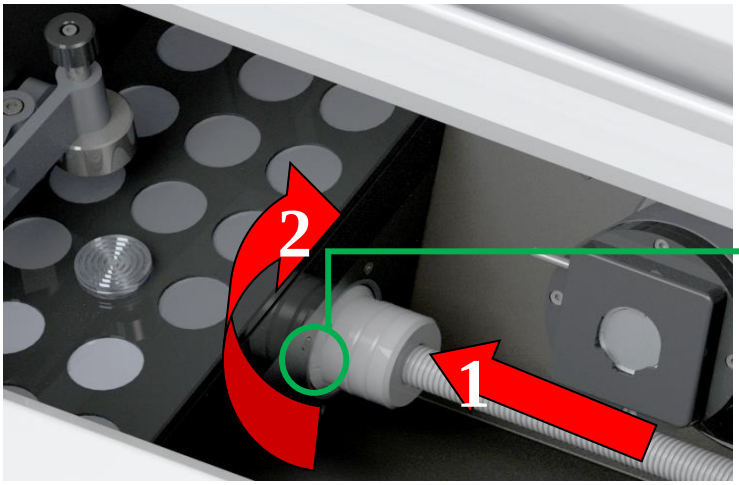

Fig 28

Fig 29

Then click on the icon No. 5 in the interface Figure 11, the icon becomes green and began pumping equipment scrap, move the handheld pipe near the pumping debris, the scraps will be sucked into the scrap bag.

After the scraps have been sucked, click the icon No 5 in the interface Fig 11, the color becomes gray, and the equipment stops the pumping.

After end the chip sucking, clockwise rotation the sucking joint to end firstly, and pull out the sucking joint horizontal direction, then use the silica plug close the sucking hole, remove the scrap bag finally to clean scrap.

During the suction process, if the suction is not enough, please stop it firstly and then removed the scrap bag to clean the waste scraps, or change a new scrap bags to continue 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) . As showed in fig 30.

● 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.

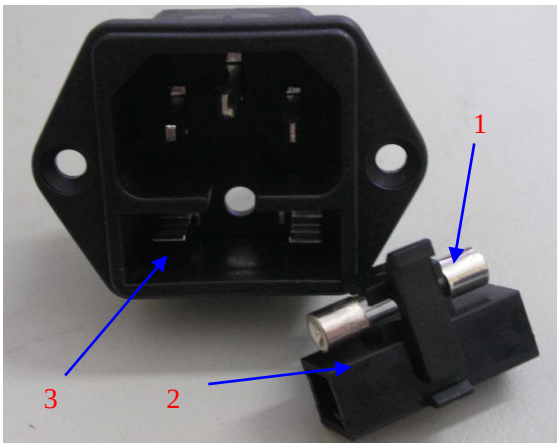

Fig30

6、Trouble Shooting

Below you find a list of the problems that most frequently occur. And they are mostly caused by the operator, 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 on	Mains cable not properly connected or it is break in the circuit	Reconnect the main cable or replace it.
	Mains fuses defective	Replace the fuse.

	The input voltage is not matched with the one showed in the marks	If it is not matched, please call for the professional personnel.
Touch screen no action	Touch screen is locked	Unlock the touch screen by lock key
The section is uneven from the second section	The section angle of the blade is too small.	Alternately thick and thin sections are produced. In extreme case every second section is skipped, being followed by a very thickness. Systematically try wider clearance angle setting until optimum angel width has been found.
	The clamping setting is not steady	Check if all the screw are tightened.
Section curl	The space between anti roll plate and blade is too small or anti roll plate is lower than the blade	Adjust the anti roll plate.
Section soften	The temperature of blade or anti roll plate is too high	Extend the cooling time of blade or anti roll plate.
The section sticks to the blade or anti roll plate	The blade or anti roll plate is polluted	Clean the blade or anti roll plate
Section splinter	Temperature too low for tissue cut	Reduce the cooling time and adjust cryo chamber temperature
The surface of the section is in wave.	The gradient of the blade is not proper.	Readjust the gradient.
•The section flies away and sticks to the microtome or other objects near the microtome	It is affected by static.	Increase the surrounding humidity to get rid of the static.
The blade produces sounds when section , and the section are scratched and show vibrated mark	The gradient of the blade is not proper.	Reinstall the blade and adjust the gradient of the blade.

If there any other troubles cannot be resolved, please contact with the manufacturer.

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