Labotronics

Automatic Microtome

LB-30AM

Index

1. Safety Measures

Precautions:

1) The user should read this user manual carefully before installation and operating the machine.
2) Check your power socket is well grounded.
3) Blade is sharp, beware when you change it.
4) Do not place blade anywhere with the cutting edge facing upwards.
5) Before changing specimens, always lock the hand wheel and cover the knife edge with the knife guard.
6) Do not put instrument under extreme temperature and high air humidity environment. Failure to follow this will cause the instrument severe damage.
7) Ensure to keep the instrument far away from fire.

Notice:

1) Must grasp the specimen before positioning the knife. During the operation, lock the hand wheel and cover the knife edge with its cover sheet.
2) Be most careful when you take the section knife. It is possible to lead to bad hurt because of the sharp cutting edge.
3) User should turn the hand wheel with the same speed during the cutting process. The hand wheel turning speed must suit the hardness of the specimen. Harder specimen use slow speed.
4) Locking hand wheel and covering the knife edge with its cover sheet when changing specimen piece.
5) The instrument should be positioned on the experiment work table level and stable. Preventing it from quakes from the ground, and don't put other equipment which may produce vibration near the instrument.
6) Holding the fore and end trough of the back when moving it, and don't hold the other parts like the hand wheel handle.
7) Periodically cleaning the instrument. Locking the hand wheel before cleaning.
8) Don't use acetone or xylene liquid to clean up the instrument.
9) Make sure that no paraffin comes into the inside of the machine during the cleaning. Follow the safety warnings while using the cleaning solvent.
10) Put the hand wheel on the locking position when turning down the instrument.
11) Electronic parts are repaired by professionals, and other people do not touch them.

Symbols	Explanation
	Protective grounding (earth)
	Check the random file
	Prevent electric shock

2. Introduction

Automatic Microtome LB-30AM offers fully automatic sectioning with adjustable speed. Features precise micro motion specimen feeding system for controlled operation. With precise slide mechanism and groove for high precision. Advanced mechanisms and functions facilitate the operation with high accuracy.

3. Features

1. A high-precision Automatic microtome
2. Fully automatic sectioning with 3 modes
3. Adjustable speed for easy operation
4. LED display for parameters
5. Offers high precision mechanism
6. Large easy-to-clean waste tray

4. Specifications

Model No.	LB-30AM
Section thickness range	0.5 to 100 μm
Section thickness setting	0.5 to 5 μm; 0.5 μm increment 5 to 20 μm; 1 μm increment 20 to 60 μm; 5 μm increment 60 to 100 μm; 10 μm increment
Trimming thickness range	1 to 600 μm
Trimming thickness setting	1 to 10 μm; 1 μm increment 10 to 20 μm; 2 μm increment 20 to 50 μm; 5 μm increment 50 to 100 μm; 10 μm increment 100 to 600 μm; 50 μm increment
Specimen retraction	10 to 150 μm; 1 μm increment
Specimen stroke	Vertical: 60 mm Horizontal: 25 mm
Specimen size	55×45 mm
Specimen orientation	8° on X/Y axis
Display	LED
Power supply	AC 220 V±10%, 50 Hz
Power	30 W
Packaging dimension (W×D×H)	695×525×490 mm
Gross weight	45 kg

5. Applications

Used for slicing thin sections of different specimens, as biopsies for pathological diagnosis, tissue samples of animal and plant, plastic, cork, wood, polystyrene, etc.

6. Instrument Introduction

The instrument mainly consists of the following:

1) Box type specimen clamp
2) Direction movable support for the specimen clamp
3) Fore-and-aft movable knife holder and locking device
4) Removable waste tray
5) Microtome hand wheel and locking device
6) Seat and driven mechanism on it
7) Cover
8) Electronic control system
9) Chromatic LCD touch screen
10) Cassette Clamp

General Overview:

Figure-1

7. Installation

7.1 Working Conditions

1) This instrument is a movable desktop type which can be placed on the experiment stable working table to prevent it from receiving quakes from the ground, and don't install other vibrating equipment around it.
2) Place the instrument with appropriate space around it to ventilate and smoothly rotate the handle.
3) After confirming power with grounding wire (three holes socket), connect the instrument and power socket by attaching wires. Turn on the switch on the back of the instrument and it is in a state of working.
4) This instrument uses single-phase voltage 220V±10% and 50Hz AC power supply. If it does not meet the requirement, it needs to externally connect an AC voltage stabilizer.
5) The instrument should be used at ambient temperature +10℃~+40℃.
6) Environmental relative humidity shall not be more than 80%.

7.2 Parts Adjustment

7.2.1 Specimen holder and orientation system

1) Turning the locking lever to set the specimen holder to the adjustable release condition and section lock status.
2) Turning the two orientation knobs under release condition make specimen holder clamp plane defluxion by pass horizontal axis and vertical axis for ensuring required tangent plane location to decide the required plane cutting location.
3) Turning the adjustable lever to lock and loosen the specimen holder clamp.

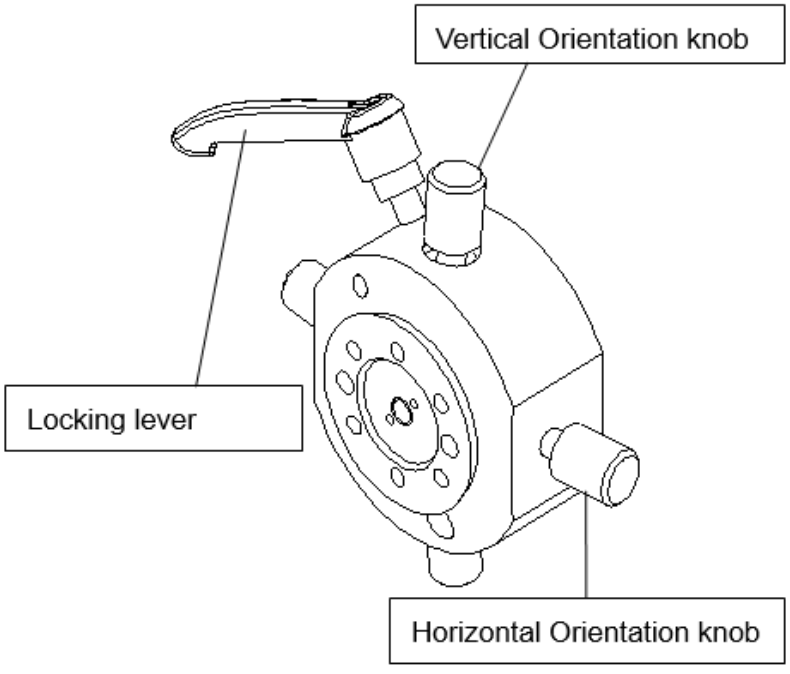

Figure-2

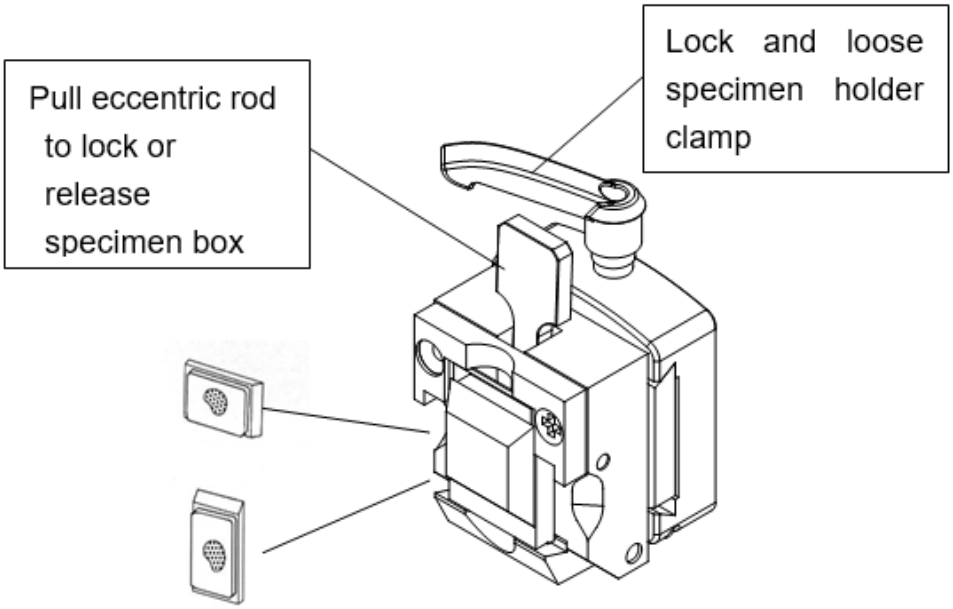

Figure-3

7.2.2 Box shaped specimen clamp

1) Turning the spanner on the specimen clamp can make the jaw in the state of braced and locked.
2) The specimen can be put in or taken off in the state of braced.
3) Specimen box may be placed horizontally or vertically.

7.2.3 Knife holder

1) To turn the adjustable lever under the knife holder to release and lock the knife holder base.
2) In release conditions, you can make the knife holder base do the back and forth movement by hand to choose the latched position needed. There is a scale under the knife holder for reference by location.
3) Use hexagon spanner to turn the eccentric rod in the hole on the right side of the knife holder to release and lock the rotator of the knife holder.
4) In release condition, you can move the rotator by hand to choose locked cutting angle needed. There is a scale on the right side for reference by location.
5) Turn adjustable lever on the rotator to release and lock knife clamp. In release condition, you can make the knife clamp do the left-and-right movement by hand to choose the latched position needed.
6) Turn adjustable lever on the knife clamp to release and lock knife flat.
7) User can put in or take off the knife in release conditions. Take off the knife after finishing the work.
8) The protecting plate shall be in its installed position when the knife is on the knife clamp.

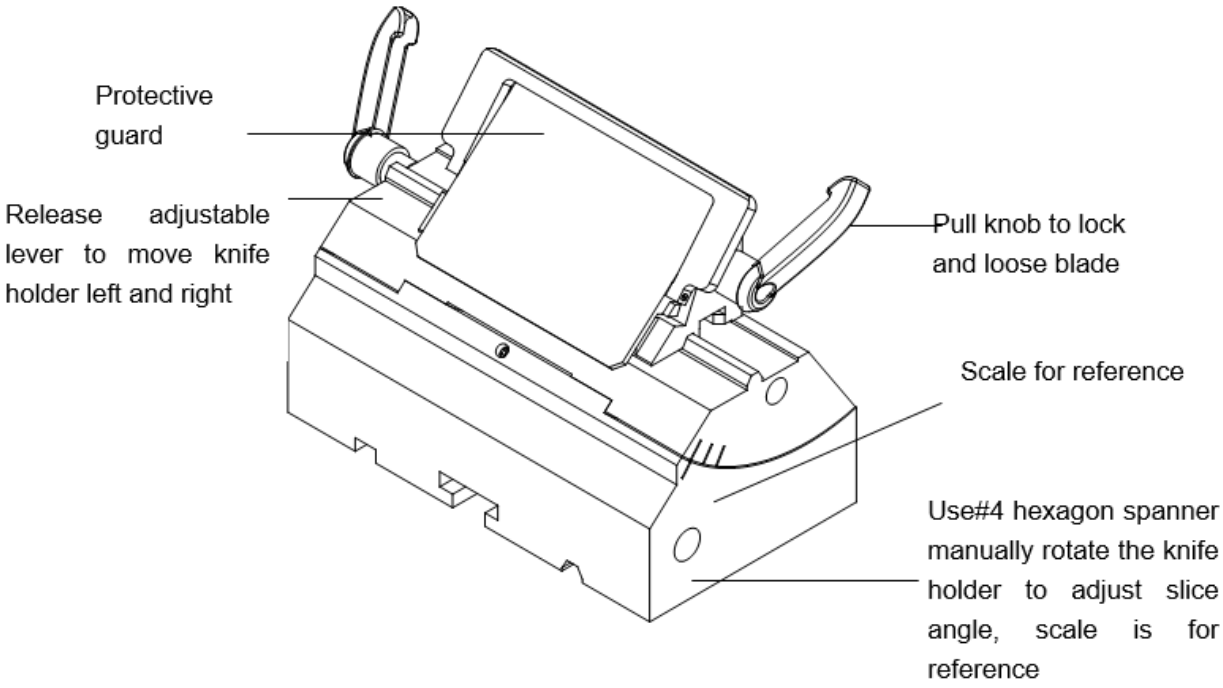

Figure-4

The knife holder can move freely. It can improve the efficiency of the disposable blade.
The user can divide the blade into three parts; A, B, C. It's more effective to use the blade and save the consumables cost.

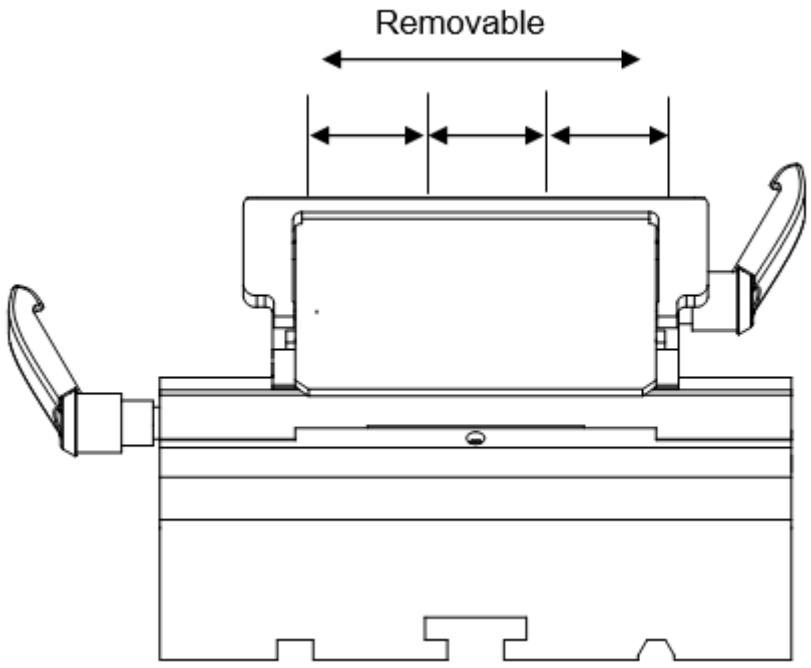

Figure-5

7.2.4 Hand wheel

1) Hand wheel can be released or locked status.
2) Hand wheel can be locked at a specific position when the spanner on the hand wheel is turned.
3) Turn the eccentric rod handle under the hand wheel to lock it at any position. Where there is a solid circle is locked, where there is a hollow circle is rotatable.

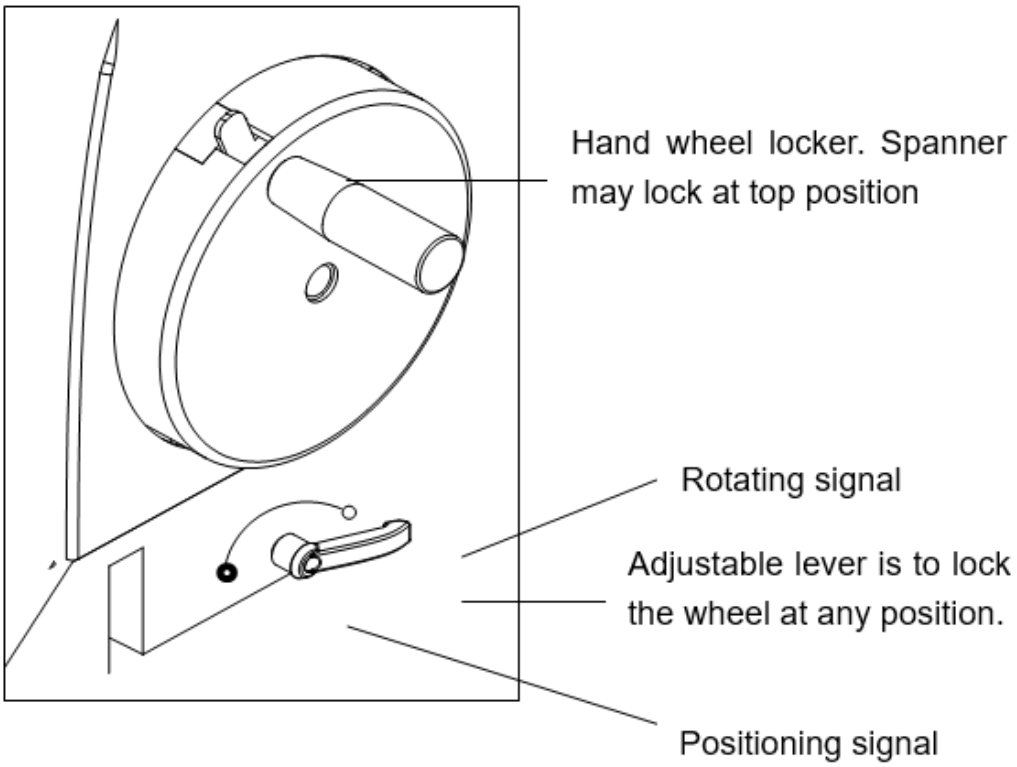

Figure-6

8. Operations

8.1 Turning on

The instrument should be connected to a grounded main power outlet socket. To connect the instrument only by using one of the main cables supplied together with the instrument. Turn on the switch at the rear of the instrument, after the instrument starts, the LCD screen is showing as below:

Figure-7

8.2 Operation for LCD touch screen

8.2.1 Total amount of cutting times and thickness

Press "**Menu Mode**" to switch displayed number between the total amount of cutting times (∑n) and the total amount of thickness (∑um). It shows the present mode the user chooses by turning on the blue light after it. Press "**clear**" to reset.

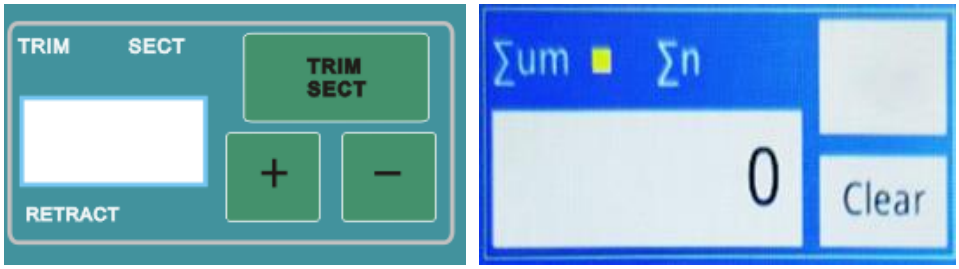

Figure-8

8.2.2 How to set the section/trimming thickness

"TRIM SECT"—— Switch mode between trim and section
"SECT" —— Section thickness
"TRIM" —— Trimming thickness
Press "+" and "-" to increase or decrease the setting thickness.

8.2.3 Settings for retraction

Unit enables retraction function; retracting value is from 0 to 150um adjustable.
Follow the following steps to set this function:

1) Press **"TRIM SECT"** on the screen for 2 seconds until the yellow cursor goes to **"RETRACT".**
2) Press **"+"**, **"-"** to set the retracting value.
3) When done settings, press **"TRIM SECT"** until the yellow cursor goes back to **"TRIM SECT".**

8.2.4 Movement of the specimen clamp

Figure-9

Lower half for the LCD screen is the touching area:

1) **"↑↑" Fast back:** Press it once and the cassette clamp moves back at a speed of 60mm/min and will stop at the limit while the blue light stays lit. Press the button again to stop moving.
2) **"↑" Back:** Press on it and the cassette clamp moves back at a speed of 30mm/min and stops when the pressure is gone. The blue light on the left top of the button flickers during movement and stays lit when moved to the limit.
3) **"↓↓" Fast forward:** Press it once and the cassette clamp moves forward at a speed of 60mm/min and will stop at the limit while the blue light stays lit. Press the button again to stop moving.
4) **"↓" Forward:** Press on it and the cassette clamp moves forward at a speed of 30mm/min and stops when the pressure is gone. The blue light on the left top of the button flickers during movement and stays lit when moved to the limit.

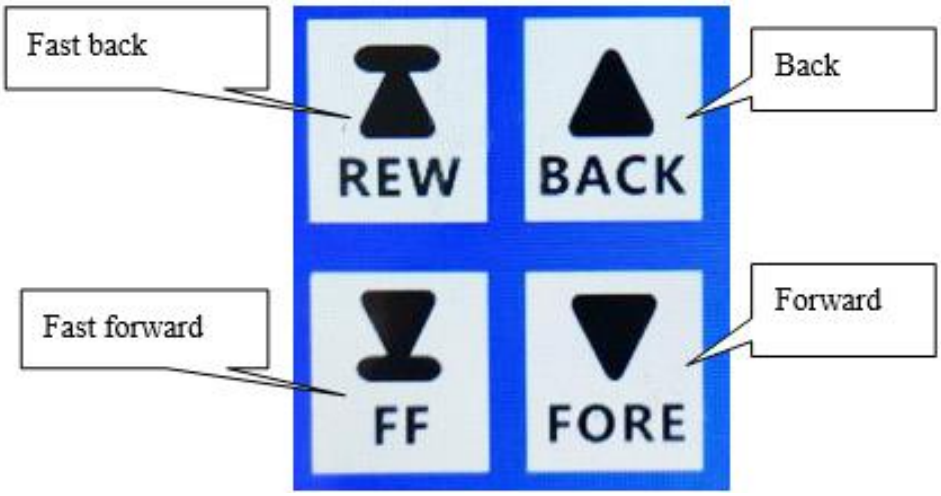

Figure-10

How to choose a language

- Unit enables the display in English.
- Press **"English"** for 2 seconds until the language changes.

8.3 Operating instructions for sectioning and trimming

4) Put the paraffin-embedded specimen into the specimen holder of the microtome. Then rotate to fix it to the lock lever. The specimen is fixed with the clamping properly.
5) Put the disposable blade into the knife holder (Lock the handwheel first), face the cutting point to the specimen.
6) Adjust the section thickness and trimming thickness according to the need.
7) Rotate the handwheel. Rotate a circle for cutting one piece; continuous rotation for getting continuous pieces. On LCD screen ∑n, ∑um (press "**Menu Mode**" to switch) can show you the total section thickness and the total numbers.
8) Stop shaking the handwheel and lock the lever. Put the sections into the tray carefully with the forceps.
9) After section, clean up the microtome promptly. Keep the knife and holder tidy.

8.4 Rock-cutting operation

1) Press **"ROCK"** button, it would be rock-cutting state when there is a yellow light on the button.
2) On the position of 12 o'clock and 6 o'clock of the handwheel, it is forward by clockwise, and backward by anticlockwise.
3) **Switch of manual and automatic:** The button **"Manual Auto"** is for switching between manual and automatic.

8.5 Automatic operation

8.5.1 Selection of automatic operation models

1) Press **"CUT MODE"** button to select operation models before automatic operation, there is a yellow light showing model state.
2) **CONT:** Continuous operation after microtome switched on, press "**RUN STOP**" to stop it.
3) **SINGLE:** Single operation, one press of "**RUN STOP**" one time of operation. Then stopped.
4) **STEP:** "**RUN STOP**" for operation for one time, then stopped. The light flicking in "**STEP**". Press "**CUT MODE**" of the step switch once, the microtome cuts once more. "**RUN STOP**" for quit.
5) **RUN AND STOP:** Press "**RUN STOP**" button for 3 seconds(all three yellow indicators were on), the machine operates automatically. Repress "**RUN STOP**" to stop it.

8.5.2 Selection of cutting speed

Press "+" and "-" to select cutting speed. Selection range is 100%-10%. When speed was 100%, it was about 60 pcs/s. There is a speed percent index above the button.

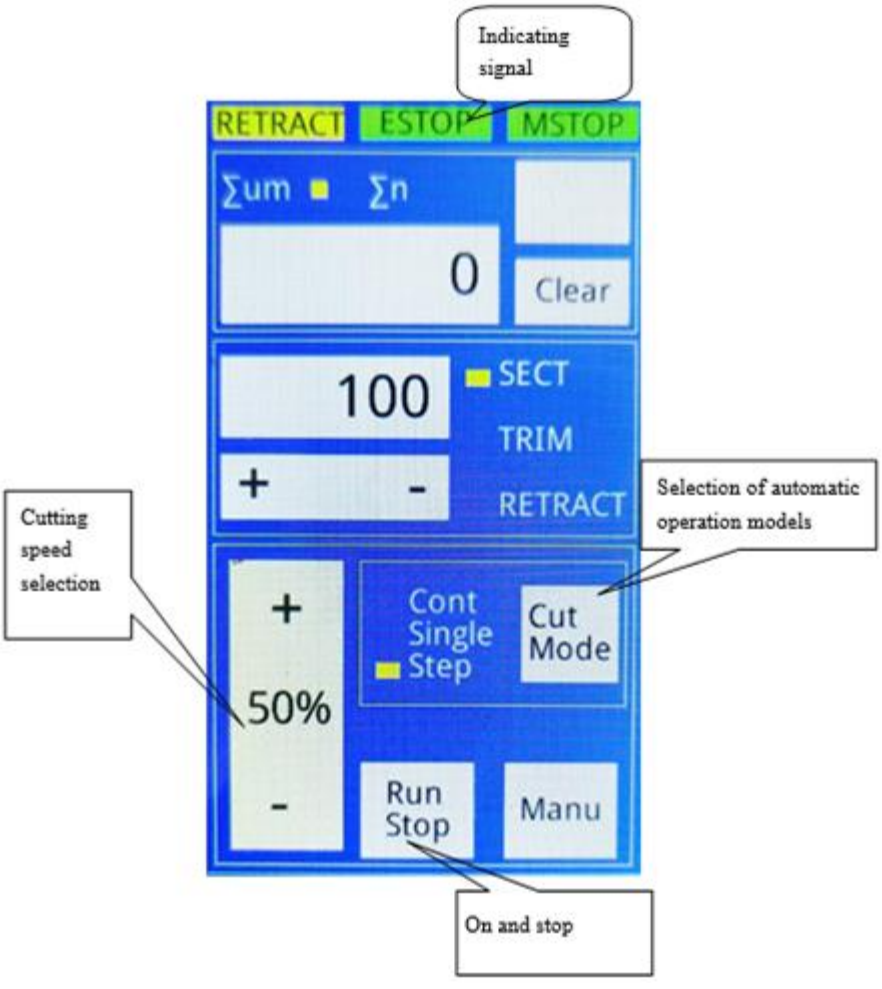

Figure-11

8.5.3 Indicating signals

On top of the working menu, there are 3 indicating signals:

1) **RETRACT:** Retracting signal and indicates retracting when becomes orange.
2) **ESTOP:** Emergency signal and indicates functions disabled when it becomes red. Clockwise rotate the "**emergency stop button**" to shut ESTOP down, then the unit can be turned on normally.
3) **M-STOP:** Locking signal for handwheel, and indicates the handwheel is locked and functions are disabled when becomes jacinth. Unlock the handwheel to go back to normal.

9. Maintenance

9.1 Cleaning up the instruments

9.1.1 Conduct the following steps before cleaning each time:

1) Turn up the specimen grip to the top and lock the hand wheel.
2) Release the specimen grip and pull it out.
3) Pick off the knife from the knife holder and put it back in the knife box.
4) Dismount the knife holder and its seat to clean up.
5) Take down the specimen from the specimen nip. Clear away the section waste with dry brush.
6) Take down the specimen grip to clear up separately

9.1.2 Instruments and external surface:

1) If necessary, the external painted surface can be cleaned with light-duty commercial housework cleaner or suds. And then use a wet cloth, rub it until dry.
2) User may use a substitute of xylene, paraffin oil, or paraffin scavenger to erase residual.
3) The instruments must be dry when used again.

9.1.3 Knife holder

According to the following steps to clean up the knife holder if it had been dismounted.

1) Downwardly turn over the cutting edge cover sheet.
2) Turn the eccentric rod handle in the lateral of the body of revolution and draw it out from sideward.
3) Push the knife clamp back, which has the knife clip, and shift it out from the rotary unit.
4) Turn the eccentric rod handle in the lateral of the knife clap and draw it out from the side.
5) Dismount the knife clamp. Clean up all parts of the knife holder.

Don’t use xylene or alcoholic liquid (e.g: glass cleaner) when cleaning up the paraffin.

6) Make the knife holder dry and assemble it.
7) Apply a thin layer of lubrication after cleaning up the parts which had been taken off.
8) When fixing the knife clip, make sure that its upper part is parallel with the back edge of the knife clamp seat.

9.1.4 Box shaped specimen grip

1) Dismount the box-shaped specimen grip to clear away the residual paraffin.
2) Don't use xylene or alcoholic liquid to clean up. Use the substitute of xylene or paraffin scavenger.
3) User can put the box-shaped specimen grip into the oven to heat it to 65°C until lipid paraffin bleeds off. Wipe off paraffin with dry cloth.
4) Apply oil to the axis grasping joystick after using the oven heating method.

9.2 Lubricate instruments

Do oil lubrication for the following parts monthly. (1~2 drop is well enough)

Instruments and specimen holder

1) Grip draw in the clamp.
2) Lock in iron at the **"T"** knife clap back of the microtome bedplate.
3) The knife holder slides on the microtome bedplate.

Knife holder

1) Lock in iron at the **"T"** body of the rotary units on the knife clamp seat.
2) The knife control grip is shifted to the eccentric rod handle.
3) The iron locking head on the knife clamp of the **"T"** body of the rotary unit and the knife holder with the slide way.
4) The grasping joystick of the knife.

Box shaped specimen grip: The bearing of the grasping joystick.

10. Troubleshooting

There are normal problems in the following table, which are likely to happen when the instrument is used. Besides, some possible causes lead to these problems and solving methods.

Trouble	Reason	Solving Methods
Possible phenomena		
The section is uneven. The thin and thick sections are alternated, even if it doesn't cut away.	The knife centre gripping is improper.	Fasten knife again.
	Knife is dull	Move the knife holder laterally or stick in a new knife.
	Pressure plate is broken or adjustment isn't right. The cutting angle of the knife is too low.	Change the new holder plate, or use a new knife holder.
The section is congestion and compressive. The sections congestion. There is the phenomenon of crease and nip.	Knife dull	Use the other part of the knife or a new one.
	Specimen temperature is high. Cutting speed so fast.	Make the specimen cool before cutting. Reduce the cutting speed.
There is fringe in the section.	On the pressure plate, the paraffin is filling up on back of the knife holder.	Clear up this regional paraffin.
There is noise when cutting. The knife will shake and sound when cutting a hard specimen. There is a pull or slightly frictional make on the knife.	Cutting speed too fast.	Turn hand wheel at a rather low speed.
	The cutting angle is too big.	Decrease the cutting angle gradually until you find the optimum one.
	Clip of specimen or knife not fixed.	Check all the screwed and jaw connection in the specimen rest and knife holder system. If necessary, fixture the control rod and screw.
Instrument failure		
No section is cut when turning the hand wheel.	The specimen has reached the extreme position.	Press **"back"** key to make the specimen backward and so the knife holder.
Knife service time is short.	The power for the section is too strong.	Adjust the cutting speed or the section thickness in the process of cutting. Choose smaller section thickness or slow down speed of turning hand wheel.